

# **Interdisciplinary MPH Program**

## **Student Handbook**

### **2021-22**

Berkeley Public Health

UNIVERSITY OF CALIFORNIA BERKELEY  
SCHOOL OF PUBLIC HEALTH

## EMERGENCY CONTACTS

**Emergency response:** Dial 911 from any phone (on or off campus) to report an imminent threat to life or property.  
**From a cell phone,** dial direct for faster emergency response:

- UC Berkeley Police: **(510) 642-3333**
- City of Berkeley Police/Fire: **(510) 981-5911**
- Alameda County Sheriff: **(510) 667-7721**

### Emergency information

Campus emergency information line: **(800) 705-9998**

During an emergency, this recorded message will be updated with the latest information.

Campus radio station: **KALX (90.7 FM)**

City of Berkeley emergency broadcast station: **1610 AM**

### Non-emergency contact numbers

- UC Berkeley Police: **(510) 642-3333**
- City of Berkeley Police: **(510) 981-5900**

STUDENTS	
Life threatening emergency	Go to the nearest hospital emergency department or call 911 (on-campus or off-campus) if an ambulance is needed. The closest hospital emergency room to campus is <a href="#">Alta Bates Hospital, 2450 Ashby Ave, just east of Telegraph Ave</a> .
Urgent: Medical Problem	<p><b>When Tang is Open:</b> Come directly to <a href="#">Urgent Care</a> at the Tang Center. Urgent Care parking and entrance is located on Durant Avenue between Fulton and Ellsworth Streets. Tang is open</p> <p><b>When Tang is Closed:</b> If you have an urgent medical problem that cannot wait until the Tang Center is open: Call After Hours Assistance Line at (510) 643-7197 for immediate assistance. If you need to speak with a counselor urgently, call the 24/7 counseling line at (855) 817-5667. SHIP members may contact the Aetna 24/7 nurse line at (800) 681-4065.</p> <ul style="list-style-type: none"><li>● Find a local <a href="#">Urgent Care Center</a> with extended hours</li><li>● See <a href="#">After Hours Assistance</a> for information on emergency contraception, dental emergency, pharmacy refills, more.</li><li>● find a local emergency room (The closest hospital emergency room is to campus is <a href="#">Alta Bates Hospital, 2450 Ashby Ave, just east of Telegraph Ave</a>.)</li></ul> <p><i>Please note:</i> care may be at your own expense; emergency room care typically cost significantly more than urgent care centers.</p>
Urgent: Mental Health Concerns	<p><b>Although, CPS and Social Services operate on an appointment basis, a student may face an urgent concern or crisis that feels too overwhelming to wait for a scheduled appointment.</b></p> <p><b>During Business Hours</b> <b>Counseling and Psychological Services</b> Come to Counseling and Psychological Services on the 3rd floor of the Tang, for in-person crisis assessment and intervention. Please inform a staff member at the reception desk that you have an urgent concern. Wait-times vary depending on the time of the day, but CPS counselors will see all students in crisis on the same day they come in. You can call CPS at (510) 642-9494.</p> <p><b>Social Services</b> For urgent concerns related to sexual assault, IPV, pregnancy, disordered eating, or alcohol and other drugs contact Social Services at (510) 642-6074 for in-person crisis assessment and intervention. Please inform a staff member at the reception desk that you have an urgent concern.</p> <p><b>When Tang is Closed:</b> Call our After Hours Support line at (855) 817-5667. .</p>
Sexual Assault	<ul style="list-style-type: none"><li>● In the event that you or someone you know is sexually assaulted, please do the following:<ul style="list-style-type: none"><li>● Get to a safe place first.</li><li>● Do not shower or change your clothes.</li><li>● Call someone you would like to have with you.</li><li>● Call the police if you decide to report the assault and they will accompany you to the hospital for medical care.</li><li>● If you are not ready to speak to the police, call the UHS Advice Nurse (510) 643-7197 to determine the best plan for taking care of yourself. (When Tang is closed, call Bay Area Women Against Rape: (510) 845-7273.)</li><li>● Contact Social Services at UHS for follow-up counseling or other assistance, (510) 642-6074</li></ul></li></ul>
Interpersonal Violence (Domestic Violence)	<ul style="list-style-type: none"><li>● When Tang is Open: Get immediate medical attention. Come to Urgent Care at Tang. Urgent Care parking and entrance is located on Durant Avenue between Fulton and Ellsworth Streets.</li><li>● When Tang is Closed: Get immediate medical attention. Call campus police at (510) 642-3333 or your local police for assistance. For referrals to local resources call the After Hours Assistance line at (510) 643-7197.</li></ul>



*University of California, Berkeley  
School of Public Health  
2121 Berkeley Way, Room 5302  
Berkeley, CA 94720*

*publichealth.berkeley.edu*

Dear Interdisciplinary MPH Class of 2022:

Congratulations again on your acceptance to the Interdisciplinary MPH program at the School of Public Health, UC Berkeley. We are looking forward to a productive year of learning with you!

No better time to become a public health leader than in 2021!

This will be a year full of challenges and new realities for all of us, hopefully better ones than for most of 2020. We will start with online classes through the summer, and hopefully will be back on campus in the fall, as the country, California and the Bay Area is fighting the COVID-19 epidemic with increasing success.

We are all working hard to ensure that all students continue to thrive in an abundant academic environment not only within the School of Public Health, but also the larger UC Berkeley campus. The richness of the UC Berkeley community lies not only in its courses and faculty, but you will find that some of the most important educational lessons and connections will come from your many talented classmates. The Black Lives Matter movement inspires all of us, and the school is looking forward to continue its advocacy and integrate anti-racism training into the school-wide curriculum.

The Interdisciplinary Program core faculty are looking forward to getting to know each of you soon, and we are committed to your success both during the year at UCB and after you graduate. Feel free to reach out to us with any questions to [ipmph@berkeley.edu](mailto:ipmph@berkeley.edu) or [ahemmerling@berkeley.edu](mailto:ahemmerling@berkeley.edu)

Best wishes,

A handwritten signature in black ink that reads "Anke Hemmerling". The signature is fluid and cursive, with a distinct "A" at the beginning.

Anke Hemmerling, MD, PhD MPH  
Director, Interdisciplinary MPH Program, UC Berkeley School of Public Health  
UCSF Bixby Center for Global Reproductive Health  
Email: [ahemmerling@berkeley.edu](mailto:ahemmerling@berkeley.edu)

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# 2021-22 BERKELEY ACADEMIC CALENDAR

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## 2021 Fall Semester

Fall Semester Begins	Wednesday, August 18, 2021
Convocation	To Be Determined
Instruction Begins	Wednesday, August 25, 2021
Academic and Administrative Holiday	Monday, September 6, 2021
Academic and Administrative Holiday	Thursday, November 11, 2021
Non-Instructional Day	Wednesday, November 24, 2021
Academic and Administrative Holiday	Thursday, November 25 & Friday, November 26, 2021
Formal Classes End	Friday, December 3, 2021
Reading/Review/Recitation Week	Monday, December 6–Friday, December 10, 2021
Last Day of Instruction	Friday, December 10, 2021
Final Examinations	Monday, December 13–Friday, December 17, 2021
Fall Semester Ends	Friday, December 17, 2021
Winter Commencement	To Be Determined, commencement.berkeley.edu
Academic and Administrative Holiday++	Friday, December 24 & Monday, December 27, 2021
Academic and Administrative Holiday++	Friday, December 31, 2021 & Monday, January 3, 2022

## 2022 Spring Semester

Spring Semester Begins	Tuesday, January 11, 2022
Academic and Administrative Holiday	Monday, January 17, 2022
Instruction Begins	Tuesday, January 18, 2022
Academic and Administrative Holiday	Monday, February 21, 2022
Spring Recess	Monday, March 21–Friday, March 25, 2022
Academic and Administrative Holiday	Friday, March 25, 2022
Cal Day	To Be Determined, calday.berkeley.edu
Formal Classes End	Friday, April 29, 2022
Reading/Review/Recitation Week	Monday, May 2–Friday, May 6, 2022
Last Day of Instruction	Friday, May 6, 2022
Final Examinations	Monday, May 9–Friday, May 13, 2022
Spring Semester Ends	Friday, May 13, 2022
Commencement	Saturday, May 14, 2022
Academic and Administrative Holiday	Monday, May 30, 2022

## 2022 Summer Sessions

First Six-Week Session Begins	Monday, May 23, 2022
Academic and Administrative Holiday	Monday, May 30, 2022
Ten-Week Session Begins	Monday, June 6, 2022
Eight-Week Session Begins	Monday, June 20, 2022
First Six-Week Session Ends	Friday, July 1, 2022
Academic and Administrative Holiday	Monday, July 4, 2022
Second Six-Week Session Begins	Tuesday, July 5, 2022
Three-Week Session Begins	Monday, July 25, 2022
Ten-Week Session Ends	Friday, August 12, 2022
Eight-Week Session Ends	Friday, August 12, 2022
Three-Week Session Ends	Friday, August 12, 2022
Second Six-Week Session Ends	Friday, August 12, 2022

**PROGRAM DESCRIPTION**  
**UC Berkeley School of Public Health**  
**Interdisciplinary MPH Program**

## OVERVIEW

The Interdisciplinary MPH is an accelerated, 11-month program designed to meet the needs of mature scholars with diverse cultural and professional backgrounds who have specific public health career goals in mind. The program focuses on an interdisciplinary understanding of complex issues and the leadership challenges of successful interventions in public health. Graduates leave as well-rounded public health professionals with a heightened understanding of the importance of a multidisciplinary approach to public health practice.

The class size ranges between 20 and 30. Originally dominated by mid-career physicians, the program now accepts senior medical students, residents, and fellows. In addition, we also actively recruit applicants with a range of professional background who hold a master's degree or the equivalent, and who have significant health care experience or interest in public health. Applicants from the fields of journalism, business, social work, anthropology, economics, law, and others are encouraged if their future career paths include public health activities and/or significant interaction with public health systems.

The Interdisciplinary Program's curricular flexibility allows successful applicants, in consultation with their faculty advisers, to develop an individualized course of study tailored to meet their needs. In addition to the required courses at the School of Public Health, elective courses may be chosen from any of the academic offerings across the Berkeley campus. A mentored MPH project, to be conducted throughout the year, is required for completion of the program.

## MISSION

The mission of the 11-month program is to offer our students the opportunity to gain a professional skillset that will allow them to take on the most pressing public health challenges. These skills will be taught in required courses, electives, and small group seminars that run throughout the year. The goal is for students to apply these skills as they develop, implement, and disseminate a final MPH project. The Interdisciplinary Program core faculty are committed to student success during the year and after graduation.

## COMMITMENT TO ANTI-RACISM

At Berkeley Public Health we strive to create an anti-racist learning environment and commit to teaching this course, to the best of our ability, with an antiracist, racial justice, and equity-minded lens. We invite you to take this journey with us by being fully present. We are interested in your perspectives and in the value and knowledge you bring to help make this an enriching classroom environment.

We view this syllabus as a dynamic document oriented toward learning and not just coverage of material; thus, we may add or modify topics covered, assignments, and resources (e.g., required readings/videos) slightly based on the needs and interests of students in the course. We welcome feedback and input at any time and invite careful reflection of any modifications that may help improve the course in the future.

As your instructor team, we agree that:

- Course content will include relevant information pertaining to BIPOC communities (e.g., readings; films; speakers; data, etc.)
- Students are the experts of their own experiences. Your world lens is welcomed; and as students, you are invited to lift up information and/or data that is relevant to the course material. Everyone is a teacher and everyone is a student.
- We cannot speak on behalf of all groups, or fully understand the issues, concerns and history of all BIPOC. However, we are willing to listen and learn, admit mistakes and engage in ongoing cultural humility practices.

## CURRICULUM REQUIREMENTS

The curriculum for the Interdisciplinary MPH Program is an intensive, full-time program. Students in the program are required to complete 42 semester units of course credit between July and May. Students are expected to start their studies by enrolling in the Summer Session prior to the Fall Semester in which they enter the program. After completing one or two summer courses (3-8 units), students take a heavy course load (17-19 units per semester), in order to satisfy the 42-unit requirement. Consequently, students should not plan to work during the semester, and should make every effort to minimize work-related responsibilities while at school.

We advise students to enroll in the six-week Summer Session D courses on Epidemiologic Methods (PH 250A) and /or the Introduction to Biostatistics (PH 142). This will reduce their course load to manageable levels in the Fall and Spring semesters. Students with previous biostatistics or epidemiology experience may take both summer courses provided that they can make a full-time commitment to coursework beginning in early July. Students who have taken rigorous or advanced epidemiology or biostatistics in the past are encouraged to take the exemption exams in epidemiology and biostatistics in late August. Passing out of a course, however, does not decrease the 42-unit requirement for graduation.

Students are required to attend a one-unit Interdisciplinary Summer Seminar during which they will begin to develop ideas for their year-long MPH project. The course number is PH 292. Students should enroll in this course for one unit with the LETTER GRADE grading option.

The Interdisciplinary MPH core requirements consist of nine courses totaling 24 units. These include:

### BIOSTATISTICS

PH 141, or PH 142, or PH 245, or PH 252 (4-5 units)

There are several ways to satisfy the Biostatistics requirement:

1. Take PH 142 (Intro to Biostatistics) in the Summer (strongly recommended);
2. Take PH 142 (Intro to Biostatistics) in the Fall;
3. Take PH 245 (Intro to Multivariate Statistics) in the Fall;
4. Take PH 252 (Epidemiological Analysis) in the Spring
5. Take and pass the Biostatistics exemption exam during welcome week before the Fall Semester begins. *If passing the exemption exam, a total of 42 units is still required for graduation.*

### EPIDEMIOLOGY

PH 250A (3 units) or PH 250B (4 units)

There are several ways to satisfy the Epidemiology requirement:

1. Take PH 250A (Epidemiological Methods I) in the Summer (strongly recommended) or Fall;
2. Take PH 250B (Epidemiological Methods II) in the Fall.
3. Take and pass the epidemiology exemption exam during welcome week before the Fall Semester begins. *If passing the exemption exam, a total of 42 units is still required for graduation.*

## BREADTH COURSES

PH 200J – Health Policy and Management (2 units): in the Fall Semester

PH 200L – Health and Social Behavior (2 units): in the Fall Semester

PH 200K – Environmental Health Sciences (2 units): in the Spring Semester

NEW:

PH 291A - Preparation for Public Health Practice (or PH W289 or PH 223C as equivalent)

## INTERDISCIPLINARY PROGRAM SEMINAR SERIES

PH 292 (1) – Summer Interdisciplinary Seminar (1 unit)

PH 292 (12) – Fall, 4 units, and PH 292 (7) – Spring, 4 units: a full-year course designed to enhance knowledge and practice skills and to provide guidance and mentorship in the development and implementation of a culminating MPH Project.

The one-year Interdisciplinary MPH Program requires completion of a research project (this is an MPH Project, *not* a thesis). Projects may take a variety of forms including community-based projects, research studies, needs assessments, program evaluations, analyses of secondary data, or policy analyses. Projects are presented at the end of the Spring Semester in written and oral formats and fulfill the School of Public Health Comprehensive Exam requirement.

The oral presentation and written paper for the MPH project satisfy the Public Health Practice and Comprehensive Examination requirements for the degree. A four-unit class is the equivalent of 180 hours or work per semester (45 hours per unit) – about 10-15 hours of work a week dedicated to your MPH research project.

We also recommend that you take PH 291, the Preparation for Public Health Practice Workshop Series, a one-unit course offered by the Center for Public Health Practice with a S/U grading option only. The remaining 19-20 units are available for electives that may be used to customize a curriculum that fits your career-building needs. Up to four units from previously completed graduate coursework may also be applied towards the 42 units, subject to ‘rules for transfer units’ and approval from Graduate Division. Curricular requirements are summarized below.

## **SCHOOL OF PUBLIC HEALTH SPECIALTY AREAS**

While taking electives towards the MPH, students may also simultaneously complete a Specialty Area, or minor, in a particular area. Specialty Areas draw faculty and students across many areas of study. They require that students complete nine units of specific courses and electives. The School offers the following specialty areas of study:

- Aging
- Global Health
- Maternal and Child Health
- Multicultural Health
- Public Health Nutrition

Please refer to the School of Public Health website for more information about the Specialty Areas:

<http://sph.berkeley.edu/graduate-degrees/specialty-areas>

***University of California, Berkeley – School of Public Health***  
***Interdisciplinary MPH Program***  
**CURRICULUM**  
**2021-22**

The curriculum for the Interdisciplinary MPH program is an intensive, full-time program. The 42-unit program requires completion of at least 17 units of coursework in each of the Fall and Spring Semesters. In order to meet the 42-unit requirement, students are also expected to enroll in the summer session prior to the Fall Semester in which they enter the program. Up to four units from previously completed graduate coursework may also be applied towards the 42 units, subject to ‘rules for transfer units’ and approval from Graduate Division. Curricular requirements are summarized below. The one-year program also requires completion of a **community-based research project (this is an MPH Project, not a thesis)**. Projects may take a variety of forms including research studies, needs assessments, program evaluations, analyses of secondary data, or policy analyses. Projects are presented at the end of the Spring Semester in written and oral formats and fulfill the School of Public Health Comprehensive Exam requirement.

**Bolded type** denotes courses that are required by the School of Public Health and the Interdisciplinary MPH Program.

***Recommended 1-year Interdisciplinary Course Selection (ALL MUST BE TAKEN FOR A LETTER GRADE EXCEPT WHERE NOTED):***

SUMMER SEMESTER

<b>PH 250A</b>	Epidemiological Methods I	3 units
<b>PH 142</b>	Introduction to Biostatistics	4 units
<b>PH 292</b>	Summer Interdisciplinary Seminar	1 unit

FALL SEMESTER

<b>PH 142</b>	Intro to Probability & Statistics in Biology & PH (if summer PH142 not taken)	4 units
<b>PH 200J</b>	Health Policy and Management Breadth Course (half semester)	2 units
<b>PH 200L</b>	Health and Social Behavior Breadth Course (half semester)	2 units
<b>PH 292</b>	Interdisciplinary Seminar	4 units
<b>PH 250A or</b>	Epidemiologic Methods I	3 units
<b>PH 250B</b>	Epidemiologic Methods II	4 units

(Note: PH 250A and/or 250B not needed if PH 250A was taken in summer)

<b>PH 291A</b>	NEW: Preparation for Public Health Practice (or PB W289, PB 223C as equivalent)	2 units
Electives (to be chosen by student)***		4-7 units

SPRING SEMESTER

<b>PH 292</b>	Interdisciplinary Seminar	4 units
<b>PH 200K</b>	Environmental Health Sciences Breadth Course	2 units
<b>PH 291A</b>	NEW: Preparation for Public Health Practice (or PB W289, PB 223C as equivalent)	2 units
Electives (to be chosen by student)*** (For examples, see below)		11-14 units

\*\*\* Electives are chosen in collaboration with Faculty Advisor, customized to provide the skills for each student's desired career path. Students must have approval of their faculty advisor for elective courses taken outside the School of Public Health.

**TOTAL NUMBER OF UNITS REQUIRED FOR THE 11-MONTH MPH PROGRAM:** **42 units**

## **EXAMPLES OF SCHOOL OF PUBLIC HEALTH ELECTIVES:**

(see <http://catalog.berkeley.edu> for complete selection)

*Note: there are no restrictions on where you take your electives as long as they are on the Berkeley campus. You can take electives in other UC Berkeley schools and departments such as Business, Public Policy, Demography and Anthropology, or any other department subject, to approval from that department and from the student's faculty advisor. A limited number of electives for upper division undergraduate students may also be taken.*

### **Fall Electives**

PH 201E	Public Health Interventions: Theory, Practice and Research (3 units)
PH 204A	Mass Communication and Public Health (3 units)
PH 204D	Community Organization and Community Building for Health (3 or 4 units)
PH 204E	Multicultural Competence in Public Health (3 units)
PH 206A	Nutrition Status, Physical Activity, and Chronic Conditions (3 units)
PH 206C	Nutritional Epidemiology (3 units)
PH 210B	Adolescent Health (3 units)
PH 210C	Needs Assessment in Maternal and Child Health (3 units)
PH 212A	International Maternal and Child Health (2 units)
PH 213A	Family Planning, Population Change, and Health (3 units)
PH 216A	Biological Embedding of Social Factors (3 units)
PH 217A	Aging and Public Health (3 units)
PH 220F	Healthy Workforce and Public Policy (2 units)
PH 223A	Introduction to the Healthcare System (3 units)
PH 224A	Health Organizations and Management (3 units)
PH 226A	Health Economics (3 units)
PH 226D	Global Health Economics (3 units)
PH 235	Impact Evaluation for Health Professionals (3 units)
PH 245	Introduction to Multivariate Statistics (3 units)
PH 252C	Intervention Trial Design (3 units)
PH 252D	Introduction to Causal Inference (3 units)
PH 253C	Overview of AIDS Epidemic (3 units)
PH 255C	Mental Health and Psychopathology (3 units)
PH 257	Outbreak Investigation (1, 3 units)
PH 260A	Principles of Infectious Disease (3 units)
PH 263	Public Health Immunology (3 units)
PH 264	Current Issues in Infectious Disease (2 units)
PH 270B	Toxicology (4 units)
PH 282	Topics in the History of Medicine and Public Health (3 units)
PH 285A	Public Health Injury Prevention and Control (3 units)
PH 285A	Public Health Injury and Control (2 units)
PH 290 (2)	Health Issues Seminar: Social Justice and Worker Health (1-4 units)
PH 290 (4)	Health Issues Seminar: Health Communications in the Digital Era (1-4 units)
PH 290 (5)	Health Issues Seminar: Behavior Change in Adolescence (1-4 units)
PH 290 (6)	Health Issues Seminar: Healthcare Quality (1-4 units)
PH 290 (7)	Health Issues Seminar: Implementing Health Reform (1-4 units)
PH 291A	Preparation for Public Health Practice
PUB POL 260	Public Leadership and Management (3 units -Note: special enrollment procedures)

## **Spring Electives**

PH 144	Introduction to SAS Programming (2 units)
PH 200A	Current Issues in Public Health Ethics – Research and Practice (3 units)
PH 202E	Ethnic and Cultural Diversity in Health Status and Behavior (3 units)
PH 205	Planning, Development and Evaluation (3 units)
PH 212E	Private Sector Health Care in Developing Countries (2 units)
PH 212D	Global Health Core Course, Part 2 (2 units)
PH 217D	Biological and Public Health Aspects of Alzheimer's Disease (3 units)
PH 218B	Evaluation of Health and Social Programs (4 units)
PH 219A	Advanced Methods: Qualitative Research (3 units)
PH 219C	Community Based Participatory Research in Health (3, 4 units)
PH 219E	Introduction to Qualitative Methods in Public Health Research (2 units)
PH 223C	Strategic Management and Organization of Health Services (2-3 units)
PH 223F	Effective PH Negotiations (2 units)
PH 224A	Healthcare Organizations and Management (3 units)
PH 223	Legal Basis for Healthcare Delivery (3 units)
PH 230	Advanced Health Politics (3 units)
PH 253B	Epidemiology and Control of Infectious Diseases (3 units)
PH C234	Green Chemistry: An Interdisciplinary Approach to Sustainability (3 units)
PH 253C	Ethical Challenges in Public Health Interventions (2 units)
PH 253D	Behavior and Policy Science in HIV Prevention and Treatment (3 units)
PH 255	Social Epidemiology (3 units)
PH 257A	Disaster Epidemiology (2 units)
PH 270B	Toxicology (3 units)
PH 207C	Practical Toxicology (3 units)
PH 271C	Drinking Water and Health (3 units)
PH 271E	Science and Policy for Environment and Health (3 units)
PH 271G	Health Implications of Climate Change (3 units)
PH 272A	Geographical Information Science for Public Health and Environment (3 units)
PH 281	Public Health and Spirituality (2 units)
PH 271D	Global Burden of Disease and Comparative Risk Assessment (3 units)
PH 282	Topics in the History of Medicine and Public Health (2 or 3 units)
PH 290(2)	Health Issues Seminar: Designing Innovative Public Health Solutions (3 units)
PH 290(8)	Public Health Journalism (3 units)
PH 290(9)	Seminar: HIV Biology to Policy
PH 285	Public Health Injury and Control (2 units)
PH 291A	Preparation for Public Health Practice
MBA 209F	Fundamentals of Business for Non-Business Majors (3 units)
PUB POL 280	Wealth and Poverty (3 units. Note: special enrollment procedures)

## **FOUNDATIONAL 22 COMPETENCIES FOR MPH STUDENTS (CEPH CRITERIA)**

The MPH curriculum emphasizes active, student-directed learning, problem solving, and the acquisition of skills essential to the practice of public health. It follows the MPH Foundational Competencies laid out by the Council on Education for Public Health (CEPH). Among those, all MPH students identify 5 competencies to achieve (at least 3 from CEPH foundational list, the remainder can also be from the concentration-specific list) during their course of studies. We encourage students to carefully review the competencies and consult with their faculty advisor to choose elective courses best suited to their needs.

<b>EVIDENCE-BASED APPROACHES TO PUBLIC HEALTH</b>
1. Apply epidemiological methods to the breadth of settings and situations in public health practice
2. Select quantitative and qualitative data collection methods appropriate for a given public health context
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
<b>PUBLIC HEALTH &amp; HEALTH CARE SYSTEMS</b>
5. Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings
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
<b>PLANNING &amp; MANAGEMENT TO PROMOTE HEALTH</b>
7. Assess population needs, assets and capacities that affect communities' health
8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs
9. Design a population-based policy, program, project or intervention
10. Explain basic principles and tools of budget and resource management
11. Select methods to evaluate public health programs
<b>POLICY IN PUBLIC HEALTH</b>
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
14. Advocate for political, social or economic policies and programs that will improve health in diverse populations
15. Evaluate policies for their impact on public health and health equity
<b>LEADERSHIP</b>
16. Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making
17. Apply negotiation and mediation skills to address organizational or community challenges
<b>COMMUNICATION</b>
18. Select communication strategies for different audiences and sectors
19. Communicate audience-appropriate public health content, both in writing and through oral presentation

- |   |
|---|
| 20. Describe the importance of cultural competence in communicating public health content |
| <b>INTERPROFESSIONAL PRACTICE</b>   |
| 21. Perform effectively on interprofessional teams  |
| <b>SYSTEMS THINKING</b>   |
| 22. Apply systems thinking tools to a public health issue                                 |

**Additional Program-Specific Competencies for the INTERDISCIPLINARY PROGRAM**

- |  |
|--|
| 23. Successfully navigate the application process for IRB Human Subjects approval and/or waiver for the MPH research project |
| 24. Demonstrate skills needed for effective scientific presentations during the comprehensive exam                           |
| 25. Demonstrate skills needed for authoring a comprehensive scientific publication (MPH research report)                     |
| 26. Apply the skills for effective community engagement and community-based participatory research                           |
| 27. Describe principles of design thinking approaches to public health   |

## INTERDISCIPLINARY PROGRAM CORE FACULTY

**Anke Hemmerling, MD, PhD, MPH** is the director of the UCB SPH Interdisciplinary Program. She is an alumna of the class of 2004 and served as core faculty for the program since 2012. Anke received her medical training at the Humboldt University in Berlin (Germany), and her public health education at the University of California, Berkeley (UCB). During her clinical training, she repeatedly worked in health projects and hospitals in Latin America. Her PhD research evaluated medication abortion in Germany. She was a postgraduate Global Health Research Fellow for the UCB SPH Bixby Program, and a Director of Special Health Projects for Venture Strategies for Health and Development, conducting research related to safe motherhood and safe delivery in developing countries.

In 2007, she joined the Bixby Center for Global Reproductive Health at the University of California, San Francisco (UCSF). There she has been focusing on the prevention of HIV and other genital infections in women and conducted a number of phase 1 and 2 clinical trials. Currently, she is the protocol co-Chair of the NIH-sponsored multi-site phase 2B study for the prevention of bacterial vaginosis, conducting an NIH-sponsored phase 2 study in South Africa, and preparing a phase 1 clinical trial testing a biologic drug for HIV prevention in women. At UCSF, she is mentoring and teaching students in the Infectious Disease Research and Training Program (IDRTP), and the UCSF Global Health Master's Program. She is core faculty for a bi-weekly seminar on "Sustainable Development for HIV", a collaboration of UCSF and Maseno University Kenya. In addition, she is active in the Education Committee at the UCGHI Center of Expertise in Women's Health, Gender and Empowerment. She also serves as a senior technical adviser for the Coalition Advancing Multipurpose Innovations (CAMI), on the steering committee of the Coalition Advancing Multipurpose Innovations for Reproductive Health (IMPT), and on the Microbicide Advisory Board of the Population Council. Email: [ahemmerling@berkeley.edu](mailto:ahemmerling@berkeley.edu)

**Karen Sokal-Gutierrez MD, MPH** is a Clinical Professor at the UCB School of Public Health, and the UCB-UCSF Joint Medical Program where she teaches medical students, public health graduate students and undergraduates. She is a physician trained in pediatrics, preventive medicine, and public health/maternal-child health. Her work focuses on improving early childhood health and reducing health disparities. She has served as a physician in community health clinics, public health program administrator, consultant to childcare and preschool programs, and writer for a parenting website. She has worked in global health for 40 years, including for the past 15 years directing a family of studies on children's nutrition and oral health in El Salvador, Ecuador, Vietnam, Nepal, and India. She received her BS degree from Yale University, MD from UCSF, and MPH from UCB; and is a Fellow of the American Academy of Pediatrics. For the academic year 2017-18, she was also a Fellow at the New England Journal of Medicine. Email: [ksokalg@berkeley.edu](mailto:ksokalg@berkeley.edu)

## INTERDISCIPLINARY PROGRAM STAFF

**Deanine Johnson** is the new primary Program Manager for the Interdisciplinary Division. She obtained her Master of Arts in Applied Professional Studies from DePaul University and has over twenty years of student services experience. Although she is just getting started in her role she has already committed to serving on committees aimed to support students including the Welcome Week & Onboarding committees. Email: [deaninejohnson@berkeley.edu](mailto:deaninejohnson@berkeley.edu) or [ipmph@berkeley.edu](mailto:ipmph@berkeley.edu)

**Judy Smithson** is the Senior Program Manager for the entire Interdisciplinary Division. She served as the primary program manager of our Interdisciplinary MPH program during 2018 - 2021, and remains active to support Deanine on specific issues. Judy has over 15 years of experience serving as an Academic Advising Administrator at elite public and private universities. She has a Master of Education from the University of Southern California in Postsecondary in Administration and Student Affairs, with a Certificate in Management of College Student Services. Judy has also held various leadership roles on-campus from being Co-Chair of the Graduate Staff Roundtable to currently serving as Co-Chair for Cal Women's Network Association. Her passion is social justice and this year Cal Women's Network has teamed up with Food Insecurity & Housing Initiative to bring awareness and resources to staff about this growing crisis on our college campuses impacting our students.

## STUDENT REPRESENTATION

**Class Ombudsman** -- elected by nomination and vote of the class. The role of the ombudsman is to be a resource for students in the Interdisciplinary Program who have concerns that they may not want to voice directly to the program faculty. Concerns can be about the program itself, other courses in the school, or aspects of the learning environment that need to be addressed. The Ombudsman can elect to communicate concerns with any of the program faculty or staff. The program leadership will have regular check-in sessions with the Ombudsman to make sure that student needs and concerns are heard. The Ombudsman will also have a key role in the recruitment and admissions process for the Class of 2020-21.

**Class Social Director** -- elected or appointed by the class to suggest, initiate, and/or organize after-hours social events for the group such as happy hours, hikes, BBQs, etc. The program has a small budget for class social events, and requests can be made directly to the program leadership.

## **GRADING CRITERIA FOR INTERDISCIPLINARY MPH SEMINAR**

### **SUMMER 2021**

Students will receive a credit of one unit (LETTER GRADE) for attendance of the seminar and delivery of the assignment by **TBA** (outline of ideas for MPH project). More than one unexcused absence will result in a failing grade.

### **FALL 2021**

<b>10 %:</b>	<b>Attendance and full participation in seminar and advisor meetings</b>
<b>20 %:</b>	<b>Draft Project Plan</b>
<b>30 %:</b>	<b>Final Project Plan, incl. completed IRB process</b>
<b>40 %:</b>	<b>Literature Review</b>

Assignment grading will be based on quality of content, adherence to outlined expectations, and timeliness of submission. **Deadline extensions will not be granted without prior approval from faculty.**

### **SPRING 2022**

<b>10 %:</b>	<b>Attendance and full participation in seminar and advisor meetings</b>
<b>40 %:</b>	<b>Project presentation</b>
<b>50 %:</b>	<b>Final Project Report</b>

Assignment grading will be based on quality of content, adherence to outlined expectations, and timeliness of submission. **Deadline extensions will not be granted without prior approval from faculty.**



## **SUMMER 2021 SEMINAR SCHEDULE**

**Interdisciplinary MPH Seminar  
Public Health 292 (1) – Enrollment # 80045  
Letter Grade or S/U grading option  
Location: online seminar  
Fridays, 2-4 pm (TBA)**

July 9	<b>Welcome Session</b> Anke Hemmerling, Karen Sokal-Gutierrez
July 16	<b>MPH Program Overview</b> Anke Hemmerling, Karen Sokal-Gutierrez, Deanine Johnson
July 23	<b>MPH Project Overview</b> Anke Hemmerling, Karen Sokal-Gutierrez
July 30	<b>Personalities in Leadership and Teamwork</b> Ruthann Haffke, UCB SPH CPHP
August 6	<b>Alumni Panel</b> Participants TBA
August 13	<b>Discussing your initial MPH Project Ideas</b> Anke Hemmerling, Karen Sokal-Gutierrez

Students will receive a credit of one unit (LETTER GRADE) for attendance of the seminar and delivery of the assignment by TBA --outline of ideas for MPH project. More than one unexcused absence will result in a failing grade.

**SCHOOL OF PUBLIC HEALTH  
UNIVERSITY OF CALIFORNIA, BERKELEY  
Interdisciplinary MPH Seminar – PH 292 (12)  
FALL SEMINAR SCHEDULE  
Location: TBD, Berkeley Way West  
Example Only**

### **Course description**

This seminar is designed to enhance the knowledge and practice skills of students enrolled in the Interdisciplinary MPH Program and to provide guidance and mentorship in the development and implementation of a culminating MPH Project. Weekly meetings throughout the academic year will challenge students to integrate their learning and experiences across the MPH curriculum, and to synthesize their knowledge and skills via a project that addresses a specific public health challenge.

**Instructors:** Anke Hemmerling, Karen Sokal-Gutierrez

August __	<b>Community Engagement</b>
August __	<b>Mixed Methods Research in Public Health</b>
September __	<b>Community Participatory Research</b>
September __	<b>How to conduct a Policy Review</b>
September __	<b>IRB Workshop</b>
October __	<b>Survey Design in Public Health</b>
October __	<b>Ethics in Public Health Research</b>
October __	<b>Project Workshop 1</b>
October __	<b>Designing Innovative Public Health Solutions</b>
November __	<b>Project Workshop 2</b>
November __	<b>Project Plan Presentations 1</b>
November __	<b>THANKSGIVING HOLIDAY - NO CLASS</b>
November __	<b>Project Plan Presentations 2</b>
December __	<b>Project Workshop 3</b>

### **Readings and assignments**

Course readings and assignment guidelines will posted on B-Courses

### **Important deadlines**

September __	<b>Meeting with your program advisor once in September</b>
October __	<b>Completion certificate for CITI training</b>
October __	<b>Draft Project Plan</b> , including detailed plan for IRB submission and identified project mentor/ mentor within community organization
October __	<b>Completed IRB submission</b>
November __	<b>Meeting with your program advisor once in November</b>
November __	<b>Final Project Plans and Community Partner Agreement</b>
December __	<b>Literature review of your project</b>

SCHOOL OF PUBLIC HEALTH  
UNIVERSITY OF CALIFORNIA, BERKELEY  
**Interdisciplinary MPH Seminar - PH 292 (7)**  
**SPRING SEMINAR SCHEDULE**  
**Location: TBD, Berkeley Way West**  
**Example Only**

### **Course description**

This seminar is designed to enhance the knowledge and practice skills of students enrolled in the Interdisciplinary MPH Program and to provide guidance and mentorship in the development and implementation of a culminating MPH Project. Weekly meetings throughout the academic year will challenge students to integrate their learning and experiences across the MPH curriculum, and to synthesize their knowledge and skills via a project that addresses a specific public health challenge.

**Instructors:** Anke Hemmerling, Karen Sokal-Gutierrez

January __	<b>Project Briefs and Introduction to Spring Semester</b>
January __	<b>Media Advocacy Training</b>
February __	<b>Workshop 1</b>
February __	<b>The Art of Decision Making</b>
February __	<b>Project Workshop 2 - Dissemination &amp; Sustainability</b>
February __	<b>How to write a good scientific article and get it published</b>
March __	<b>Grantseeking and Foundations</b>
March __	<b>Student presentations 1</b>
March __	<b>Student presentations 2</b>
March __	<b>SPRING BREAK - NO CLASS THIS WEEK</b>
March __	<b>Student presentations 3</b>
March __	<b>Student presentations 4</b>
April __	<b>Student presentations 5</b>
April __	<b>Student presentations 6</b>
May __	<b>Student presentations 7, also Wrap -Up and Course Evaluations</b>

### **Readings and assignments**

Course readings and assignment guidelines will be posted on B-Courses

### **Important deadlines**

February __	Schedule a meeting with your program advisor at least once in February
February __	Completed Advancement Candidacy Forms due
March - May __	Student presentations in class
April or May	Interdisciplinary Annual Alumni and Student Picnic
May __	Final Project Report due
May __	<b>COMMENCEMENT CEREMONY - Greek Theater, UC Campus</b> <b>Interdisciplinary MPH Program</b>

## **PROJECT PRESENTATION AND FINAL REPORT GUIDELINES**

The Interdisciplinary Program Project spans 11 months and fulfills the School of Public Health's Master-level requirement for a practicum or field experience. The culminating assignments – an oral presentation to peers and colleagues, and a final project report worthy of publication – serve as the oral and written components of the comprehensive examination required for graduation. Please review the following guidelines carefully to ensure that you meet all requirements.

### **ORAL PRESENTATION GUIDELINES**

Your **oral presentation** serves as the oral component of your comprehensive examination required for graduation. The presentation should describe what your project is designed to deliver and the outcomes you anticipate or hypothesize. Make sure to present your data, even if you have not completed the analysis. ***If your data gathering and analysis is not complete at the time of your oral presentation date, don't worry.*** You may call it a "work in progress."

The oral presentation is not supposed to be a presentation of the written paper; rather, it is a demonstration that affirms your understanding of PH investigative processes, the appropriate use of statistical tools, and your ability to present.

These should follow the standard presentation outline:

- Title
- Background and Public health significance
- Project goal and objectives
- Methods: study design, ethical review, study population and partner organizations, variables, data collection methods and instruments, data analysis
- Results – completed, up-to-date or hypothesized
- Discussion: Key findings, comparison to other studies
- Project impact: What is the relevance of this work in the bigger picture? Has it, or will it actually affect the lives of the people whose needs you sought to address?
- Plans for project sustainability and dissemination
- Project limitations and changes you would make if you had the opportunity to start over
- Acknowledgements

## **PRESENTATION TIPS**

We strongly encourage attention to the following tips on how to make your presentation the best that it can be.

- Approach the presentation as if telling a story. Try to relax and enjoy the experience. Speak to and engage the audience.
- A slide on the public health significance of your project is **required**.
- Be focused. This is to be a 15-20 minute presentation with 5 minutes for questions (total: 25 minutes maximum). Practice in advance, time yourself, avoid redundancy, and cut out unnecessary material. Get feedback in advance - from a classmate, colleague or professor.
- Prepare answers for expected questions. In previous years students have found it helpful to provide a handout.
- Use Powerpoint, Prezi or similar presentation software – but use it effectively. Use a variety of media on the slides (e.g., text, photos, diagrams, graphs, tables) and also consider using brief video or audio. Count on one slide per minute, with no more than approximately 15-20 slides total. Be sure to include a slide with all contributors and their affiliations. Put no more than 7-9 lines of text on a single slide as more than that is unreadable. Use graphs liberally.

## **PRESENTATION LOGISTICS**

Oral project presentations are scheduled during class time between mid-March 19 and late April . We will use our Friday class time for these presentations. Your audience will be asked to write down a few comments for your consideration.

We encourage you invite your mentor, interns or anyone else you would like to see you present your work.

## **PRESENTATION SCHEDULE**

We will circulate a sign-up sheet for the online presentations in early February. If you are not happy with your assigned session date, please negotiate with other students to exchange dates. Please let Anke know ASAP if you have changed your date so that she can adjust the schedule.

## **FINAL REPORT GUIDELINES**

The written final report fulfills the written comprehensive examination requirement for the MPH degree. This is an opportunity to demonstrate that you can apply knowledge and principles learned from your coursework in addressing a current public health challenge.

Your project paper should be in publishable condition with perfect spelling, grammar, and organization. You can choose to write it as a longer report, or try to follow the “Guidelines for Authors” instructions for a specific journal you have in mind if you consider publication. Be assured that it will be harder to write a succinct 3,000-6,000 word manuscript for publications than a longer report that has more flexible page limits.

- Scientific writing is all about a structured presentation. Most journals will use a similar scientific format:
  - *Title, Abstract* (300 words or less)
  - *Introduction* (background/ situational analysis) - should include your December literature review, a statement as to why the problem addressed in your project is significant for public health, and a statement about how the objectives for the project address that problem
  - *Methods* – should describe details on study design, ethical review, study population and partner organizations, variables, data collection methods and instruments, data analysis.
  - *Results* - should describe your findings and their reliability (your data analysis)
  - *Discussion* - should go into detail about your key findings and their importance for the field, implications for policy/programs/research, limitations, lessons learned, and next steps. Any barriers to completing the work? How do your results compare to the findings in the peer literature?
  - *Recommendations* - based on your work, what further actions would you recommend to address this problem? How might your findings be implemented on a larger scale?
- Length and format: About 10-15 pages, double spaced. EXTRA: tables, graphs, references, and any other appendices such as surveys etc.
- Feel free to write the paper as a manuscript for the journal you selected for publication, following their length and formatting requirements.
- Check out “Instructions for Authors” pages in the *American Journal of Public Health* for information on formatting references, tables, and graph headings
- For citations and references, please use AMA style or a style appropriate for your field

**Please load your Final Report onto BCourses by 11:59 pm on Sunday, May 8.**

## FAQS ANSWERED FOR INCOMING INTERDISCIPLINARY MPH STUDENTS ACADEMIC YEAR 2021-22

- 1. Is there a minimum grade required for required courses and a required overall GPA?**  
Yes-- students must attain a B- or better in the breadth course requirements (Epidemiology PH 250A; Biostatistics PH 142; Health Policy & Management 200J; Environmental Health PH 200K; and Health and Social Behavior PH 200L). Students who attain less than a B- will be required to retake the course. To receive the MPH degree, the student must also meet the Good Academic Standing Rule with an overall 3.0 GPA and a B average.
- 2. Can I work during the 11-month program?**  
The full course load required is 42 semester units for the year, which is approximately 5-6 classes per semester - a very high course load compared to students in the 2-year MPH program who have to complete 48 units over 2 years. While some of our clinical fellows can fit in a few monthly shifts on selected days, like weekends or over holiday periods, we do not recommend any kind of regular part-time job or full-time job.
- 3. Summer session: How do I decide which summer course(s) to take?**  
Students are required to take the Summer Interdisciplinary MPH Seminar PH 292 (1), course control number 50770. In addition, we also recommend taking Biostatistics PH 142 and Epidemiology PH 250A. The 2021 summer session runs from July 6 to August 13. As this is a heavy course load for beginners on these topics, we recommend that you do not work during the Summer Session. If you're not able to take all three courses, please check in with the Interdisciplinary Program faculty to make alternate plans.
- 4. Do the summer session courses satisfy the MPH requirements for Biostatistics and Epidemiology?**
  - Yes, PH 142 satisfies the Biostatistics requirement.
  - Yes, PH 250A satisfies the Epidemiology requirement
- 5. Can I take the Biostatistics and Epidemiology exemption exams to satisfy the requirements?**  
You can satisfy the Biostatistics and Epidemiology requirements by passing the exemption exams, which will be offered just before the Fall semester. You will receive notice of these exams in advance. Please email Deanine Johnson at [ipmph@berkeley.edu](mailto:ipmph@berkeley.edu) if you have questions. Please note that if you satisfy the Biostatistics and Epidemiology requirements by passing the exemption exams, you will NOT receive unit credit for them and will still need to complete 42 units of course work in order to graduate.
- 6. Can you recommend any online resources for biostatistics preparation or a refresher?**  
Yes, please see the free courses that are available at <http://oli.cmu.edu/>
- 7. Is health insurance for Summer Sessions available?**  
Please see [Health Services](#) for information on health insurance options.

- 8. When do the Fall and Spring semesters begin and end?**
  - Please refer to [UC Berkeley Registrar's Office](#) website for more details.
  - Fall 2021 orientation activities ("Welcome Days") are planned for late August 2021. More information about these activities and other important information will be coming to you soon via email from the School of Public Health Student Services office.
- 9. How can I satisfy the 42 units for the Interdisciplinary Program in just eleven months?**

The two-year MPH programs require that you complete 48 units in two years, whereas the 11-month MPH programs require 42 units in 11 months. The Interdisciplinary program is rigorous but doable, provided you are not working or have other time-intensive obligations. We will provide a list of possible curriculum scenarios at the beginning of the Summer Session.
- 10. What is the minimum number of units that I may take each semester?**

The minimum allowable number of units per semester is **12**. However, as an Interdisciplinary student, you will need to take many more units each semester.
- 11. Can I transfer of units from previous graduate coursework not counted towards another degree?**

You may be able to transfer up to four units of graduate level coursework towards your MPH degree. According to UC Berkeley's Graduate Division Policy: "A master's student may transfer up to four semester units or six quarter units of course work completed as a graduate student at another institution. The units must be equivalent to courses in the student's graduate program at Berkeley, and the student must have received at least a B in the course(s) and have a grade point average of at least 3.3." The courses to be transferred must be approved by the School of Public Health Curriculum Review Committee to insure that they meet the requirements for transfer. Students must submit a syllabus for each course. Eligible units might be stand-alone courses or courses taken that exceeded the requirements (extra units) for a previous degree. Detailed procedures for transferring units will be announced at the start of the Fall semester.
- 12. Do I take PH297, the field practicum requirement that is listed on some UC Berkeley School of Public Health MPH curriculum materials?**

No-- this course is for two-year MPH students only. As an 11-month student, you satisfy your practicum requirement as part of the Fall 2021 and Spring 2022 Interdisciplinary MPH Seminars --PH 292(12) and PH 292(7) in the Spring.
- 13. The Interdisciplinary Seminars – PH 292 in Fall and PH 292 – in the Spring are variable unit courses. How many units should I enroll in for each of these courses?**

4 units for each course, taken for a letter grade. This is the equivalent to 180 hours of work per semester.

**14. Can I take undergraduate courses and can they count towards my 42 units? How many undergraduate units can I take?**

Yes, you may take undergraduate courses and they will count towards the MPH, but they must be upper division courses numbered 100 or above. You may take a maximum of 12 units in 100-level courses.

**15. How many elective units can I take outside the UCB School of Public Health?**

There is no limit on the number of elective units that may be taken outside SPH across other UCB departments.

**16. Can I complete one of the public health specialty areas along with the interdisciplinary MPH?**

Yes. You may use elective units in the Interdisciplinary curriculum to complete specialty area requirements such as for the Global Health Specialty Area.

**17. May I take courses Pass/Fail or Satisfactory/Unsatisfactory?**

All required courses must be taken for a letter grade. You may take electives as S/U, but no more than a third of your total units taken can be taken S/U (excluding independent study courses numbered 299).

**18. What are the guidelines for taking independent study (299) units?**

- The maximum number of PH 299 course units you may take towards the degree is ten.
- PH 299's can be taken either S/U or for a letter grade. The choice depends on what you arrange with the instructor.
- Although no more than one third of total units can be taken S/U, this one third does NOT include PH 299 units.

**19. As a UCB student, do I get access to STATA for data analysis?**

You have free access to STATA on the computers in the Epi/Biostat computer lab. You can also buy your own copy of STATA at a discount. Please see:

<http://www.stata.com/order/new/edu/gradplans/campus-gradplan/>

**20. As a UCSF resident, can I receive the two-thirds tuition and fee reduction available to UC staff?**

Unfortunately you cannot. To receive this discount, you may take no more than nine units of coursework per semester. The Interdisciplinary Program requires that you take more than nine units per semester.

**21. When will I be presented with a financial aid package for this program? Are there financial support options that I should consider looking into?**

While the School of Public Health has a variety of merit and need-based scholarships/fellowships, there is no guarantee that a newly admitted graduate will be a recipient of an award. As of right now, SPH scholarship/funding award letters have been sent out, but that does not necessarily mean all opportunities have been exhausted!

In addition to fellowships/scholarships offered through SPH, it is common for students to look into external scholarships and/or federal loans. With regards to financial aid packages, which consist of loan allocations, as well as any grants one may be eligible for, [UC Berkeley's Financial Aid & Scholarships Office](#) will notify newly admitted graduates of these opportunities around late April/early May, but only if the Statement of Intent to Register is submitted. In the meantime, I would highly encourage you to look at the different ways to [fund your education](#).

Another thing to note is that there will be more opportunities, such as GSI/GSR-ships and other internal scholarships, which you can apply for through our SPH jobsite. Enclosed please find a "[Tips for Finding GSI\\_GSR](#)".

Also, as a member of the Association for Schools and Programs of Public Health (ASPPH), our graduate students have access to funding resources such as "Tips and Tricks to Obtaining Scholarships" and external sources that are based on specific qualifying criteria (e.g., race, gender, state of residency, etc.):

Tips and Tricks to Obtaining Scholarships (<http://www.aspph.org/study/financing-your-degree/>)

How to Finance Your Public Health

Degree (<https://www.youtube.com/watch?v=eMRiom7Elmg> webinar hosted by ASPPH).

**22. Can I teach and facilitate a De-Cal course to undergraduates and receive unit credit for it?**

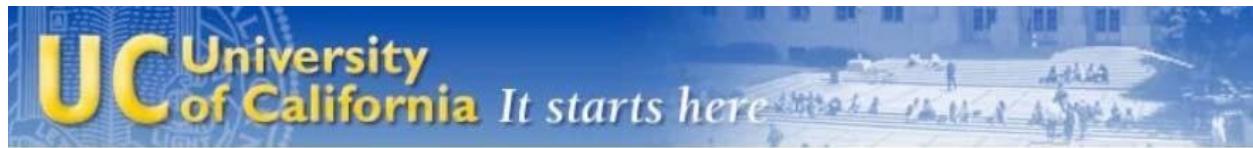
Yes. You can receive unit credit via undergraduate independent study 199 units. For information please see <http://www.decal.org/>

**23. If I need to book a room to use for a student meeting, project interview, etc., how can I do so?**

You may ask Deanine Johnson – email her at [ipmph@berkeley.edu](mailto:ipmph@berkeley.edu), and please give her at least several days' notice to find the room.

**24. Are students required to wear traditional regalia to the Commencement ceremony?**

Yes. The program has several gowns available that students can borrow.



## Standards of Ethical Conduct

*Adopted by The Regents of the University of California, May, 2005*

The University's *Statement of Ethical Values and Standards of Ethical Conduct* commits everyone in the UC community to the highest ethical standards in furtherance of the University's mission of teaching, research, and public service. It identifies the University's core ethical values as integrity, excellence, accountability, and respect.

**In summary, we are committed to the following:**

1. **Fair Dealing.** We will always conduct ourselves ethically, honestly, and with integrity.
2. **Individual Responsibility and Accountability.** We will accept responsibility appropriate to our positions and delegated authorities.
3. **Respect for Others.** We will treat everyone we contact with respect and dignity.
4. **Compliance with Applicable Laws and Regulations.** We will learn and abide by federal, state, and local laws that affect our campus roles.
5. **Compliance with Applicable University Policies, Procedures and Other Forms of Guidance.** We will learn and abide by University and campus policies and procedures that affect our campus roles.
6. **Conflicts of Interest or Commitment.** We will avoid both actual conflicts of interest and the appearance of such conflicts, and devote our primary professional allegiance to the University and its mission of teaching, research, and public service.
7. **Ethical Conduct of Research.** We will conduct our research with integrity and intellectual honesty, and show the greatest care for human or animal subjects.
8. **Records: Confidentiality/Privacy and Access.** We will follow applicable laws and University policies when accessing, using, protecting, or disclosing records.
9. **Internal Controls.** We will ensure that internal controls are established, properly documented, and maintained for activities within our jurisdictions.
10. **Use of University Resources.** We will ensure that campus resources are used only on behalf of the University.
11. **Financial Reporting.** We will ensure that accounting and financial records are accurate, clear, and complete.

**Reporting Violations and Protection from Retaliation.** We will report all known or suspected improper governmental activities under the provisions of the University's Whistleblower policy, recognizing that everyone is protected from retaliation for making such reports under the Whistleblower Retaliation Policy.

## **ADDITIONAL RESOURCE FOR INTERDISCIPLINARY STUDENTS**

### **DLAB - STATISTICS HELP**

IF there are specific questions or topic area that students think are aligned with one of our consultants, they can schedule appointments at <http://dlab.berkeley.edu/consulting>. They are also welcome to direct general questions to the consultant list - we may or may not be able to answer.

You can also contact the Statistics Department's consulting service (<http://statistics.berkeley.edu/consulting>), the DataLab in Doe Library (<http://www.lib.berkeley.edu/wikis/datalab/>), or the Geospatial Innovation Facility (<http://gif.berkeley.edu/>)

## **HOW TO ENROLL IN COURSES IN OTHER UCB SCHOOLS AND DEPARTMENTS**

**Please visit the websites of other schools and departments for information about how to take courses in those departments. Enrollment in courses in many departments and schools is restricted to students in those schools.**

**Boalt School of Law, the Goldman School of Public Policy, and the Haas School of Business have specific procedures allowing students from outside those schools to enroll in courses. Those procedures follow below and on the next several pages.**

### **BOALT SCHOOL OF LAW**

*Note: Classes in the Law School start 2 weeks early.*

- You cannot just enroll via CalCentral - you need to use a separate procedure to apply to enroll in a law school course.
- Complete this [form](#).
- If you have any other questions, please call Boalt Law School Student Services - 510 643-2744.

## GOLDMAN SCHOOL OF PUBLIC POLICY

- Elective courses are open to all students and you can get onto the waitlist by enrolling via CalCentral. Core courses are restricted and not open to students outside Goldman unless allowed by the professor teaching the course.
- Look in <http://catalog.berkeley.edu> for electives open to all. Also, the UCB online schedule <http://schedule.berkeley.edu> will tell you if the course is restricted.
- Students are advised to talk with the instructor on the first day of class to request to be added to course.

## HAAS BUSINESS SCHOOL

### Enrollment Process For Non-Haas Students Wishing To Take MBA Electives

For one course you can register following the normal process for your other classes via CalCentral:

#### **MBA209F - Fundamentals of Business: An Introduction to Business for Graduate Students** Tuesdays 6:10 – 9PM, 3 units

Fundamentals of Business is a course specifically designed for graduate students in schools other than Haas (and will serve as an elective course for their degree programs). The purpose of the course is to introduce non-business students to the vocabulary of business and to understand how business people analyze problems and determine strategy. It's not quite a "survey" course. Rather, we cover a selection of topics in some depth as is appropriate for graduate students.

Many UC Berkeley graduate students will go on to work in business and even those who continue their research careers will spend much of their professional lives interacting with business people.

The course is taught in 3 five-week modules:

1. Marketing and Strategy
2. Accounting and Finance
3. Organizational Behavior and Management

The class meets once a week, from 6:10 to 9:00 p.m. on Tuesday evenings in Fall 2021 at the Haas School; the first class meeting is Tuesday, August 24 and the last class is on Tuesday, December 7. There is no final exam; the course is examined by three take-home exams. Each module also has a required short term paper.

Unlike most other MBA courses, students should enroll in MBA 209F directly, via CalCentral using the class number. Contact FTMBA Academics Team for the course control number ([ftacademics@haas.berkeley.edu](mailto:ftacademics@haas.berkeley.edu)[ink@berkeley.edu](mailto:ink@berkeley.edu)).

### **For all other courses at Haas Business School:**

If you are a graduate student in another UC Berkeley department you may take elective courses in the Full-time MBA Program, provided:

- You are registered for the current semester, which means that you must be enrolled in at least one course and have paid your fees.
- There is space in the class at the end of the second week of the semester.
- You meet the prerequisites, if any, for the class.
- You submit your request(s) by the applicable deadline.
- Your home department or school does not offer an equivalent course.

The MBA Program does not use CalCentral to manage its course enrollments, with the exception of MBA209F – Fundamentals of Business. For all other MBA courses, we will add requested courses to your schedule if we are able to accommodate you. To request all other Haas MBA classes, you will instead use our Online Registrar system, which will open on July 5:

- Go to <http://mbarequest.haas.berkeley.edu> and log in to submit your request.
  - Requests are not treated as first-come, first-served, so you just need to submit by the deadline
  - The deadline to submit requests for Fall 2020 courses is 12 noon on Friday, September 4.
  - You may request up to 3 MBA courses, order them according to your preference, and indicate the maximum number of courses you wish to be enrolled in.
  - Once you enter your requests, you can edit them up until the end of the request period.

For a list of courses and instructions on how to enroll, please contact FTMBA Academics Team ([ftacademics@haas.berkeley.edu](mailto:ftacademics@haas.berkeley.edu), [ink@berkeley.edu](mailto:ink@berkeley.edu)).

### **bCOURSES**

bCOURSES at <http://ets.berkeley.edu/bcourses/> is the course management system for all UC Berkeley courses, where course syllabi, readings, assignments and grades are posted. Each course has its own bCOURSES site. Please go to bcourses.berkeley.edu and click through the information and demonstration.

**bSpace retired June 30<sup>th</sup>**  
bSpace was officially retired on June 30, but is still available for instructors and site maintainers to retrieve old content. You can retrieve your files in two simple steps!

**Why bCourses?**

In Spring 2014, campus began the transition to bCourses, Berkeley's new Learning Management System (LMS) powered by Canvas. Educational Technology Services (ETS) is here to guide campus faculty and students in the adoption of bCourses. As of Summer 2015, 100% of courses sites have been migrated from bSpace to bCourses.

Vice Provost Catherine Koshland and Associate Vice Chancellor Larry Conrad, along with the campus-wide project steering committee, are excited by the new features, modern user experience, and increased opportunities for integration that bCourses will offer in support of courses at Berkeley.

**Create a Course Site Today!**  
Instructors can now create course sites in bCourses for Summer and Fall semesters by following the instructions below.

**Transfer bSpace Quizzes**  
Users can transfer files from bSpace in two easy steps. To transfer quizzes and other bSpace materials, fill out the form below for additional assistance.

**Request Support**  
Let us know if you have a question, need support, or would like to provide feedback about bCourses.

## RECOMMENDED ELECTIVE COURSES

The following electives received a rating of 1 or 2 (out of 5 on a Likert Scale with 1=great and 5=would not take again) from Interdisciplinary students who took the course. Here are students' comments.

### Electives Recommended by Class of 2021

#### FALL

**PH W212: Foundation of Global Health.** Instructor: Hildy F Fong, Arthur L Reingold. Self-paced with moderate readings. Well-structured course materials which introduce the fundamental concepts from public health disciplines through a creative-thinking experience. The assignments require students to apply the class learnings into the real-world global health needs. The Professors and GSI's are available to answer any questions. The course structure is engaging because there's a new theme or domain every week with occasional guest lecturers. The workload is light and manageable. Some other useful skills developed through the

assignments: writing policy briefs, writing a research proposal, and developing a budget. Additionally, the readings and related discussions foster critical thinking and help develop analytic skills.

**PH 257: Outbreak Investigations.** Instructor: Arthur L Reingold. A discussion based class in which Dr. Reingold teaches the various aspects of performing outbreak investigations. Given readings each week on specific topics and "discussion questions", which are then discussed in class. Workload is very reasonable, and Dr. Reingold is very engaging in discussions. No specific assignments, quizzes, or tests. Dr. Reingold is very experienced and is a wealth of knowledge when it comes to outbreak investigations. The readings assigned are a bit dated, as in general outbreak research specific to the class are difficult to come by.

**PH 213A: Family planning, population change, and health.** Instructor: Ndola Prata. Lecture-based class with a very light workload. Several readings each week, but most are short. The course covers most of the spectrum of family-planning with a global focus, including the design and implementation of programs in various countries. Experienced guest lecturers bring in different perspectives. There is substantial freedom to choose the topic of the final paper and it can also be used to develop one's Capstone project.

**PH 290.002: Social justice and worker health.** Instructors: Suzanne Teran and Diane E Bush. Course uses innovative teaching methods to keep students engaged throughout the three-hour-long class. Readings are long and heavy, but the workload is not. All assignments involve the application of learnings from class and develop analytical and writing skills. The group work for the class is paced well making it easier for students. Has a lot of experienced guest speakers, including workers and activists.

**PH 211/LAW 2646: Health and Human Rights.** Instructors: Eric Stover & Rohini Haar. This is by far one of the most interesting courses I've ever taken - it was so thoughtful, well-adapted to virtual learning, and fascinating. The professors have incredible professional experience and are very driven by student engagement. The diversity of guest speakers is impressive - we learned from NYT reporters, practitioners working with trafficking and torture victims, and leaders in human rights research. The course requires a 30-page paper (topic of your choice) to be submitted at the end of the semester - beyond that, there are really no other deliverables. However, it is expected that you carefully read all assigned literature and come prepared to share your thoughts in class. It is well worth the work and a great class.

**PH 210: Foundations of MCH Policy.** Instructor: Cassie Marshall, PhD. This class does a phenomenal job of linking theory, application, and action. Dr. Marshall structures the course in such a way that you see how MCAH came to be, how it has changed, and where it is going. She brings in terrific speakers that expose you to real examples of people changing MCAH policy including Expecting Justice's team (Links to an external site.), experts on ACEs, and Alameda County's head of Public Health. Dr. Marshall is an engaging lecturer and utilizes a variety of tools to make the class engaging and seems to spin magic in the form of community building. Workload: There is a mix of small assignments throughout the course that includes introductory videos, informal recordings of an issue you are passionate about, a TED talk style

in-class presentation, and two short papers. The assignments build on one another and are scaffolded well so that things never become overwhelming. Readings include collaborative weekly comments that transform the act of reading for class from boring to an opportunity to clarify content and learn from peers. The only class I did all the reading for.

**PH 220E Global Health Policy.** Instructor: Stefano Bertozzi. The small course is a case-based group workshop approach to implementing global health policies. The four cases we looked at were designing a universal health coverage benefits package, international pandemic response, conditional cash-transfer program, and soda tax. The idea is not to give you an overview of global health, but rather to place you in the position of a consultant to a government or NGO trying to solve a health problem. Dr. Bertozzi is an exceptionally dedicated instructor with tons of experience. He tries to get to know you personally and is invested in improving your presentation and research skills and helping you network for jobs. He brings in speakers from the Gates Foundation, foreign and domestic governmental health organizations, the WHO, World Bank, etc. The course is a fair amount of work (~6-8 hours per week outside of class) but it is steady throughout the semester without a final or midterm exam.

## SPRING

**PH 254: Occupational and Environmental Epidemiology.** Instructors: Ellen Eisen and Sadie Costello. The class is mainly discussion-based and consists of weekly journal article critiques, covering various topics of occupational and environmental hazards and methods of analysis. The class would then discuss the critiques as a large group each week. The workload was higher than some classes, since you had to read a journal article and fill out the critique form each week, but I felt that I learned a lot about how to critically analyze papers. Some of the concepts were complex, though the instructors would give lectures at times, going over the concepts. As for grading, there were 4 critique forms that we needed to turn in for grades, and there was also a final group project in which we selected two articles and had to give a presentation comparing and contrasting them. After taking their class, I feel my critical thinking skills and ability to evaluate a scientific article have greatly improved. The workload is very manageable.

**PH 201E Public Health Interventions: Theory, Practice, and Research.** Instructors: Neuhauser, Linda and Syme, Leonard. A super-fun, thought-provoking, truly interdisciplinary class that encourages one to think of novel public health interventions with a new perspective. The workload is quite low with students having to do some background research, design, and present their idea for a public health intervention for a topic of their choice. Other than this group project, there's just a short essay to give feedback on the class itself. There are guest lecturers every week and each session is more intriguing than the last. The instructors are encouraging and respectful, and so talented at class facilitation. As grounded as they are, their combined experience is truly mind-blowing. If you're interested in designing public health interventions, I would strongly recommend this class.

**PUBAFF 290 Design Thinking for Policymakers.** Instructor: Josie Innamorato. This was a half-semester 1-unit course offered through the Goldman School of Public Policy. The course is designed as a series of workshops meant to engage policymakers through design thinking and putting participants at every step of the solution process. This class was one of the most wonderful and useful courses I took during my year because it was practical, engaging, and thought-provoking. The final project has you create a design-thinking proposal that is based off your current work or projects (great for your capstone!). The instructor, Josie Innamorato was great at facilitating the course and providing concrete feedback. The class size is capped at 15, because of the participation/discussion-based nature of the material. The course meets once a week for 2hrs. There are no required readings, but they are useful to do if you want to get the most out of the course. Outside of class there were assignments that usually took about 30min-1hr per week. The amount of work seemed a little much for a 1unit course, but it only lasted half a semester and the skills I took away were invaluable.

**PB 266B Zoonotic Disease.** Instructor: Peter Dailey. 2 units. This class focuses on major zoonoses and their life cycle, disease manifestations, epidemiology, and methods for prevention and control. There is a heavy emphasis on One Health, for those interested in the topic. As someone interested in One Health, this course is the best one I've found in the public health school that truly integrates the One Health approach throughout the entire semester, rather than having it simply mentioned once during a random lecture. Each week has a different guest lecturer from a variety of different backgrounds/careers. Examples include wildlife veterinarian, state/local public health workers, USAID, researchers, etc. Topics discussed included anti-microbial resistance, dengue, malaria, outbreak investigation, tabletop response exercise, and rabies. There is an emphasis on discussion and participation. The readings for the class can get somewhat overwhelming, as there are often 4-5 papers assigned per week and sometimes they are very technical. The papers are provided mostly for background knowledge so that you can participate thoughtfully in discussion. Other large assignments include a group class presentation and a take home final. If you are interested in zoonotic disease and/or One Health, this is a fun overview course.

**PH 210B Adolescent Health** (Taken as an Independent Study Seminar). Instructor: Julie Deardorff. A group of us approached Julie about taking the course asynchronously as it was given on Friday afternoon in conflict with 292's seminar. Julie graciously offered to allow us to take as a 1-hour seminar together where she would lead discussions about the previous week's material and give access to the lecture recordings and readings. In non-Zoom times if given in conflict this would likely not be feasible, but the course itself was wonderful. Julie brings many paradigm-shifting insights about the strengths, motivations, and current issues in adolescent development. She had exceptional speakers and was able to moderate discussions that did not shy away from the deep or complicated issues.

**PH 223C Strategic Management and the Health Sector.** Instructor: Kim MacPherson. Taken to fulfill the required leadership course, this class focused intensely on the business/management strategy side of Healthcare. It was interesting to work alongside many MBA MPH folks. While it can be uncomfortable to think about the consumer/client side of health care delivery in terms of business success it felt important to learn about how all aspects of this world can work

together. The business buzzwords were a little alienating at times because that isn't my background, but Kim and the class were very helpful. The workload was not too arduous, but there were a few larger group projects, including working with real local businesses (hospital systems, startups, etc) working on strategy projects. My team worked with a teletherapy company looking to scale cross-licensing for their therapists on their platform. It was fun to work on a school project that had immediate real world application.

## **Electives Recommended by Class of 2020**

### **FALL**

**PBHLTH 206: PH Nutrition Core Course.** General overview of various public health issues. Very light readings every week. Just a final paper and presentation. Excellent guest speakers. Very interesting topics.

**PBHLTH 210: Foundations of Maternal and Child Health Policy, Practice and Science.** Great overview of MCH, US policy, skill building. Well thought out assignments, readings, topics. Can be used for capstone project development.

**PBHLTH 212A: International Maternal and Child Health** Leisurely paced class. Best for students who want to learn international concerns with regards to maternal adolescent and child health.

**PBHLTH 213A: Family Planning, Population Change, and Health** For those interested in global health or reproductive studies. Small, interactive class with a professor who is an expert, knows everything and everyone!

**PBHLTH 216A: Biological Embedding of Social Factors** Best for students who are looking for the interface between social science and biomedicine, for students who need a lighter course to balance their course load. Teacher is a lovely human who gives time for in class discussion and does not shy away from talking through difficult topics (e.g., white supremacy, colonialism). Course attracts an interesting mix of students from SPH programs and programs from other schools.

**PBHLTH 220D: Health Policy Advocacy** Learn policy history, how law and public health work together. Experienced professors.

**PBHLTH 224E: Health Care Quality** Quality improvement work with an actual real-life application project. Good professor who will teach great theories and skills for future quality improvement projects as a doctor.

**PBHLTH 257: Outbreak Investigation** Very light workload. Art Reingold is an expert in the field and challenges you to think critically.

**PBHLTH 266C: Hospital Associated Infections** Learn the tasks of an infection preventionist. You'll learn from others, and John Swartzberg has great experience to share.

**PBHLTH 290: Health Issues Seminar - Critical Theory and Social Science Methods** Learn critical theory analysis. Heavy workload, but readings are full of important historical and critical theories. You will also interact with law students who have cool perspectives, it's great to talk to them.

**PUBPOL 271: The Political Economy of Inequality** Best for students who want to learn politics. The discussion is super useful and you see students from other disciplines.

**SOCWEL 210C: Aging Processes** Learn about aging and social factors that influence it. Professor Scharlach is amazing, and there is great space for open discussion.

**UGBA 152: Negotiation and Conflict Resolution** Best for students who want to learn how to approach potentially contentious discussion of dividing limited resources in a way that leads both parties on good terms. You will practice negotiations of fictional and semi-fictional scenarios every week. Good for people comfortable with participation, must prep before class.

**MBA 209F: Fundamentals of Business** Good for anyone who wants to learn how to better understand how organizations do accounting as well as how to market. Excellent lectures, and although it is 3 hours, it is definitely worth it. It's a good investment of your time and all the content is high yield/applicable.

**PBHLTH 226A: Health Economics** A Light workload. Better understanding of how health compensation works. Learn about different payment methods, gain idea of how to improve costs.

**PBHLTH 269E: Current Topics in Environmental Medicine** Minimal workload. Different expert speakers every week, wonderful course directors. Great for OEM and environmental medicine.

## SPRING

**EWMBA/MBA296.11 Unlocking Digital Health Innovation** You get to partner with a real-life client (this year was Eko Health) and do a business proposal for something related to digital health. You work in an interdisciplinary team which is really great to learn other's perspectives and collaborate.

**PBHLTH 201E Public Health Interventions: Theory, Practice, and Research** Encouraging energetic faculty. Small class size. Active small group work in every class. Opportunity to interact with students from a wide range of programs. A relatively light workload.

**PBHLTH 210B Adolescent Health** Mid-level of reading per week. Deliverables for semester include presenting one current events article during the semester, and then one major semester-

long project. This project is scaffolded very well, and students submit small pieces of this and receive helpful feedback from the instructor throughout the semester. The instructor creates a very open and collaborative classroom environment.

**PBHLTH 212A International Maternal & Child Health** Light workload. Best for students who want to learn about the global perspective of Maternal, Child, Adolescent Issues & Solutions. Engaging discussion.

**PBHLTH 219C Community-Based Participatory Research** Readings are assigned each week and are the basis of discussion. In general, the workload is pretty appropriate for a 3 unit course. Best for those who have a strong interest in or a background in participatory research. The professor really bases much of the class discussion around what is of interest to students.

**PBHLTH 219E Introduction to Qualitative Methods in Public Health Research** Moderate but evenly distributed workload. Best for students who want to learn qualitative methods—very comprehensive and detailed.

**PBHLTH 255A Social Epidemiology** An introduction to social epidemiology. You don't have to know much about epidemiology beyond the breadth course. The focus of this course is on learning and applying theories of social epi, NOT in learning and applying methods. Really interesting topics presented each week. Highly engaged class discussion. Highly recommend this course for anyone interested in exploring social determinants of health!

**PBHLTH 258 Cancer Epidemiology** Mixed workload. Great faculty.

**PBHLTH 269C Occupational Biomechanics** Best for anyone who wants to learn more about MSK disorders at work or even less thought-of things such as chair choice, lighting, desk height etc. Wide range of topic choices and interesting lectures.

**PBHLTH 288C Preventative Medicine Seminar** Great for physicians especially medical students, IMGs like myself and occupational medicine people.

## **Electives Recommended by Class of 2019**

### **FALL**

**PH 290 - Structural Competency** Interesting content not offered elsewhere in public health, diverse reading articles. Understand how macro structure impact individual situations. Would highly recommend for medical providers and those interested in social settings.

**PH 210 Foundations of Maternal and Child Health** The Professor is amazing and really made the class exciting and engaging. The workload was very manageable. A few reading each week. Class was leisurely paced and informative.

**PH 213A Family Planning, Population Change and Health** Any student interested in family planning should take this. If interested in an MCH/FP topic for your capstone project, you can work on that for this class.

**PH207A Public Health Aspects of Maternal and Child Nutrition** Readings are heavy but worthwhile. Great learning experience with great mentors. Instructor is very energetic.

**PH 204A Mass Communications in Public Health** Lori is wonderful, loved this class. Relatively heavy workload.

**PH206C Nutrition Epidemiology** Leisurely paces, speeds up around last few weeks. Got to work with real NHANES data. Applied basic nutrition science, Epi, STATA and research methodology. Professor Madsen is amazing.

**PH206 Critical Issues in Public Health Nutrition** Leisurely paces, busier around time of student presentation. Critical issues in public health nutrition in US and globally.

**PH250B Epidemiologic Methods** Jack Colford is an amazing asset to research design and understand epidemiology. Good for those willing to take a deep dive in epidemiology methods.

**MBA 292 B Nonprofit Boards** Real life expertise from non-profit executives on execution, planning and governance.

**INFO 290 Research Design and Data Analysis** See data, research and decision making from an information systems perspective. Great Professor Nick Merrill.

## SPRING

**PH 269C - Occupational Biomechanics (Ergonomics)** To learn about ergonomic assessment of jobs learn to use tools to assess risk of MSK diseases. Site visit/job analysis with a partner. Often have foreign researchers, who have a different perspective which can expand your own. The final was really hard and was surrounded by a number of other projects from my other courses.

**PH 288CD Preventive Medicine Seminar** -Broad topics that are relevant for physicians that don't get covered in other SPH classes. Duration around 4 hours (2 papers and 1 short assignment). Two great instructors who want you to succeed as physicians.

**PH 298 (UCSF M180) Occupational Toxicology** 8 (half semester condensed course) 2 papers/1 presentation. To improve knowledge about workplace toxins/heavy metals. A large number of visiting lectures who may have been one of the first people to submit a case report/series on a particular compound. Fantastic course.

**PH 270C Practical Toxicology** Get into toxicology or present a poster with assistance. Develop a poster as a group and present it at the NorCal Society of Toxicology meeting as the main

portion of your grade. Half the time there is free food. The poster took a long time, but it was worth it.

**PH 200F Environmental Health Online** I liked the topic/lectures and the variety of assignments. Doing a group project with people in a number of different countries/time zones that have different availability than you. Way too much work for a 2-unit course. Take the in person class unless you have a light spring semester

**PH 142W Intro to Biostats (Online)** Great lectures. Well thought out. Much better teaching on use of R than Fall in person class. Problem sets were not all R and multiple examples were in the reader. Study at their own pace and don't mind doing Zoom/skype office hours. Second half of course had lectures and problem sets not being posted until over halfway through the week. Too late in the program for biostats to be useful in Capstone.

**UGBA 192T Edible Education 101** About the food system and how to take action and improve our food system. Great, well known guest lecturers like Alice Waters. Class challenges you to apply what you learn and take action in your daily life.

**PH 290 Public Health in Practice: Communicable Diseases** Get a sense of what the California department of health does and wants to work for the public health department or is interested in real life application of outbreaks. Many great speakers who all work for the California department of health (the class is held in Richmond at the California department of health). Great way to hear how people who work for the CDPH got to where they are and also connect with them if interested. Also got to stay up to date on the latest outbreaks, like measles, and how the CDPH handles outbreak cases.

**PH 281 Public Health and Spirituality** How spirituality relates to the public health field. This class is ultimately based on how well group discussions go since there is no lecture and everything is group discussions. Light - 1 final paper, 1 weekly 1 page reflection.

**PH 260F Infectious Disease Research in Developing Countries** Weekly guest speakers who spoke about their research in developing countries, able to connect with researchers whose work you find interesting.

**MBA 252 Negotiations and Conflict Resolution** Very engaging/fascinating/fun. One of the best classes I took at Berkeley. To gain exposure to this extremely important skill.

## **Electives Recommended by Class of 2018**

### **FALL**

**PH 203A – Theories of Health and Social Behavior** A lot of reading but the readings were helpful and enjoyable, Seth Holmes is an incredible professor and the readings really changed how I think about medicine and public health.

**PH 250B - Epidemiology II** Instructor is very clear and organized and the content and pace are good. Grades are heavily determined by three exams which doesn't account for the investment in homework and readings.

**PH 210B - Adolescent Health** Students can do a real project. Multi-disciplinary view of the target population. Great presenters.

**PH 216A - Biological Embedding of Social Factors** Great discussions on the science behind social determinants of health. Very light workload and flexible deadlines.

**PH 211 - Health and Human Rights** Taught by the Human Rights Center on campus. Great expertise and brought in amazing guest speakers. Explored how to move health and law together in really interesting ways.

**PH C233 - Healthy Cities** Get to collaborate with students in city planning and do a community project.

**PH 291A - Preparation for Public Health Practice** Exposure to careers in public health, meet local public health professionals, and network.

**MBA 209F - Fundamentals of Business** Different approach to thinking compared to public health, broad exposure to management, leadership, and finance.

**PH 224E - Health Care Quality** This goes over the hard science of social determinants of health. The professor is hilarious and extremely knowledgeable, and we had good discussions. You gain on-the-job experience and practice. Great for health professionals.

**PH 218B - Evaluation of Health and Social Programs** Reading is a little heavy but the instructor does a very thorough job of how to conduct good program evaluations with real community partners. Expect a big workload with your evaluation plan for a community partner.

**PH 269E - Current Topics in Environmental Medicine** There's a student presentation at the end.

**PH 257 - Outbreak Investigation** Some of the readings are old but Professor Reingold is smart and entertaining. Light work load.

**PH 220D - Health Policy Advocacy** Professors really challenged you to think on your feet and think more critically. On the spot discussion of advocacy skills and current events. It can be intimidating at times but was a great experience overall. The projects at the end is long and time consuming.

**PH 226A - Health Economics** Decent amount of overlap with HPM breadths but definitely added information. In-depth health insurance discussion.

**PH 129 - The Aging Human Brain** Light reading and interesting material.

## SPRING

**PH 200A - Current Issues in Public Health Ethics: Research and Practice** This is a very challenging but stimulating course and so critical for anyone in public health. Highly recommend the professor Jodi Halpern and the class size of about 18 students.

**PH 201E - Public Health Interventions: Theory, Practice, and Research** This was a great course, almost like a think tank, which included lots of discussion and student driven presentations. Definitely would recommend for any public health student, though especially for those in the Interdisciplinary program like clinicians or those who work in medical settings and want to learn more about creative approaches to the hardest public health problems.

**PH W209 - Comparative Health Systems** This is a must take online class for people interested in global health and health policy. It's hard to balance the course load if it's offered on the second half of a regular semester.

**PH 255A - Social Epidemiology** This course covers equity issues through a social determinants of health lens.

**PH W226C - Economics of Population Health** This is an online course and covers the policy side of social equity issues.

**PubPol 103 - Wealth and Poverty** One becomes a better person out of taking Robert Reich's class. It is very difficult to get into this course though.

**PH 271C - Drinking Water and Health** This course is excellent for those who are interested in water-related projects and how they impact public health. Heavy on reading and expectations but Prof. Smith makes it fun with her innovative jigs - Jeopardy, Movie, interesting case studies (Flint Michigan, Salinas Valley and more), visit to Orinda water treatment plant, stakeholder discussion forum, term paper, and quizzes - all rolled into one.

## **Electives Recommended by Class of 2017**

### FALL

**PH 203A - Theories of Health and Social Behavior.** Best for students who want to learn how to apply health theory to interventions and think about the social determinants of health. Learn how to bring a social justice perspective to public health work. A lot of readings per week but totally worth it. Seth Holmes is a great facilitator and wonderful resource. Definitely take this course if you can!

**PH 204A – Mass Communications in Public Health.** Learn really practical and applicable skills in using media to advance policy and in analyzing how media frames topics. Best for students who want to learn how to make upstream public health changes, how to start a social movement, and how to advocate for policy change. Lots of work, but would still highly recommend. The professor is amazing – she will try to scare you away from the class but just come back the week after and you will get in. She is knowledgeable, dynamic, engaging, and tough but fair.

**PH 220D – Health Policy Advocacy.** Best for students who want to learn really practical and applicable skills in policy and advocacy. Harry Snyder and Tony Iton are amazing! They shift the discussion according to the needs of the students. Great mentorship from professors. Engage in conversation rather than lecture. They expect you to know the readings very well. Work load goes up and down but is manageable. The policy plan is a lot of work but definitely worth it.

**PH 223F – Effective Public Health Negotiations.** Manageable workload but lots of outside prep. Learn practical negotiation skills in healthcare settings. Almost all practice scenarios. Learn how to better your own negotiation style. Best for students who want to learn self-confidence and power of persuasion. I now feel much more confident about asking for what I want and negotiating (including negotiating salaries!)

**PH C253 – Foundations of Public Health.** Light work load. Best for students who want to learn about the global burden of infectious and non-communicable diseases around the world. Work load is not too bad. Wonderful lectures. Great course overall.

**PH 290(9) – Structural Competency.** Gain knowledge in how different structures affect health and health care. Seth Holmes Is inspiring! Lots of amazing discussions. Very laid back and flexible course. Sometimes readings are very heavy on theory.

**Soc Wel 255 - Community Organizing.** Reasonable work load. Best for students who want to learn community engagement and organizing. Great students and speakers.

**PP 260 – Public Leadership and Management.** Weekly assignments, and tough for people that struggle with introspection. Best for students who are interested in the psychology of leadership and want to devote time to personal development. Dan Mulhern is incredibly invested in his students. The course gives you the structure and accountability to work on yourself and your vision/leadership goals with as much help from Dan as you need. You have to be personally interested in self-development and have the personality to learn from different perspectives. Some students struggled with this.

**MBA 292N – Social Impact Metrics.** Good practical skills for working with non-profits. Practice consulting. Case studies are very relevant and practical. Engaging professors and guest lecturers. Awesome experience working as consultant. Heavy for a 2-unit course.

## SPRING

**PH 201E – Public Health Interventions: Theory, Practice, and Research.** Best for students who want to learn design thinking for public health interventions, intervention oriented thinking, and network. Awesome professor, chill work load, but learned a lot. Your classmates really make the class- everyone has “learner” mindset. Leisurely class - workload is just a group presentation.

**PH 204G - Research Advances in Health Disparities: Multidisciplinary Perspectives.** Best for students who want to gain a broad understanding of health disparities. Fantastic discussion and guest lectures.

**PH 214 - Eat. Think. Design.** Tough class. Best for students who want to learn design thinking and work on multidisciplinary projects. Fun community but course is not very structured.

**PH 241 – Statistical Analysis of Categorical Data.** Lots of work- weekly homework forces you to stay on top of the work. Lectures are recorded which is very helpful. Best for students who want stat skills and how to use STATA. You get the stat skills you need for your MPH project.

**PH 281 – Public Health and Spirituality.** Light workload and short weekly readings. Best for students who want to learn about how religion and spirituality intersect with public health. Wonderful professor, great climate of the course, and great discussion.

**PH 290 – Impact Evaluation.** Moderate to heavy work load and weekly homework. Best for students who want to learn impact evaluation, causal inference, STATA, and research methodology. Learn practical skills. Dr. Gertler is fantastic and very accessible. Everything about the course was amazing. Consider taking it S/U.

**Devp 237 – Leadership, Conflict Resolution, and Community Development.** A lot of readings. Super cool guest lectures.

## **Electives Recommended by Class of 2016**

**PH 253G - Sexual Health Promotion and Sexually Transmitted Diseases.** Great, highly recommend. Great guest speakers talking about transgender health, trauma-informed care, HPV, HIV, prevention, etc. Great overview of sexual health issues with a social justice perspective. Really low workload, just weekly readings, a final presentation and an annotated bibliography. No Paper! Taught by the head of the STD control branch at CDPH, who is awesome.

**Social Welfare 274 - Immigrants and Refugees in the U.S.** Good if you want broad overview of the policies and social welfare issues affecting immigrants and refugees in the US. Good readings, covers wide range of issues including children, domestic violence, health care, etc. Enthusiastic, supportive professor. The 2nd half of the class is all student presentation which got kind of repetitive.

**PH 205 - Program Planning, Development and Evaluation.** Good overview of how to plan a program in public health. Enthusiastic, supportive professor. Get to work on a real-world project with a community organization.

**PH281 - Health and Spirituality.** A lot of reading, but can skim it. Weekly write-ups, but very easy. How religion and health interacts as shown in current literature. Doug Oman is great and very accommodating. The class is only 8 weeks, which gives time for MPH project.

**CY PLAN 230 - US Housing, planning and policy.** There was about 4 hours of reading per week, but not necessary. People who want to learn about housing, housing policy, housing advocacy, housing discrimination, etc. Carole Galante is the instructor; she is amazing and she invites amazing people both in HUD and other local and national housing organizations.

**PH 266B - Zoonotic Diseases.** About emerging infectious diseases, one health approach. Dr. Dailey's enthusiasm, amazing guest speakers, 'flipped' classroom – more interactive and engaging.

**PH 291C - Participatory Research.** Lots of reading and two papers. Moderate workload. CBPR qualitative research is awesome. Readings were good. Too much small group work.

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**PH243C - Information Systems in Public Health.** Easy optional reading. Overview of current info tech systems in healthcare. Easy course load stimulating guest speakers at cutting edge of informational technology.

**PH216A - The Biological Embedding of Social Factor.** Best for students who want to learn about the biological underpinnings of social discrimination/poverty etc. affects health. Very light work load. Inspiring professor.

**SW 210C - Aging Processes.** Optional reading. In-class discussion most important. Professor was a very kind, enthusiastic, knowledgeable, and overall excellent professor. Variety of topics related to aging. Kind of slow paced class sessions, but gave me room to think.

## Electives Recommended by Class of 2015

**PH 181- Population and Poverty.** Not a big workload. Good overview of all the issues facing our world today! Amazing, world-renowned and passionate professor (Dr. Potts).

**PH 203C – Theories of Health and Social Behavior.** How to think about health, policy, funding, the body and PH methodology more critically. Excellent professor (Seth Holmes, MD, PhD) with amazing class discussions. You get introduced to a whole new way of thinking so that we don't keep repeating the same mistakes or making vast assumptions. Lots of reading - 60 pages per week.

**PH 204 – Mass Communication and Public Health.** Significant workload – 405 hours per week of reading, large semester-long project, and other assignments. Helps us understand how to use media to advance PH. Learning a real skill set – practical and you actually practice skills you're learning. More work than my other classes – probably should be 4 units rather than 3. I learned more in this class than any other class. I heard from alumni and this was very valuable and useful. Lori Dorfman is an amazing instructor who inspires her students to take action. Writing an op-ed and letter to the editor as an assignment was a highlight. The group project was tough but it still wouldn't deter me from the experience. Time intensive but learned the most SKILLS so far! Good guest lecturers. Lots of reading and assignments.

**PH 206 Core Nutrition Topics.** Good background for any student. Barbara Laraia is super nice and laid back. Topics are interesting, self-directed topics are great. Paper and presentation.

**206C - Nutrition Epidemiology.** Epi study design, critical thinking, STATA. Kris Madsen is an amazing teacher. Nutrition students are nice!

**PH 213 Family Planning.** Great class with good discussion of global issues but very high workload.

**PH 220D – Health Policy Advocacy.** Manageable short readings each week and one final paper -- ~2 hours/week. How to take a PH issue and come up with an advocacy plan to address it. Great guest speakers and group discussion with manageable workload. If you don't like group discussion and speaking up in class, this course probably isn't for you unless you're trying to develop these skills. A great class for thinking about leadership and how to be a force for positive change in your community. Pretty leisurely. Learn about policy advocacy, coalition building, capacity building. Discussions were thoughtful, guest lectures were incredible, and students brought snacks! Not a lot of direction about final project until the end.

**PH 224 – Healthcare Management.** Take any class with Professor Hector Rodriguez!

**PH 226D Global Health Economics.** Great speakers. Learn how healthcare systems work.

**PH 224D – Health Organizations and Management.** Course is largely reading based with couple of short papers and a group presentation. Learn about organizational management and how it applies to health care. Instructor is very friendly and enthusiastic and engages the class very well. Is heavily theory based but with concrete examples.

**PH 235 - Impact Evaluation.** Weekly STATA assignments and major course project. Learn methods for evaluating impact of program or intervention. Instructors do great job of explaining material with real examples. This was the first year with STATA, which was not so good. But will likely improve. A fair amount of reading and almost weekly problem sets (3-4 hours each) and major final paper. Overall, an above-average workload. Best features: thinking through all the logistical challenges of designing an impact evaluation was really useful,. Also, some speakers talked about the future of impact evaluation, which was interesting. It's a lot of time if you're designing a hypothetical evaluation. You learn to write a grant, design randomized control trials and do an impact evaluation. Taught by Paul Gertler and Jack Colford-- two big shots. Homework is intense. Impact evaluation is a specific program evaluation tool – it's excellent. Learn about impact evaluation – different methods and designing a study. Good class textbook and project. STATA homework not so great. Great knowledge based on real world examples and study design. A lot of STATA -- some took MANY hours. Pretty time intensive. Great lectures about components of impact evaluation, pretty theoretical. STATA homework took more time than the 1 unit that is allotted.

**PH 240 - Community Needs Assessment in Maternal and Child Health.** Heavy workload. You will be paired with a community group or member and actually do a CNA or related project. If you don't have an MPH project, you could use this class to partner with an organization and work on your year-long project. The teacher was a bit distracted and not well prepared with good class activities. Grading criteria very unclear.

**PH245 - Multivariate Statistics.** Four homework assignments plus a final project--- overall, a light work load. Best for students who want more advanced stats knowledge and computing skills. Class is very useful and practical – you can apply skills to your project. First time this professor taught the course and it was a bit more confusing than it could have been. Great for learning different multivariate tools. Few mandatory homework assignments (4 total) plus one final project. Does not go too into depth. New lecturer- feels like he's still working on his teaching style, but is open to feedback. Could use more real world examples.

**PH 250B -Epidemiological Methods II.** Tough, quick-paced, weekly optional homework, many readings. You get more in-depth coverage of study design and general epi. Great lecturer, well organized, you learn a lot. It may be too in-depth for students not that interested in epi.

**PH 253 - Global Public Health Core Course.** Readings interesting but did not have to do them. Good workload – 2 policy papers and a group project. Built around several issues in Global Health. I enjoyed all the different perspectives and presenters and group discussions. It took a while to get our first assignment back and comments came just before the next assignment, but it was still OK. Lots of good speakers and info.

**PH 256 -City Planning and Healthy Cities.** A lot of reading – ~100 pages per week and required online responses. Also, big paper at end. Good for students interested in social justice. The readings were really interesting, diverse and important. The students are a smart bunch. But the professor isn't good at stimulating a lively debate.

**PH 260A – Introduction to Infectious Diseases.** Medium load and required intermediate knowledge of virology and immunology. Best for students who need comprehensive knowledge of infectious diseases. Very organized and comprehensive about infection – it includes etiology, epidemiology, clinical features, treatment, and prevention of almost all infectious diseases. Not so great for MDs – would probably be repeated in medical school.

**PH 290(4) – Health Communication in the Digital Era.** Leisurely pace; weekly blog posts for the class website. Learn how to effectively use social media, start a blog, use multimedia in the public health sphere. I learned a lot and experimented with Twitter, making videos , and class blog posts. The pace was slow and it could have been a little deeper. Teachers for the course listen to feedback and made changes based on class concerns. You get to be creative! Great teachers (Diego and Lisa). Some projects, e.g., video production, take a lot of time.

**PH 290(6) – Healthcare Quality.** Workload is 5-8 hours per week, depending on internship commitment. Taught by COO of SF General – gives solid intro to how to improve healthcare processes and deepens policy background greatly. You do internship at SF General or other organization to practice real work skills. Internship is time consuming. Really special class for clinicians or those interested in process improvement, future COOs, people who want to work at SF General. A lot of reading, two papers, class group project. Learn how to do a QI project using LEAN. You learn a great skill set for doing QI. Group project takes a lot time. Based on a group project that requires 2-3 hours per week. Best for students interested in quality improvement, chronic care, lean management. Instructor is great and passionate about the subject matter. Project can be hit or miss but I think everybody in the class got something out of it.

**PH 298 (40) – Advocacy in Action.** Hands-on advocacy work with an organization. Getting to work with a community partner and learning about their work. I also liked learning from classmates about their placements. This semester the class was small, more organized in the future. If it isn't, you just need to manage your own work. Unlike many other classes, you can put your work for this class on your resume since it's like an internship or consulting project.

**Social Work 250M – Death and Dying.** Great course for anyone working in a medical setting and people working with older adults, long term planning and end-of-life care, or intensive care units. Really wonderful instructor, great discussion about end of life and personal experiences.

**Social Work 265M – Motivational Interviewing.** A new technique for motivating and working with patients to make change. Interactive, great instructor who has taught the course many times. You get a lot of practice with MI!

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## Electives Recommended by Class of 2014

### FALL

**PH 201C - Needs Assessment in Maternal and Child Health :** Best for students who want to learn about program planning. Not much weekly course work but there is a semester-long project. Small seminar group, community involvement. You have to do a project – time consuming but rewarding. Course could use a little more structured discussion.

**PH 204A - Mass Communication in Public Health.** A heavy workload – weekly assignments and readings, and a very large final project. It totally changed my thinking towards public health – very useful course, teaches framing issues around environmental policy changes. Don't let the teacher scare you out of the class! She likes a smaller class size.

**PH 206 - Nutrition Core Course.** Overview of critical issues in PH nutrition. A couple of hours of leisure reading per week. Great topics, lecturers, passionate student who teach other. Professor Laraia is laid back. Interesting topics, interactive, wonderful teacher. Great class without too much work!

**PH 290 (4) - Health Communications in the Digital Era.** Global health mobile and web technology. Caricia Catalani is a great professor! But unfortunately class schedule interfered with seminar so had to leave early. Had to write up 5 blogs based on readings and present on one mHealth technology, and propose a new mHealth technology and present to the class in a powerpoint format. Totally doable. Professor was amazing and has great experience in the field. I learned a lot about new mHealth applications, wrote my first blogs, and created an mHealth innovation that ties into my public health interests. It was a very creative and hands on class – refreshing.

**PH 290(6) - Healthcare Quality.** My favorite class because the professor (Iman Nazeeri-Simmons) is very engaging and topics very useful, especially for those interested in healthcare administration. Tons of work – semester-long project with a hospital/clinic is very useful but very time intensive. Class is so popular – don't let professor scare you away. She is amazing! She tries to weed out class to get smaller seminar. Two hours of reading per week; semester-long project; two other short papers and final paper. Very informative and dynamic professor, well run and organized. Seminar with 20-30 students. It's the first time she taught the course. Group project with community partner had logistical challenges but professor was made aware and will make changes for next year. Course is very competitive to get in to – must go the first day to get admitted.

**PH 290(8) - Family, Housing and Health.** Light work load, no midterm or final. This course was taught in the problem-based learning pedagogy, and was my first class ever taught this way. It was a small multidisciplinary group (MDs, social workers, PH students, an architect) which enriched the discussions. There were three professors overseeing this course and it was awesome being able to hear from all of them. Class discussions were facilitated and run by students and we went over five different case studies over the semester. Excellent class for social workers or those who will need to know more about policies, resources and interventions related to housing and health, and how to go about finding them.

**Business (Haas) 256 - Global Leadership.** Professor is awesome, class is engaging. Hard to get in to.

## SPRING

**PH 200D - Global Nutrition and Food Policy.** Instructor is awesome!

**PH 201E - Public Health Interventions** - Very supportive and knowledgeable faculty. Safe, creative space to grow as a public health practitioner.

**PH 205 - Program Planning, Development and Evaluation.** Grant writing skills and logic model. You walk away being able to plan a program! A lot of work - should be 4 credits.

**PH 212C - Immigration and Health: A U.S.-Mexico Binational Perspective.** Covers important topics in Latino migration and health. Overview of many issues affecting immigrants. Great professors, students from a variety of backgrounds.

**PH 216A - Biological Embedding of Social Factors.** Course is about epigenetics, social determinants of health, racism etc. Open forum to discuss cutting edge topics. Sometimes gets into nitty-gritty of science but course meant for non-science background people.

**PH 219E - Qualitative Methods** Light to moderate work load. Very good professor, interesting and interactive assignments although readings were often too theoretical.

**PH 281 - Public Health and Spirituality.** Great readings, laid back professor and class discussions. Class is half a semester only (first half).

**PH 243C - Information Systems in Public Health.** Learned about health-related technology. Very interesting topic, light workload. Survey course - so not super detailed.

**PH 257 - Outbreak Investigation.** Professor Reingold is incredible.

**PH C271G - Health Implications of Climate Change.** Global health, air quality, city planning. Some climate modelling readings were very complex.

**PH 290(2) - Designing Innovative Public Health Solutions: Eat. Think. Design.** Lots of work by the assignments are really fun. Design, prototyping, ethnographical interviewing. Fantastic course and great instructors, interdisciplinary group of students. Creative design thinking. Collaborative learning projects. Fun and useful! Group project working with a community organization. Lots of work but worth it.

**PH 290(8) - Public Health Journalism.** How to write articles, blogs, etc. Useful skills! Impacted course, but instructor will do small group independent study if you can get a few people together.

**PH 291 - Preparation for Public Health Practice.** Mini skills sessions. Useful for communications skills – amazing! Especially speech skills session. Team building, how to give good powerpoint presentations, program management and evaluation.

**Public Policy 103 – Wealth and Poverty.** Robert Reich instructor – incredible class. Take it – you will learn a lot! Overview of wealth disparities in the U.S. Sign up early – class fills up fast. A moderate amount of reading.

**Public Policy 290(2) - Negotiations Seminar.** Basic negotiation theory based on Harvard's negotiation program. Excellent instructor (Amy Slater).

## Electives Recommended by Class of 2013

### FALL

**PH 245 - Multivariate Statistics.** Good class. Lectures are recorded which is super helpful. Maureen is a good teacher and easily accessible for questions.

**PH 250B - Epidemiology.** Good class. LOTS of reading and outside work. Fast pace.

**PH 204A - Mass Communication and Public Health.** This class should be required, and the first half of it was really fun... the group projects were hard, but I think everyone learned a great deal, and it was the most down to earth public health class I took.

**PH 290 (1) - Impact Evaluation:** Great class if you want to learn evaluation. Lots of work, but you will learn a lot. The instructors are awesome! Small class with lots of time for questions. Super interesting material, final project was time intense but a very good learning tool, readings and lectures were great, but readings were long and could be quite dense, probably my most high yield course during the semester.

**285A - Injury Prevent and Control.** Super interesting material, small discussion oriented class, few easy/low key assignments, final presentation, mid/low time requirement outside of class... depending on if you read the readings or if you skim them... found it very useful as a medical

student interested in primary care...

## **SPRING**

**PH 200A - Public Health Ethics..** My favorite class this semester. We think about the "why" behind what we do in public health - has spilled over and started informing how I approach my own discipline (landscape architecture) and how to teach my own theory class in the College of Environmental Design.

**PH 217C - Aging and Public Health.** Interesting seminar covering a very diverse set of topics relating to the elderly. Great for anyone who may have to work with the elderly in the future found it useful as a future MD; there were also a lot of Social Welfare students in the class. Weekly readings to prep for class discussion. Final paper at end of class/semester.

**PH 219E - Qualitative Methods.** Excellent class. Karuna is a great lecturer with a lot of qualitative & mixed methods research experience. Good balance of lecture & in-class activities. Assignments useful and fun to do.

**271G - Climate Change and Health.** interesting class, some overlap with 200C2 (Environmental Health Breadth course). Weekly readings and discussion. Poster presentation is final assignment. Covered lots environmental health topics that I was previously unfamiliar with. Some topics were pretty dense, especially since I basically didn't know anything about environmental health.

**PH/EH 272A - Geographic Information Science for Public and Environmental Health.** Very time-consuming, but I am learning a valuable new skill to use in public health. Clearer lectures than those taught elsewhere on campus. Class size is good and Alberto and Diane (the GSIs) are very supportive, patient and awesome.

**PH 281 - Public Health and Spirituality.** Really interesting readings, only 1/2 the semester, 2 units, short weekly assignments, option of a take home final or short final paper.

**PH 290 - mHealth Experiential Learning:** Excellent class and instructors!

**PH 290 (2) - Designing Innovative Public Health Solutions.** Excellent class! Applies methods from design, business, and engineering to creating solutions for PH problems. Excellent instructors and a fun class. Very challenging, always surprising, this class helps me re-learn how to approach projects and collaborate in a playful way. Very time-intensive, but I am also learning so much about pushing past my comfort zone.

**PH 290 (11) - US Food and Drug Administration, Drug Development, Science and Health Policy.** Interesting topics, readings and lectures can be quite dense/technical, readings can be quite long. Relevant for people interested in medicine, pharm, infectious disease, law, drug development, & drug regulation. Focus is on HIV/AIDS and Hepatitis C.

**291A - Preparation for Public Health Practice.** One-unit workshop, covers topics that would be useful for any future professional, not just people going into Public Health. You are only required to attend 11 of the 2 hour sessions. Lots of really dynamic speakers, usually involves class participation in some sort of group or partnered activity. Very little prep required.

**UNIVERSITY OF CALIFORNIA BERKELEY SCHOOL OF PUBLIC HEALTH**  
**INTERDISCIPLINARY MPH PROGRAM**  
**PROJECT PARTNERSHIP AGREEMENT 2021-22**

*This work plan should be developed collaboratively by the community partner and student(s). All items must be agreed upon by both parties. Due TBA – please post to bCourses and email to your project adviser*

---

**Project Title**

**Brief Project Description**

**Project Objectives (each objective must be SMART: Specific, Measurable, Attainable, Relevant and Time-bound)**

**Expected Project Deliverables/Products**

**Sustainability Plans**

**Dissemination Plans**

**Communication between Student and Community Partner**

*Frequency of Progress Updates (check one)*

- |   |  |
|---|--|
| <input type="checkbox"/> Bi-weekly        | <input type="checkbox"/> Once per month        |
| <input type="checkbox"/> Once per quarter | <input type="checkbox"/> Other (specify _____) |
- 
- |   |  |
|---|--|
| <input type="checkbox"/> Bi-weekly        | <input type="checkbox"/> Once per month        |
| <input type="checkbox"/> Once per quarter | <input type="checkbox"/> Other (specify _____) |

*Frequency of In-Person Meetings*

**Community Partner Liaison**

Name \_\_\_\_\_ Title \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

**Signatures**

*The undersigned agree that the project plan outlined above meets a self-defined need of the Community Partner and engages the student in meaningful, specific efforts to meet that need. Both parties will retain a copy of this agreement, commit to regular communication and problem solving as needed, and will contact UCB Program Faculty promptly should any concerns arise.*

Community Partner Liaison\_\_\_\_\_

Student(s)\_\_\_\_\_

**UCB Interdisciplinary MPH Program Faculty**

- Anke Hemmerling
- Karen Sokal-Gutierrez

# **Literature Review Guidelines for MPH Project**

(due TBA)

## **Purpose:**

The literature review will inform you of the body of research relating to the topic of your project. The best literature reviews are those that contextualize the project and its importance to public health, and discuss the shortcomings and successes of existing research to address similar questions/needs. For your reference, you can browse through several sample MPH project reports of recent years in your handbook, or browse through MPH project reports of recent years and samples for the literature reviews, all are posted on BCourses.

## **Length and format:**

Approximately 5 - 8 pages, double-spaced

## **Outline:**

Literature reviews should use the following outline:

### **I. Title**

### **II. Abstract**

### **III. Introduction**

Describe the importance of the topic, both broadly and with respect to the specific population(s) served by your project, in a style appropriate for academic settings.

### **IV. Main themes in the literature**

This must reflect synthesis across sources as opposed to straightforward linear summaries  
of identified relevant articles.

### **V. Conclusions/lessons from the literature**

- i. Summarize the lessons from the literature
- ii. Identify what is still lacking in the literature

### **VI. Reflection on application of literature to, and implications for, planned project**

### **VII. Bibliography**

Be sure to include proper referencing of all cited sources. (e.g. AMA style  
[https://owl.purdue.edu/owl/research\\_and\\_citation/ama\\_style/index.html](https://owl.purdue.edu/owl/research_and_citation/ama_style/index.html);  
AJPH; or other styles from peer reviewed journals in the field).

## **CPHS (IRB) - Ethical Review of your Project**

**Plan ahead** - Many researchers are on set schedules for their research and theses. Plan in advance to allow enough time for the review cycle which can take some time depending on the circumstances. Review cycles, depending on the quality and completeness of the submission, can take up to 8 weeks or longer.

**Seek feedback from colleagues** - Student researchers should work with their faculty advisors closely for mentoring, drafting, and other assistance with the research protocol. Obtain a copy of an approved protocol from a colleague to see commonly used language.

**Complete/comprehensive informed consent process** - Researchers should ensure that the consent documents are clear and concise and should be in a language that is understandable to the subject. See the Informed Consent Guidelines, Consent Builder, and templates on our website (<http://cphs.berkeley.edu/content/informedconsent.html>).

**Clearly describe study procedures** - Remember that the reviewer needs to be able to put him/herself in the shoes of the subject and they can't do that if there is not enough detail. The protocol should include how long each procedure will take, frequency, and estimated total time commitment for the subject to participate in the study.

**Confidentiality** - *Privacy* refers to the individuals' right to control access to themselves. On the other hand, *confidentiality* refers to how private information provided by individuals will be protected by the researcher from release. Describing how the confidentiality of research information will be maintained is an important element of the protocol & consent process.

**Anonymous data collection** - *Anonymous* data collection means that no identifiable information (e.g., name, address, student ID number, email, phone number, etc.) is connected to the data either directly or through a coding system, *at any point in the study*. Therefore, even if the identifiers are separated from the data immediately after collection, the study would not be considered anonymous. In addition to videotapes and photographs, audio recordings are considered to be identifiable; therefore any data collection that involves audio recordings, video recordings, or photographs of subjects would not be considered anonymous. It is also possible that multiple pieces of information, none of which are identifiable on their own, may uniquely identify a person when brought together; in this case, the data would be identifiable and would not be considered anonymous.

**Risks/discomforts from study participation**- Remember to include both the possible risks *and* discomforts from participation in the study. With all studies that involve the collection of private identifiable information, there is a chance that confidentiality could be compromised. However, researchers should also keep in mind that some procedures, including surveys and lab experiments with deception might cause some type of discomfort (whether physical or

emotional). When making a risk assessment, the Committee takes into account both probability and magnitude of harm, so researchers should address both of these factors in the protocol.

**Guidance on specific topics** - There are guidance documents on specific topics that may be germane to your research - what requires CPHS/OPHS review, deception in research, subject recruitment, data security, international research, etc. (<http://cphs.berkeley.edu/guideline.html>)

**eProtocol Quick Guides:**

[http://cphs.berkeley.edu/eprotocol\\_guides.html](http://cphs.berkeley.edu/eprotocol_guides.html)

How to create a protocol:

<http://cphs.berkeley.edu/eprotocolguide/investigator/create.pdf>

How to check for completeness:

<http://cphs.berkeley.edu/eprotocolguide/investigator/check.pdf>

How to submit a protocol:

<http://cphs.berkeley.edu/eprotocolguide/investigator/submit.pdf>

How to respond to comments:

<http://cphs.berkeley.edu/eprotocolguide/investigator/comments.pdf>

**Questions?**

Call our office: 510-642-7461. We answer phones during business hours: 8 am - 5 pm, M-F.

Drop-in at 2150 Shattuck Ave., Suite 300.

**Website:** <http://cphs.berkeley.edu/> (use the search box) Email: ophs@berkeley.edu

\*If you have submitted an application, contact your assigned panel manager.

**Commonly Requested Revisions:**

- Include maximum total sample size. If unsure, over-estimate.
- Include recruitment details specific to the proposed study.
- Include copies of all data collection materials.
- Include interview questions. At minimum, include topics to be explored during the interview.
- If obtaining consent online, choose the "Unsigned Consent" type. Be sure to complete all text boxes.
- Include a PDF copy of the Student Investigator's CITI completion report. Complete Group 1(bio-medical) or Group 2 (social-behavioral) for Research Investigators and Key Personnel.
- Provide thorough but concise answers. Only include information relevant to the question.
- When responding to comments, be sure make the applicable revisions to the protocol information. Be sure to click on the "submit to IRB" button to submit your responses and revisions.
- Include anticipated benefit to subject and society in the protocol and the consent form. If no benefit to subject, state so.
- Make sure information is consistent between study procedures and the consent form.
- Template Text for Adverse Events and Reporting Section in section 13F (biomedical)/11C (social behavioral) of eProtocol: "An initial report will be made to the OPHS Director within no more than one week (7 calendar days) of the Principal Investigator learning of the incident. The report can be made by fax,

mail/delivery, phone, or email. The initial report will be followed by a formal written report, submitted via eProtocol, within no more than two weeks (14 calendar days) of the Principal Investigator learning of the incident."

## Some Current Positions Held By Interdisciplinary Alumni

(main source: 2012 Survey of Interdisciplinary Alumni)

- U.S. Surgeon General
- Academic Coordinator, UCSF and Lecturer, UC Berkeley
- Assistant Clinical Professor, UC Irvine, Division of Obstetric Oncology
- Assistant Professor of Pediatrics. Seattle Children's Hospital, University of Washington School of Medicine
- Assistant Professor, UCSF -- Hospitalist Physician
- Assistant Professor, Stanford University; Advisor - Ethics Subcommittee of Advisory Board to the Centers for Disease Control and Prevention; Alta Bates Summit Medical Center - Palliative Care Chaplain; and St. Mary's College - Project Advisor
- Assistant Team Leader, Pathways to Housing DC, Assertive Community Treatment
- Associate Professor, Kumamoto University, Japan
- Associate Professor, University of Toronto, Factor-Inwentash Chair in Child Welfare
- Behavioral Psychologist, Golden Gate Regional Center Clinical Psychologist, Department of Social Services/Social Security Administration
- Executive Advisor for Strategic Partnerships, CamFed USA Foundation
- Cardiac Anesthesia Fellow, Stanford University
- Clinical Assistant Professor, Stanford University
- County Governor of South-Trøndelag (Fylkesmannen i Sør-Trøndelag, Norway) - Chief County Medical Officer
- Director, Associates in Hospital Medicine / Methodist Division, Thomas Jefferson University Hospitals
- Director, CA Emergency Medical Services Authority / State appointed position
- Director, TEACH Program and Associate Clinical Professor, UCSF
- Fellow in Preventive Medicine and Public Health, University of Rochester Medical Center
- Fellow, Jiangsu Province Population and Development Research Center
- General Pediatrician, Kaiser Permanente
- Internist, Permanente Medical Group
- Laboratory Advisor, University Research Co., LLC,
- Managing Director, Absolute Return for Kids US
- Medical Director, Housing and Urban Health, San Francisco Dept. of Public Health/ Special Advisor to the Executive Director, US Interagency Council on Homelessness
- Medical Social Worker. Pathways Home Health and Hospice
- Nurse Practitioner, Stanford Hospital and Clinics
- Orthopaedic Trauma Fellow, Wellspan Orthopaedic Surgery

- Physician (Nunavut) Professor (University of Calgary) Partner (Habitat Health Impact Consulting)
- Pediatric Medical Director, San Mateo Medical Center; Keller Center for Family Violence Intervention
- Policy Analyst, Instructor and Researcher, University of California School of Public Health Center for Infectious Diseases Emergency Readiness
- Project Director, Global Access to Technology for Development (GATD) /
- Professor (University of Calgary) / Partner (Habitat Health Impact Consulting)
- Professor at PSIA-Sciences Po Paris and College de France, Chair: Knowledge Against Poverty
- Program Director, Division of Cancer Control and Population Sciences, National Cancer Institute, NIH
- Program Director, Division of Cancer Control and Population Sciences, National Cancer Institute, National Institutes of Health
- Psychiatrist (solo practice)
- Public Health Medical Officer, California Department of Public Health
- Public Health Physician, State of North Rhine-Westphalia, Health Department, Germany
- Self-employed / Graphic Facilitator & Group Process Consultant
- Resident, Department of Radiology, Stanford University Medical Center
- Self-employed in house calls and geriatric consultation practice; self-employed as geriatric consultant to [www.caring.com](http://www.caring.com). Also now blogging to raise awareness of needs of geriatric health providers at [www.geritech.org](http://www.geritech.org).  
Senior Medical Officer, Danish Health and Medicines Authority
- Student at UC Davis School of Veterinary Medicine
- United States Air Force Commander, 374th Medical Group United States Forces Japan/Surgeon General, 5th Air Force/Surgeon General (responsible for 11,000 people)

## **2012 Alumni Survey Results**

N=61 – 22% response rate

### **Some Geographic Locations of Alumni**



## Center for Public Health Leadership and Practice CAREER SERVICES

### **Jobs & Internships**

Search for full-time or part-time jobs, fellowships, GSI/GSR, project & volunteer opportunities and internships utilizing the SPH jobsite:  
[sphjobsite.berkeley.edu/students/](http://sphjobsite.berkeley.edu/students/)

### **Career Counseling**

Make an appointment to discuss career decision-making and job search strategies:  
<https://publichealth.berkeley.edu/student-life/career-and-leadership-development/career-services/>

Have your resume and cover letter critiqued, conduct a mock interview or learn about career resources available to SPH students. Career counseling is also available to discuss applying to medical school, negotiating salaries and job offers.

### **Career Assessment**

Find out about the options available for you to evaluate your personality, interests, skills and values as they relate to your career choices. Make a career counseling appointment for more information.

### **Workshops and Programs**

Topics include career planning, interview preparation, resume writing and job search strategies. Workshops are listed on the SPH jobsite calendar and in Career Services emails sent out on the student listserv.

### **Special Events**

Interact with employers and public health professionals at a variety of special events hosted by CPHP, including Career Café, 291 Professional Development series, annual Career Fair, employer information sessions, guest lectures and conferences.

More information here: <https://publichealth.berkeley.edu/student-life/career-and-leadership-development/>

## INTERDISCIPLINARY MPH PROJECTS - DETAILS

2009-2021

Disclaimer: This fairly complete selection of MPH projects of recent years aims to provide additional details about methodological approaches that can help incoming students to quickly gain an understanding of projects conducted in the past. The provided remarks do not aim to be comprehensive summaries. If a particular report is of interest to you, you can find all project reports (anonymized) on the PH 292 BCourses website in the MPH Research Project Database.

### Year 2021

Title	Abstract
Assessing intentions to vaccinate against SARS-CoV-2 and examining perceptions of and obstacles to SARS-CoV-2 vaccination among adults living in Lebanon with a cross-sectional, online, mobile study	The COVID-19 pandemic is an additional burden on Lebanon's strained population, fragmented healthcare system, and political, economic, and refugee crises. Understanding the population's intentions to vaccinate and perceptions of and obstacles to SARS-CoV-2 vaccination can inform and improve Lebanon's vaccination efforts and relieve the pandemic's impact. We performed a cross-sectional study using an online, remotely delivered questionnaire in Arabic via convenience "snowball" sampling to rapidly assess the perceptions of 1,185 adults residing in Lebanon in Jan-Mar 2021. 46.1% of survey participants intended to take the SARS-CoV-2 vaccine when available to them, 19.0% indicated that they would not, and 34.0% were unsure. The most common reasons for hesitancy were concerns about safety, limited testing, side effects, and efficacy. We recommend disseminating clear, consistent, evidence-based safety and efficacy information on vaccines on the most commonly reported news sources by participants: television, social media, and news websites. Repeated assessments of intentions to vaccinate, concerns or obstacles regarding vaccination, and changes in motivations should be performed, especially to assess the perspectives and needs of populations underrepresented in this study.
The impact of distance learning on physical activity, mental health, and learning among 4th graders during the COVID-19 pandemic.	<b>Background:</b> Prior to the pandemic, childhood obesity and the associated increased risk of cardiometabolic disorders in adulthood were a concern, especially in children from lower socioeconomic status (SES) households. New reports are now also showing that the coronavirus disease 19 (COVID-19) pandemic is affecting the educational performance and mental health of children. <b>Objective:</b> The objective of this study is to describe changes in health habits, learning and emotional wellbeing of 4th graders' distance learning during the COVID-19 pandemic compared to in person learning in an under resourced district. <b>Methods:</b> We conducted a survey of fourth-graders between 4 Dec 2020 and 5 February 2021. Inclusion criteria were any registered 4th graders (9 - 10 years old) in the San Pablo School district for the 2020 - 2021 academic year. Seventy-four fourth-graders were enrolled in the overarching study. Two self-administered surveys were used to assess perceived benefits and challenges of distance learning on physical health, mental health, and learning. Students were asked about their habits related to diet, physical activity, sleep, and hydration. Questions also focused on mental health and their learning experience. Summary and chi-square statistics were used in analysis. <b>Results:</b> Fourth graders report that they experience more enjoyment in learning, are more physically active, and are happier when learning at school. In contrast, they are

	<p>more distracted, consume more junk food, and have more non-educational screen time while distance learning compared to in school learning.</p> <p>Students were asked if they were worried that they or a family member would catch COVID-19. Out of the 46 respondents, 78% are worried that a family member will become infected with COVID-19, and 56% are worried that they will also become ill. This cohort was also surveyed on frequency of anxiety, worry, depression, joy, and hope within the last week. While 50% experienced hope and joy on a daily basis, it is worth noting that many students reported feeling daily anxiety/nervousness (32%), loneliness (26%), depressed feelings (14%), and were unable to stop worrying (11%). Analysis using chi-square statistics determined that self-reported anxiety (<math>p = 0.25</math>) and depression (<math>p = 0.10</math>) was not related to worry about the pandemic. The rate of reported anxiety and depression is also supported by the elevated average Strengths and Difficulties Questionnaire (SDQ score of 19.8).</p> <p><b>Conclusions:</b> Children reported decreased learning and increased distractions while learning from home. The reduction in physical activity and increase in processed food consumption is concerning given the increased obesity prevalence among school children before the COVID-19 pandemic. Survey findings highlight students' concern about themselves and family members getting ill, but was not significantly associated with the depressive symptoms or anxiety reported. However, the prevalence of reported feelings of depression and anxiety among school children is concerning and needs to be addressed by the community.</p>
Recovery and Resilience in the Canal Community: An In-Depth Analysis of Economic Impacts and Solutions During the Covid-19 Pandemic	<p><b>Background:</b> Public health pandemics, such as Covid-19, not only impact the physical health and wellbeing of communities, but often have far-reaching effects on their social, psychological, environmental, and economic welfare. The Coronavirus Pandemic has highlighted the significant inequities experienced among those who are Black, Indigenous, and People of Color (BIPOC), especially in the areas of housing instability, unemployment, and debt accrual. This study investigates the socioeconomic impacts of Covid-19 on residents of the Canal neighborhood ("The Canal"), a low-income Latinx community in Marin County, California. This study also uplifts mitigation strategies already underway to facilitate post-pandemic recovery efforts.</p> <p><b>Methods:</b> This study utilized a mixed-methods, community participatory approach in which community leaders from a local nonprofit, Canal Alliance, administered a survey assessing the impact of Covid-19 on Canal residents. Additionally, community stakeholders including nonprofits, small businesses, and public officials were interviewed, and their field notes were analyzed through exploratory open coding.</p> <p><b>Results:</b> On a macro level, the data showed that Canal residents were severely impacted by Covid-19 in the form of massive job loss (61.2% of respondents were unemployed or under employed) as well as financial stress related to eviction, housing instability and debt accrual (78.8% of respondents struggled to cover rent and often had to borrow money from friends and family).</p> <p><b>Conclusions:</b> In spite of the severe socioeconomic impacts of Covid-19 on The Canal, there is significant opportunity for recovery and growth because of an overwhelming investment by residents, community-based organizations, and public officials to support those who have been financially impacted by the pandemic. Some key areas of policy focus include expansion of affordable housing, pandemic-resistant workforce development, and restructuring of social services to increase accessibility. This report will explore recommendations related to strategic funding of community-based programs as well as short term and long term solutions for economic recovery.</p>
Advancing Universal Health Coverage: Models,	Policy Analysis

Strategies, And Outcomes In Four Countries	<p><b>Objectives:</b> 1) Describe Universal Health Coverage including history, concept, scope and importance, methods to monitor and measure progress, and criticisms. 2) Analyze policy strategies to achieve Universal Health Coverage in four countries representing four different UHC approaches – Rwanda, Thailand, Japan, United Kingdom (England). 3) Compare outcomes of Universal Health Coverage in four countries – Rwanda, Thailand, Japan, United Kingdom (England)</p> <p>Studied the process of adopting UHC and the subsequent outcomes in four countries to share learnings for other nations on a similar path. These countries differ in not just their geographies, culture, history, income categories and sociodemographic indicators, but also in how they administer their UHC programs and utilize existing resources for the same. Their health systems also represent different levels of maturity, having established UHC policies at different times.</p>
COVID-19 Contact Tracing and Barriers to Quarantine Among Sexual and Gender Minorities: A Pilot Project	This qualitative pilot project aims to characterize and understand the experiences of sexual and gender minorities (SGM) and identify barriers they may have with contact tracing and vaccine uptake in the context of COVID-19. Minority populations have demonstrated unique vulnerabilities and barriers to accessing resources in the context of COVID-19 infection or contacts, and there is a lack of data specifically concerning SGM communities. The aims of this research are threefold: 1) To understand how the contact tracing process is perceived by LGBT individuals (both cases and contacts) and how this perception impacts information sharing with public health workers; 2) To identify barriers to effective information-sharing, and quarantining, as well as to consider attitudes towards vaccine uptake and 3) To develop recommendations for improving the contact tracing process for LGBT individuals affected by COVID-19.
The Effects of Telemedicine Visit Type and Patient-Provider Familiarity on Orders in Primary Care	<p><b>Introduction:</b> Telemedicine is increasingly relied upon for care delivery in primary care, but the effect of visit type on clinical ordering behavior is uncertain.</p> <p><b>Methods:</b> Within Kaiser Permanente Northern California, we identified patients who scheduled and completed telemedicine encounters in adult primary care between April 1st, 2020, and October 31st, 2020, while physical distancing restrictions for COVID-19 were in place. We collected patient sociodemographic and clinical characteristics, as well as measures of technology access, and categorized the most common primary encounter diagnoses within our cohort. We then compared physician orders for medications, lab and imaging studies within eight diagnosis groups (Skin &amp; Soft Tissue, Musculoskeletal Pain, Back Pain, General Gastrointestinal, Hypertension &amp; Diabetes, Mental Health, Upper Respiratory, and Abdominal Pain) by visit type, video versus telephone, as well as by patient-provider familiarity.</p> <p><b>Results:</b> There were 273,301 included encounters, with 122,051 (58.5%) telephone visits and 86,676 (41.5%) video visits. After adjusting for covariates, there was a significant overall increase in probability of orders of all types during video visits compared to telephone visits. The largest effect within diagnosis groups was for Skin &amp; Soft Tissue conditions, where there was a 9.0% increased probability of medication orders during video visits (45.5%, CI 43.8-46.8) compared to telephone visits (36.5% CI 34.8-37.7). There was also a significantly increased probability of diagnostic orders, and a decrease in antibiotic medication orders, during visits with familiar compared to unfamiliar clinicians.</p> <p><b>Discussion:</b> We observed small but significant differences in clinician orders by visit type and patient-provider familiarity during primary care telemedicine encounters.</p>
Qualitative Study: Community Perspectives	This paper uses qualitative methods to explore the perspectives of members of the Re-Imagine L.A. County coalition on crisis response in LA County. Open-ended interviews

on Community-Based Crisis Response Alternatives in LA County	<p>were conducted with 13 community organizations to examine how their organization currently handles crisis and to ask about their views on public safety and the characteristics of crisis interventions that would align with coalition members' visions of safety. Transcripts were also analyzed for emergent themes that were then organized into the buckets of handling crisis and public safety perspectives. For handling crisis, participants discussed alternatives to calling the police, advocating for clients when the police are involved, and the need for non-violent, non-traumatic, and non-lethal physical interventions. When asked about public safety, participants challenged conventional notions of public safety and talked about various ways of creating true safety in their communities, including innovations in crisis response that sounded promising to them. From the interviews, a list of criteria emerged for participants' ideal crisis response and prevention, with a strong leaning for systems based on self-determination. The findings of this study support the need to fund community-based crisis interventions that operate independently from police or the 911 system.</p>
Mental Health Conditions Among Essential Workers at Zuckerberg San Francisco General Hospital During the Covid-19 Pandemic	<p>Since the novel coronavirus (COVID-19) was declared a global pandemic, the World Health Organization has issued multiple statements anticipating a concomitant rise in psychological stressors. Several studies have shown the prevalence of mental health conditions such as depression, anxiety, stress, insomnia, among nurses and physicians involved in the initial mitigation response against COVID-19, but limited data exists on the mental health impact that this pandemic has had on non-clinical staff members designated as essential workers.</p> <p>To characterize the psychological impact of the COVID-19 global pandemic on essential workers, a cross-section study was conducted by gathering anonymous surveys from 1,171 of 6,637 eligible clinical and non-clinical essential workers at the Zuckerberg San Francisco General Hospital and Trauma Center (ZSFG), the largest public hospital operated by the San Francisco Department of Public Health, from July 22, 2020 to September 2, 2020. Respondents were mostly female (73.8%), median age 40 (IQR: 33, 50), predominantly nurses (33.7%), and Asian (47.7%) or White (38.4%). Using physicians as the reference group, severe depressive symptoms were significantly higher among nurses (aOR 1.93, 95% CIs 1.12 – 3.46), social service employees (aOR 2.61, 95% CIs 1.35 – 5.17), service workers (aOR 2.55, 95% CIs 1.20 – 5.48), and administrative staff (aOR 2.93, 95% CIs 1.57 – 5.61). When measuring the impact of financial strain on the relationship between job category and mental health outcomes, social service employees (aOR 2.10, 95% CIs 1.06 – 4.21) and administrative staff (aOR 2.29, 95% CIs 1.21 – 4.43) were significantly more likely than physicians to experience severe depressive symptoms.</p> <p>This study contributes evidence toward the disparities of mental health impacts that COVID-19 has had on various occupational roles within the healthcare system beyond physicians and nursing staff. Further studies are necessary to measure the impact of suggested policies and practices to prevent poor mental health outcomes and improve overall wellness among these essential workers.</p>
An Ecological Analysis of Exposure to PM2.5 and COVID-19 Mortality in California: A Planning Project	<p>Chronic exposure to fine particulate matter (PM2.5) has been associated with increased rates of emergency department visits, hospitalization and deaths from asthma and heart disease, and may be associated with an increased incidence and exacerbation of chronic obstructive pulmonary disease (COPD).</p> <p>Positive associations have also been shown between short-term exposure (i.e., weeks) to PM2.5 and the rates of ED visits and hospitalizations for influenza-like illness. Toxicologic models describing the impact of PM2.5 on lung tissue have demonstrated free radical injury, imbalanced intracellular calcium homeostasis, and inflammatory injury due to</p>

	cytokine overexpression. Recently, a positive county-level association has been found between air pollution and COVID-19 mortality in the United States and Europe. However, analysis accounting for confounders and potentially disproportionate effects on vulnerable communities has not yet been completed. Additionally, detecting an association with improved spatial refinement (i.e., to the neighborhood or census-tract level) would increase the positive public health impact to communities by providing an evidence basis for specific policy initiatives. The present study aims to bridge these gaps by examining both long-term and proximal exposure to PM2.5 in relation to COVID-19 mortality and other important covariates including race/ethnicity, income, obesity and smoking rates, population density, segregation, and occupation. Covariate datasets will include the American Community Survey, the Behavioral Risk Factor Surveillance System, the California Health Interview Survey, CalEnviroScreen, U.S. Census, and other data as needed. Multivariate and mixed statistical models will be preformed on the data to estimate COVID-19 risk, and results will be assembled into a geographic information system (GIS) platform.
Diagnosing Racism in Medical Education: Medical Student Experiences and Observations of Racism in Medical Education	Diagnosing racism in medical school education, and organize it into critical context, examine existing tools, define tactics. Compare curricular standards across schools. What skills will future clinicians need to build anti-racist practices? Understanding medical students' experience with racism. Phase 1: survey among MD/ DO students on racism in medical education. Phase 2 to come: Delphi Process.
What's the Harm? Examining the Effects of Barriers to Medication Abortion: A Scoping Review	Research shows that many women prefer medication abortion to procedural abortion, and that it holds certain advantages, including confidentiality and the ability to avoid an in-clinic or surgical procedure. It is less clear what harms are caused by the inability of abortion-seeking people to access a wanted medication abortion. Laws that limit access to medication abortion in the U.S. are often enacted in the name of public health when they may be harming, rather than helping, the people they claim to protect. This scoping review assesses the extent of current research on the harms caused by barriers to medication abortion. While existing research is limited, identified harms include frustrated demand for medication abortion; emotional harms including fear, stress and anxiety; and the potential for absolute loss of the right to abortion when procedural abortion is also unavailable. Barriers to medication abortion may also force people with complex reasons for avoiding procedural abortion, such as transgender people and people who have experienced intimate partner violence, to decide between a procedural abortion they do not want and abandoning their right to abortion altogether. Further research is needed to better assess the near-term outcomes and long-term impact of not being able to obtain medication abortion.
The 21st Century Cures Act and Adolescent Confidentiality in California	Policy Analysis. Methods – Bardach Eightfold Path. Timeline of development of standards – pre HIPAA, CA Minor consent laws, 21st Century Cures Act. Tripod of confidentiality, privacy laws and right to health information. Pain points: parents' rights and responsibilities, age range for determining adolescence varies. Construct of Alternatives. Current use of ICD-10 codes vs SNOMED codes.
Identifying and Characterizing Risks of Zoonotic Disease	USAID's Emerging Pandemic Threats (EPT) PREDICT program was a globally collaborative project with the aims of finding and identifying zoonotic viruses with the potential for pandemic outbreak.

Transmission in the Lake Zone of Tanzania	This capstone project for the Interdisciplinary MPH at UC Berkeley, is a secondary analysis of survey data gathered during PREDICT from the Lake Zone of Tanzania. Building upon the research gathered from biological specimen collection, the survey data was collected in collaboration with local communities regarding social and behavioral factors that might have some influence on risks of zoonotic disease transmission. PREDICT Tanzania team members administered structured surveys on behavioral risk investigations in the Lake Zone districts of Kigoma, Kyerwa, and Kibondo. The aims were to identify and characterize social, ethnographic, and behavioral beliefs and practices that influence zoonotic disease transmission in these districts. Descriptive statistics were performed and high-risk behaviors and activities for zoonotic disease spillover were characterized. Based on these findings, general recommendations for areas of intervention as well as a method for developing interventions using a human-centered design proposal are discussed.
A participatory assessment of the USDA funded Farm Fresh Food Relief Program	The COVID-19 pandemic has exacerbated food insecurity in the Bay Area and put tremendous financial strain on small businesses such as local farms. In response, the Farm Fresh Food Relief (FFFR) program was created to distribute high quality, fresh, organic produce to communities in need, while providing essential financial support to local and regional small farms. This program, centered around themes of social justice, was built on a network of farmers, food hubs, and community based organizations. It was meant to complement other emergency food programs in the community. The purpose of this evaluation is to understand how the FFFR program operated and to evaluate its impact on relevant stakeholders in the context of the COVID-19 pandemic. A program wide analysis as well as mixed methods case studies were performed. Results from the program wide analysis revealed that FFFR distributed 56,438 produce boxes across the Bay Area and invested over \$1.6 million in the community. The program financially supported over 57 small farmers, of which at least 22 were BIPOC owned. Case studies revealed that the FFFR model was successful in distributing food to low income, racially diverse communities. 100% of recipients reported better nutrition while receiving the boxes, and the majority (92%) reported that the boxes helped them have enough to eat. The program exemplified its value of food justice by providing fresh, high quality, culturally relevant produce for free to communities who lacked access. It promoted racial justice by sourcing from a large proportion of BIPOC farmers and partnering with communities of color. It encouraged economic justice by financially supporting small farms who did not have other market opportunities. This model was rooted in community networks, which build capacity for lasting change. The success of this program suggests that the USDA should consider funding for regionally based emergency food programs that focus on quality and social impact.
Effects of Feeding Patterns and Dietary Exposures as A Risk to Early Childhood Caries Among 6 Months - 6 Years Children In El Salvador -A Cross-Sectional Study.	<b>Objective:</b> To determine whether feeding patterns and dietary exposures and associated with risk of early childhood caries (ECC) among 6 months - 6 years children in El Salvador. <b>Methods:</b> A cross-sectional study of the sample size of 1290 children aged 6month to 6 years underwent a comprehensive dental screening consisting of 49 questionnaires were collected from the responses given by the mother of the child that studied information about the child's pattern of feeding, mother education level, brushing intake of dietary sugars and dmft status. Data analysis included bivariate analysis and logistic regression. <b>Results:</b> The study showed that children who were ever breastfed (95%) and ever bottled fed (44%). It was noted that there was statistical significance observed in the age of the children and early childhood caries (ECC). Similarly, the age and duration of breastfeeding and breast used as a pacifier were statistically significant ( p<0.000). However, the effect of bottle-feeding and age at which the bottle was weaned off,

	<p>sleeping with bottle or bottle being used as a pacifier did not have a statistical significance on the early childhood caries. Dietary intake of sugary beverages such as milk, soda, and candy were statistically significant (<math>p&lt;0.000</math>) to the early childhood caries.</p> <p><b>Conclusions:</b> This study documented early childhood caries among 6-mo – 6-year-olds children. Early childhood caries prevalence was associated with the feeding patterns and the influence of dietary sugars on their diet.</p> <p><b>Policy implications:</b> Results show an urgent need for increased policies and awareness among the communities regarding early childhood caries.</p>
Risk Factors for Epicondylitis in the Working Population	<p><b>Background:</b> Epicondylitis is among the most commonly diagnosed work-related musculoskeletal disorders (WMD's). The objective of this study was to determine the risk factors associated with epicondylitis among industrial workers.</p> <p><b>Methods:</b> Between 2001 and 2010, five research groups, part of the NIOSH Consortium Study, conducted a coordinated prospective study of upper extremity WMD's among various industrial sites. In this study, a cross-sectional analysis of pooled data from three of the five research groups was performed in order to determine the associations of risk factors for epicondylitis. 1649 workers participated in structured interviews, physical examinations, and individual exposure assessments of biomechanical and psychosocial factors. Multivariable logistic regression modeling was used to determine the associations.</p> <p><b>Results:</b> After exclusion, 1273 participants were included in the analysis. 36 subjects had the diagnosis of epicondylitis at baseline. Age 30-40 (9.32, 95% CI 1.38-62.94) and 40-50 (16.32, 95% CI 1.13-235.22), as well as being in "fair/poor health" (2.78, 95% CI 1.01-7.62) on questionnaire were found to be significant personal risk factors. Worker rated peak hand force (3.21, 95% CI 1.25-8.28) was found to be significant biomechanical risk factors.</p> <p><b>Conclusion:</b> In a multicenter study of industrial workers, being age 30-40 and 40-50, being in "fair/poor health", and worker rated peak hand force were found to be significant personal, work related, and biomechanical risk factors associated with epicondylitis. These findings may influence the design of workplace safety programs for the prevention of work-related epicondylitis.</p>
Silent Crisis at the Border: The Unmet Mental Health Needs of Migrant Children	<p>Over the past six years, the popular and political lens has focused on the plight of migrants from Central America and Mexico seeking asylum at the southern border of the United States. There are many reasons people leave their country of origin and make the difficult journey to the United States. Many are fleeing unsafe or violent conditions, seeking family reunification, or opportunities to improve their livelihoods, and most experience an accumulation of traumas along the path . The escalation of aggressive policies by the U.S. government towards this group, particularly under the previous federal administration, has created a humanitarian crisis and public health emergency. These conditions have only worsened during the global pandemic from COVID-19, and the politically motivated response to effectively halt asylum processes of those seeking refuge at the border.</p> <p>Children and families are a particularly vulnerable group in this population. While ostensibly protected by international human rights declarations from the United Nations as well as U.S. federal laws, in reality children in custody experience many violations of their entitled protections. Multiple published reports from advocacy groups, pediatricians, and the American Academy of Pediatrics (AAP) document poor conditions in detention and processing centers.</p> <p>In the project I will explore the conditions and historical policies that led to the current crisis, the effects of the outgoing administration, and the subsequent effects of complex</p>

	trauma and adverse childhood experiences. Finally, I will identify recommendations for policies to reduce ongoing harm and specifically address mental health needs for children to ameliorate the current crisis and move towards a more humane system for children and families.
Association Of Satellite-Detected Tropospheric Nitrogen Dioxide And Acute Respiratory Infections In Senegal - Spatiotemporal Analysis	Objectives: 1) Acute respiratory Infections in Senegal and relation to NO <sub>2</sub> 2) low birth weight and PM 2.5 pollution. Description of analytic pathway, spatial and temporal considerations, confounders. Used websites such as OpenAQ for global ground monitoring PM 2.5 data. Weather variables, human modification index. Vegetation index, nightlife illumination. Process of testing six different statistical models to choose the most applicable one.
Shifting Caregiver Beliefs: Investigating the Impact of Early Relational Health Programs	In this mixed methods study, the beliefs of caregivers were assessed using a questionnaire following the completion of eight sessions of CIRCLE OF SECURITY® Parenting (COSP™) Program. The findings of this study reveal consistent shifts in caregivers' self-reported beliefs across the three Early Relational Health domains. These domains were reflective functioning, responsiveness, and avoidance of harsh parenting style. Additionally, caregivers reported dramatic shifts in their ability to interact with their children that was noticeable to both caregivers and their children. Findings suggest a need to create additional policy and programs to connect caregivers with Early Relational Health training.
Examining Tobacco Cessation in the Context of Diet and Physical Activity Changes among Chinese and Vietnamese Smokers and their Families	<b>Background:</b> Smoking prevalence remains high among Asian American men. This study examined whether changes in diet and physical activity [PA] (among smokers themselves and their non-smoking family members) are associated with smoking cessation. <b>Methods:</b> This is a secondary data analysis of a randomized controlled trial where 340 smoker-family dyads received a lay health worker-led educational intervention on either smoking cessation (n=177) or diet and PA (n=163). Based on survey responses of both the smoker and family participants, changes in diet (meeting MyPlate recommendations) and PA ( $\geq 150$ minutes/week) from baseline to 6-month were categorized into: started, continued, stopped, and never. Multivariable analyses were used to examine whether diet and PA changes predicted 7-day verified smoking abstinence at 12-month post-intervention, controlling for smoker demographics and tobacco use characteristics. <b>Results:</b> At 12-month follow-up, this sample of Chinese (173, 51%) and Vietnamese (167, 49%) male smokers (mean age 54.6; 98% limited English; 42% no intention to quit at baseline) received either intervention achieved similar 7-day smoking abstinence rates (overall = 24.4%). Smokers who started meeting diet recommendations at 6-month (vs. never) were more likely to achieve abstinence at 12-month [AOR=3.0, p=0.015]. Smokers whose family continued to exercise $\geq 150$ minutes weekly (vs. never) were more likely to achieve abstinence [AOR=2.4, p=0.032]. <b>Conclusion:</b> Healthy diet and PA of smokers and their family members independently predicted smoking abstinence. Examining tobacco cessation within the context of multiple health behavior changes at the individual and dyadic levels may yield promising interventions for Chinese and Vietnamese Americans.

## Year 2020

Title	Methodology
Improvements in depressive symptoms in hospital employees after a workplace sales ban of sugar-sweetened beverage (SSB)	<ul style="list-style-type: none"> <li>● secondary analysis of “The Impact of Workplace Food and Beverage Choices on Health and Wellness” clinical trial</li> <li>● before-after study of employees at a private hospital in San Francisco, CA that implemented a SSB sales ban in 2018, evaluating whether a SSB sales ban was associated with improvements in depression and anxiety symptoms, SSB craving, reward-based eating drive, and SSB consumption, among hospital employees who drank at least a serving of SSB per week.</li> <li>● N=276 participants at baseline and at 12 month follow-up</li> </ul>
Utilization and Time to Treatment for Pediatric Patients with Gender Dysphoria Vary by Gender Identity and Diagnosing Provider	<ul style="list-style-type: none"> <li>● Secondary data analysis of data from the Kaiser Permanente Northern California (KPNC) system health records between January 2015 and December 2018.</li> <li>● manual chart review of time span from TGD diagnosis date to 6 months after to confirm the first gender identity with which the patient identified.</li> <li>● Demographic data, patient-reported race, BMI, height and weight, medications prescribed, and surgical history were abstracted from medical charts.</li> <li>● TTT measured from diagnosis date to first prescription or surgical date.</li> <li>● Data were analyzed with descriptive statistics.</li> </ul>
Health care utilization as mediated by acculturation and mental well-being in Asian-American subgroups	<ul style="list-style-type: none"> <li>● secondary analysis using data from the California Health Interview Survey (CHIS) of California’s population, in 6 languages including Chinese, Vietnamese, Korean, and Tagalog, ongoing survey since 2011, collecting and providing data on a 2-year cycle.</li> <li>● CHIS data from 2011 to 2016 was pooled to generate a sample of 124,520 adult participants.</li> <li>● Subgroups assessed for health care utilization, acculturation and mental health wellness (Kessler score and acculturation score), and additional demographic covariates.</li> </ul>
Eradicating Cervical Cancer: Lessons Learned from Rwanda and Australia	<ul style="list-style-type: none"> <li>● policy analysis including key informant interviews and extensive literature review in order to improve the uptake of HPV vaccination and cervical cancer screening</li> <li>● specific objectives: (1) describe the historical context of cervical cancer screening and HPV vaccination, (2) analyze effective policy strategies to eradicate cervical cancer in Rwanda and Australia, and (3) propose recommended policy interventions to eradicate cervical cancer globally.</li> </ul>
Identifying Super-Utilizers In Medicaid: A Policy Review And Proposal	<ul style="list-style-type: none"> <li>● Planning project to identify super-utilizers among the Medicaid populations of South Dakota who could receive additional services via the SD Health Homes program with 5,800 patients</li> <li>● Policy review to summarize our learnings from past efforts to identify</li> </ul>

	<ul style="list-style-type: none"> <li>• persistent high utilizers across the country, to launch interventions to improve care and reduce costs for this population, and highlight opportunities for ongoing research.</li> <li>• Four main sections: an analysis of methods for identification of persistent high utilizers in Medicaid, an overview of key challenges to those methods including examples, and some characteristics of successful programs to date.</li> </ul>
Coal Miner Cardiopulmonary Exercise Test (CoM-CPET) Study	<ul style="list-style-type: none"> <li>• secondary analysis of de-identified data from coal miners between 2005-2015, in one clinic specializing in Black Lung evaluations.</li> <li>• Assessing occupational exposure history, past medical history (namely diabetes mellitus, cardiovascular disease, and hypertension), tobacco history, spirometry, chest radiograph (B read), and diffusion capacity.</li> <li>• medical history chart review and cardiopulmonary exercise testing reports, chest radiography</li> <li>• n=889</li> </ul>
Medication Abortion at California Community Colleges: A Pilot Study	<ul style="list-style-type: none"> <li>• Primary study to assess the need for on-campus MA at CCCs, and the capacity of CCC SHCs to provide MA</li> <li>• Study objectives: 1) Estimate the demand for on-campus MA at CCCs, 2) Perform a preliminary evaluation of CCC SHCs' capacity to provide MA, 3) Develop next steps for further assessment of on-campus MA at CCCs</li> </ul>
Cue to Move	<ul style="list-style-type: none"> <li>• study using a personal monitoring device to objectively quantify the amount of time spent in different postures and measuring behavior changes related to worker feedback through smart cueing.</li> <li>• survey data assesses relationship between tasks and postures as well perceived barriers to utilizing sit-stand workstations.</li> <li>• Compares parameters such as subjective pain, heart rate variability, blood pressure, serum lipids, and hemoglobin A1c at the beginning and end of the study 6 months later</li> </ul>
Auditing Nurses on Pressure Ulcers Prevention At Zuckerberg San Francisco General Hospital Research Proposal	<ul style="list-style-type: none"> <li>• quality improvement project using mixed methods analysis of pressure ulcer management at ZSFG</li> <li>• qualitative analysis: interviewing ZSFG quality improvement team, Alameda Health Systems Quality Improvement Team, and ZSFG wound care nurse (WCN)</li> <li>• Quantitative analysis: conducting audit by reviewing nursing documentation of patient charts of those who were in the Intensive Care Unit (ICU) or the Medicine/Surgical Unit (med/surge) between June 2014 to June 2017. Using Braden scale score, frequency of Braden scale checks, interventions documented, site of incidence, stage prior to discharge/death, what hospital day of stay incidence occurred, total length</li> </ul>

	of stay, gender, race/ethnicity, nutrition status, comorbidities, age, resultant death.
Accidental Pediatric Exposures from Household Cleaning Products	<ul style="list-style-type: none"> <li>● Descriptive Cross-Sectional Data Analysis from the American Association of Poison Control Center's National Poison Data System (2000-2015)</li> <li>● cross-sectional study assessing all household cleaner exposure calls made to the American Association of Poison Control Centers (AAPCC) nationwide between the dates of 1 January 2000 and 31 December 2015, as logged into the National Poison Data System (NPDS)</li> <li>● includes comprehensive deidentified information on key characteristics of exposure, including subject demographics, route of exposure specifics, and relevant follow up and outcome determination. Exposures were grouped into 14 specific categories based on primary chemical agent.</li> <li>● A total of 1,317,970 cases were included for analysis</li> </ul>
An Exploration of Black Women's Lived Experiences of Abortion	<ul style="list-style-type: none"> <li>● qualitative study conducted in the Bay Area using convenience, purposive and snowball sampling to identify cis- gendered black women ages 18-46 with a history of abortion.</li> <li>● 23 one-on-one semi-structured interviews with participants both in-person and over the phone, following an interview guide developed with guidance from a Community Advisory Board (CAB) and Scholarly Advisory Board.</li> <li>● Interview questions covered numerous topics including abortion care, mental health, structural racism and interpersonal racism.</li> <li>● Interviews were digitally recorded, de-identified and transcribed</li> <li>● Analysis conducted using Atlas.ti. and modified grounded theory</li> </ul>

Medicare Hospice Reimbursement in the US	<ul style="list-style-type: none"> <li>• Retrospective Policy Analysis investigating the “Two-Tiered Routine Home Care Reimbursement” and “Service-Intensity Add On Payment” Medicare reimbursement policy changes of the Hospice Final Rule 2016 through a policy tracing technique.</li> <li>• a range of qualitative and quantitative techniques for data collection and synthesis and was conducted using a several step approach.</li> <li>• 1) a comprehensive and chronological review of the literature and key informant interviews with stakeholders in the hospice &amp; palliative care industry, and analysis of publicly available data from CMS and the Dartmouth Atlas Fund to understand hospice spending and quality trends both pre and post the 2016 policy implementation.</li> <li>• 2) Using the Policy Triangle Framework to organize factors that influenced the Medicare policy change in 2016.</li> <li>• 3) performing comparative analysis, contrasting the structure of Medicare hospice delivery to hospice systems in eight countries to determine which components of other nations’ hospice systems could be transferred to the US to improve Medicare hospice performance.</li> </ul>
The role of benzodiazepines, z-drugs and gabapentinoids in accidental overdose	<ul style="list-style-type: none"> <li>• Planning project for secondary data analysis assessing the role of benzodiazepine (BZD), gabapentinoids and z-drug prescription in accidental overdose risk among patients prescribed chronic opiates across the Kaiser Permanente Northern and Southern California Health Systems between 2007-2017</li> </ul>
Primary Care Sports Day	<ul style="list-style-type: none"> <li>• Developing a Video Training to Help Reduce Injury, Concussion, and Unexpected Death Amongst the Youth Athletes of the San Francisco Bay Area</li> <li>• produce a succinct overview presentation of the key findings of ten different systems (cardiac, nervous system, general medical conditions, pulmonary, gastrointestinal/genitourinary, dermatologic, musculoskeletal, mental health, female athletes, and athletes with disabilities), condensing an existing 300 page manual, and a 30-minute video and handout</li> <li>• Utilizing qualitative data collection/analysis, a survey distributed to all providers who participate in the UCSF Cardiac Physicals Day, and analyze if the tool resulted in increased knowledge entering the day. Provider feedback utilized for future learning tool improvements.</li> </ul>
Association Between Personality Traits And Risk Of Falls In Older Men	<ul style="list-style-type: none"> <li>• The Osteoporotic Fractures in Men (MrOS) is a multicenter prospective cohort study that focuses on assessing healthy aging specifically the incidence of fractures and osteoporosis in ambulatory community-dwelling men, since 2000 in 6000 men</li> <li>• Secondary data analysis of the personality assessment questionnaires which were completed during the follow-up “Visit 4” (Year 14) with all participants still in the study (n = 2,786)</li> </ul>

India Smiles, Children's nutrition and Oral Health	<ul style="list-style-type: none"> <li>● Qualitative Analysis of extensive intervention and research that India Smiles conducted from 2012 to 2015.</li> <li>● FMCH is a prominent Indian non-profit, non-governmental organization that provides the First 1000 Days Program for mothers and children in several nutritionally impoverished and economically challenged communities of Maharashtra through an array of skilled community health workers.</li> <li>● Four focus groups of 42 healthcare workers and care providers from the community-based Foundation of Maternal and Child Health intervention program to assess knowledge, experiences, perceptions, and barriers regarding their children's nutrition and oral health.</li> </ul>
Assessment of School Teachers' Knowledge and Skills About Child Traumatic Dental Injuries In The San Francisco Bay Area	<ul style="list-style-type: none"> <li>● study assessing collected data of a developed online survey distributed to school teachers in Santa Clara school district, and develop recommendation to improve teacher's preparedness for dental injuries in school children</li> <li>● The survey questionnaire consisted of two parts, (1) demographic information and (2) three scenario based questions.</li> <li>● Data collected using qualtrics were analyzed for school teachers' knowledge about TDI management.</li> </ul>
Factors affecting time to chemotherapy for breast cancer care	<ul style="list-style-type: none"> <li>● pilot study evaluating factors affecting timeliness of chemotherapy at University of California at San Francisco for breast cancer patients</li> <li>● determine the average TTC for women being treated for breast cancer, and find factors leading to delayed initiation of chemotherapy.</li> <li>● retrospective chart review of patients receiving doxorubicin and cyclophosphamide followed by paclitaxel (AC-T) or the combination of docetaxel and cyclophosphamide (TC), in neoadjuvant (NAC) and adjuvant chemotherapy (AC) for breast cancer of all stages, between 2014-16.</li> <li>● Evaluated factors included patient age, race/ethnicity, surgery type, and tumor biology</li> </ul>
Program Evaluation and Analysis of Farmers' Market Utilization	<ul style="list-style-type: none"> <li>● evaluation of farmers' market utilizations among low-income residents, and optimize access to healthful nutrition</li> <li>● Recommend policy interventions to increase incentives for vendors to sell and low-income residents to buy and consume greater quantities of fresh fruits and vegetables.</li> <li>● Study assessed purchasing data collected at the mobile farmers' market in Richmond, California in 2019 (total 1044)</li> </ul>

Occupational Adult Exposures to Household Cleaning Products	<ul style="list-style-type: none"> <li>Descriptive cross-sectional secondary data analysis from the American Association of Poison Control Centers (AAPCC) National Poison Data System (NPDS) between 2000 – 2016.</li> <li>Using de-identified data on significant features of exposure to include; details of exposure route, demographics of the subject, and outcomes germane to the participants and their specific exposures.</li> </ul>
Provider and administrator-level perspectives on strategies to reduce fear and improve patient trust in the emergency department in times of heightened immigration enforcement.	<ul style="list-style-type: none"> <li>Qualitative study examines provider and system-level policies on caring for undocumented patients in a California ED.</li> <li>recruited 12 ED providers and administrators from San Francisco's safety-net ED, using a trusted gatekeeper and snowball sampling.</li> <li>conducted semi-structured interviews that asked about providers' knowledge of and suggestions for policies and practices to reduce fear and enhance trust among immigrant patients in the ED,</li> <li>analyzed the transcripts using constructivist grounded theory.</li> </ul>

## Year 2019

Title	Methodology
Bundled Payment in Health Care: The Way of the Future for Quality Improvement in Surgical Patients	<ul style="list-style-type: none"> <li>Descriptive analysis of the patient population included in the bundled payment program. Inclusion criteria was patient's eligibility for Medicare as their primary insurer and be enrolled in Medicare Part A &amp; B.</li> <li>Analyzed datasets from a variety of sources (CMS, electronic medical record of UCSF patients, and the National Surgical Quality Improvement Program (NSQIP) to investigate if a close correlation between readmission and higher care episode costs exist.</li> </ul>
Assessment of the oral health needs of children in Berkeley	<ul style="list-style-type: none"> <li>A mixed-method secondary data analysis.</li> <li>Quantitative Data was collected from the pre-existing programs in the City of Berkeley which include: - Head Start, Berkeley Unified School District- School Dental Sealant Program and Denti-Cal Utilization.</li> <li>R was used to conduct Chi Square analysis to assess the association of the School Dental Sealant Internal Program with the history of Dental caries</li> <li>Qualitative data was collected through focus group discussion comprising of seven African-American mothers who were pregnant or had children, and residents of Berkeley.</li> </ul>
Bad to the Bone: Pediatric Osteomyelitis in the Northern California Region	<ul style="list-style-type: none"> <li>Retrospective descriptive study of children ages 6 months to 17 years hospitalized with osteomyelitis from 2008-2017 in Northern California Kaiser Permanente. Descriptive, bivariate, calculation of incidence rates, trend tests were used.</li> </ul>
Beats Rhymes and Primary Care	<ul style="list-style-type: none"> <li>Employed a community based participatory research (focus group discussion) to investigate barriers and solutions most relevant to the adolescent community in the Oakland Area from ten participants between the age of 18-21 years who perform in Beats Rhymes and Life.</li> </ul>

Black Women and Abortion: An exploration of Attitudes and Experiences	<ul style="list-style-type: none"> <li>A cross-sectional qualitative study. In-depth semi-structured interviews were conducted with a team who have experience providing care to Black women of reproductive-age (18-45).</li> <li>Sixteen participants from several communities around the San Francisco Bay metropolitan area were selected to participate in the interviews. Used Dedoose software to analyze themes.</li> </ul>
Childhood Malnutrition: A look at Foundation for Mother & Child Health in India data	<ul style="list-style-type: none"> <li>The nutritional status of 391 females and 402 males pre and post intervention were evaluated. The three forms of malnutrition assessed included stunting, wasting, and underweight.]</li> <li>A de-identified, non-coded data set from Foundation for Mother and Child Health India was obtained from patient charts via FMCH's electronic medical records (Salesforce).</li> </ul>
Contraception Prescribing Practices after Senate Bill 999: A Qualitative Case-Series Analyzing Reproductive Health Policy Implementation	<ul style="list-style-type: none"> <li>Investigator contacted five institutions with recruitment information for the study, which had previous IRB approval by UC Berkeley's Committee for Protection of Human Subjects. Recruitment occurred via Respondent-Driven Sampling (RDS) – a contact person within each institution was provided with a description of the study and a request for volunteer participants.</li> <li>All interviews were conducted by a single researcher and took a semi-structured format. Data transcription, coding, and analysis was completed using the qualitative data analysis tool Dedoose.</li> </ul>
Trends in Family Planning and the Role of Community Health Workers in Rwanda	<ul style="list-style-type: none"> <li>Used Rwanda Demographic and Health (RDHS) surveys from 1992, 2000, 2005, 2007, 2008, 2010, 2014-15 to analyze trends in family planning.</li> <li>Used STATACompiler to compare trends over time for family planning indicators, source, and reasons for discontinuation.</li> </ul>
Knowledge and Perceptions of Practicing Radiology Resident Physicians within the United States Regarding the B Reader Program	<ul style="list-style-type: none"> <li>An electronic survey was designed on the basis of information from a focus group of a public health training cohort at the University of California at Berkeley. The electronic survey was distributed via email and results were collected using the Qualtrics Software (Qualtrics, Provo, UT) between April 18, 2019 and May 9, 2019.</li> <li>The survey included a 2-minute introductory video on the basic requirements of a B Reader and 12 multiple-choice questions that pertained to the national B reader program</li> </ul>
Physician Management of Elevated Lead Levels Among Workers in California	<ul style="list-style-type: none"> <li>Mixed method approach. Incorporated both quantitative and qualitative questions into the survey to obtain a complete understanding of the current barriers to care for workers with elevated lead levels as well as how to best remedy those issues through legislation and physician education.</li> <li>Contacted 321 physicians and after up to three follow-up contacts via mail, researchers received a total of 101 completed questionnaires that were eligible for inclusion in the study.</li> </ul>
Maternal acculturation and child obesity in Asian Americans	<ul style="list-style-type: none"> <li>Analyzed public-use data from the 2013-2016 California Health Interview Survey to assess whether there is an association between maternal acculturation and obesity in Asian American children, and whether obesogenic behaviors mediate this relationship.</li> <li>Used logistic regression to determine the odds of obesity and obesogenic behaviors associated with maternal nativity and time in the US.</li> </ul>

Non-High Density Lipoprotein Cholesterol Association with Metabolic Syndrome within Obese Adolescent Youth and Young Adults: Evaluation Using NHANES 2003-2014 Year-Cycles.	<ul style="list-style-type: none"> <li>Secondary analysis was performed on obese individuals from 12 to 23 years-old from the National Health and Nutrition Examination Surveys 2003-2014 year cycles whom had fasting laboratory data for assessing all components of the International Diabetes Foundations (IDF) definition of MetS and non-HDL-C.</li> <li>Odds ratios (OR) were constructed using a quasibinomial logistic regression for non-HDL-C cutoffs with outcome of metabolic syndrome. ROC and AUC were calculated for MetS criteria components and non-HDL-C cutoffs with outcome of MetS.</li> </ul>
Oral Health Needs Assessment of Pregnant Women/Mothers in Berkeley	<ul style="list-style-type: none"> <li>Mixed methods. Descriptive analysis of anonymous and deidentified, uncoded data (N=57) collected by City of Berkeley Public Health Department through prenatal surveys was performed using Statistical Package for Social Sciences (SPSS 22.0).</li> <li>Logistic regression model was used to examine the predictors associated with dental visits among pregnant women/mothers in Berkeley. One African American focus group transcript was analyzed to identify themes and patterns of utilization of dental services among that population.</li> </ul>
Investigation of potential factors in healthcare workers and evaluation behaviors after blood-borne pathogen exposure events	<ul style="list-style-type: none"> <li>A case-control analytical study designed to compare follow up behaviors with characteristics of the employees initiating contact regarding an injury that may result in transmission of a bloodborne pathogen.</li> <li>The database used to track all contact made to the UCSF Needle Stick Hotline was reviewed and coded into six primary variables: job type, trainee status, campus to which the employee belongs, exposure type, exposure likelihood and follow-up behavior.</li> </ul>
Predictors of High Multisystem Urgent and Emergency Care Utilization for High Risk San Francisco Population	<ul style="list-style-type: none"> <li>Used the Coordinated Case Management System (CCMS), San Francisco County's integrated data system, to perform a retrospective cohort analysis of the top 5% population (n=2140) during the 2017-18 fiscal year.</li> <li>Chi-squared analysis was used to determine group distinction and logistic regression with adjustment by gender and race/ethnicity was used to determine predictors of increased utilization.</li> </ul>
Identification of Sexual Minority Youth in Pediatric Primary Care Setting by EHR in a Large Integrated Health Care System	<ul style="list-style-type: none"> <li>Electronic health record (EHR) data was analyzed for adolescents ages 12.5-18 years, with known birth-assigned sex, who were seen for a Well Check at one of the 52 outpatient pediatric or family medicine Kaiser Permanente Northern California facilities from January 1- December 31, 2016.</li> </ul>
Socioeconomic Predictors of Stage at time of Diagnosis of Hepatocellular Carcinoma (HCC) in California	<ul style="list-style-type: none"> <li>A complete case analysis that sought to evaluate the odds of being diagnosed at later stages (as opposed to the Local stage) of HCC given various socioeconomic qualities. The final study population incorporated in this analysis was derived from the California Cancer Registry (CCR).</li> <li>Conducted statistical analysis using chi-square and multinomial logistic regression.</li> </ul>
Urban Hospital Closures and Healthcare Access: A Case Study of Richmond, CA	<ul style="list-style-type: none"> <li>A case study. This was a part of an evaluation of the City of Richmond's Health in All Policies (HiAP) initiative, which strives to integrate considerations of health equity in all city government activities and policies.</li> <li>Analyzed current healthcare services provided by key providers in Richmond such as Kaiser Richmond, Lifelong Medical Center, Community Clinics, Planned Parenthood, Native American Health Center, Community clinic consortium and school-based health clinics.</li> </ul>

Use and Usability of Patient Facing Digital Health Interventions Based on Sociodemographic Factors and a Proposal for Reaching Underserved Populations through a Novel Approach to Generate Patient Profiles	<ul style="list-style-type: none"> <li>Systematic review of literature primarily sourced from PubMed was used to identify papers that focused on use, usability, or barriers to use of health information technology.</li> <li>Key informant interviews collected through semi-structured in-depth interviews using stakeholder-specific interview guides conducted with five experts over video conference from each of five stakeholder groups.</li> <li>The stakeholder groups include healthcare venture capitalists, developers/vendors, payers/employers, providers and patients.</li> </ul>
The Use of Technology to Prevent Public Health Disasters Before, During and After Hajj	<ul style="list-style-type: none"> <li>Mixed method study. Qualitative and quantitative data were used to generate information on the topic and secondary sources such as archival research and government websites were used as the main source of data collection.</li> <li>Secondary sources provided data collected from surveys, observations, and case studies that focused on crowd management technologies and disease interventions such as infectious disease surveillance systems used in Hajj.</li> <li>Primary qualitative data was gathered from one interview with a physician who recently worked during Hajj season.</li> </ul>
Vaping and Social Media	<ul style="list-style-type: none"> <li>Used mixed method study uses cross-sectional data collected by tracking vaping hashtags on two social media platforms: Instagram and Twitter.</li> <li>Collected social media posts from two time periods: before September 2018 when the FDA launched its anti-vaping campaign and about six months after the campaign started.</li> </ul>

## Year 2018

Title	Methodology
Needs Assessment For Girls Health Champions	<ul style="list-style-type: none"> <li>Girls Health Champions (GHC) is training adolescent girls in Mumbai as peer health educators and health leaders in 10 local schools.</li> <li>4-part curriculum to focus on nutrition, anemia, reproductive health, menstruation and mental health.</li> <li>qualitative needs assessment using focus groups to understand what health information girls already understand and what are the challenges faced</li> </ul>
Using Google Trends for Public Health Research & Surveillance: Review & Critique of a Novel Method	<ul style="list-style-type: none"> <li>Internet search queries offer a tremendous amount of data about uncensored human interests, curiosities, foibles, intended behaviors, true needs and serve as proxy measures for on sensitive and personal health-related topics, and can be compared or correlated with traditionally generated research data.</li> <li>evaluating the promise of Internet search big data analysis to study social and health behaviors typically dogged by problems of participant recruitment, selection and information biases, or stigmatization.</li> <li>This paper provides a survey of the Google-based public health landscape and assessment of the state-of-the-art reflected in publication trends as well as a critique of the normative challenges and ethics issues raised by Google Trends use for surveillance and research.</li> </ul>

Improving Door-to-Antibiotic Time in Pediatric Oncology Patients with a Fever and Central Line	<ul style="list-style-type: none"> <li>quality improvement of door-to-antibiotic time in pediatric oncology patients with a fever and central line who present to the Kaisers emergency room.</li> <li>A standardized protocol was implemented and evaluated, comparing baseline and post-implementation results (13-21 months later).</li> </ul>
Promoting Effective Implementation of Social Determinants of Health Interventions in Clinical Settings: A Program Evaluation of the Roles Outside of Traditional Systems	<ul style="list-style-type: none"> <li>program evaluation of the Roles Outside of Traditional Systems (ROOTS) program in seven clinics, each clinic has decided which social determinants of health (SDOH) and specific interventions it would focus on</li> <li>collect information around which resources clinics need as they implement their projects as well as assess providers' perceptions on their perceived clinic capacity to address patients' SDOH.</li> <li>assess what technical assistance challenges clinics face and gather feedback from the various webinars and in-person sessions for the ROOTS program.</li> </ul>
Exploring pediatric resilience factors and their application in the Family Information and Navigation Desk (FIND) Platform	<ul style="list-style-type: none"> <li>qualitative assessment exploring protective resilience factors within children's wider social environments and within their families in a standardized way in order to be integrated into their "Action Plan" profile page in the FIND Platform and consistently be accessible to all health providers they come in contact with (pediatricians, social workers, psychologists)</li> </ul>
Coccidioidomycosis - Case studies in inmate firefighters	<ul style="list-style-type: none"> <li>identifying an ideal medical monitoring system to reduce incidence of coccidioidomycosis in inmate firefighters through strategic prevention and to provide recommendations for earlier suspicion/detection of the disease.</li> <li>reviewing the medical records of 6 inmate firefighters from the 2017 Derrick fire who contracted coccidioidomycosis and make a collective case report to better describe the nature of the problem.</li> </ul>
Adherence Challenges In Diabetes Management In School Settings	<ul style="list-style-type: none"> <li>community assessment of routine diabetic management of school-aged children and adolescents in school settings in Brentwood Unified District</li> <li>observations over six months with the help of the district nurse in order to establish a diabetic management routine and identify the management challenges that increase or decrease adherence</li> <li>formulate recommendations based on the nurse's perspective</li> </ul>
Health Literacy Systems in the Safety Net: The Contextual Health Assessment of Social Stability (CHAOSS) Measure	<ul style="list-style-type: none"> <li>mixed methods study using the CHAOSS 18-item multiple choice questionnaire survey on health literacy and cognitive interviews</li> <li>assessing patients' perceptions of their health, medical care, social situation and support system.</li> </ul>

<p>Using a modified YPAR Curriculum to create a survey through a structured and informed process for an Oakland after-school program assessing student perceptions of issues concerning queer youth in high school</p>	<ul style="list-style-type: none"> <li>modified process of Youth-led Participatory Action Research (YPAR) curriculum to create a survey that assess issues surrounding queer youth in high school in a local Oakland community organization which focuses on Violence Prevention</li> <li>The organization's after-school violence prevention program works with high school youth in building their capacity to address violence in their community. The ultimate goal of the project is to prevent violence towards queer and trans youth in Oakland High Schools by enhancing the organization's needs assessment tool using YPAR.</li> </ul>
<p>Adolescent Childbearing &amp; Migration: Youth and Provider Perspectives</p>	<ul style="list-style-type: none"> <li>focus groups and interviews in several communities in Fresno County, California, and Guanajuato, Mexico in young pregnant and/or post-partum women and health providers</li> </ul>
<p>Preventing Edible Cannabis Exposures in Young Children: Applying the Human Factors Analysis Classification System to California Poison Control System Data</p>	<ul style="list-style-type: none"> <li>analyze CPCS data retrospectively, develop training for personnel</li> <li>within CPCS to improve the documentation quality of the circumstances surrounding each unintentional edible cannabis exposure in children</li> <li>assessing human factors (errors, preconditions, supervisory, and organizational) leading to unintentional pediatric exposure to cannabis.</li> <li>Developing interventions may work at the legislative, regulatory, public health, industry, and educational level to reduce the frequency and severity of these pediatric exposures</li> </ul>
<p>Sugar Sweetened Beverage Consumption in San Francisco Unified School District and the Potential of Taxing</p>	<ul style="list-style-type: none"> <li>Nutrition surveys at middle and high schools within SFUSD assessing beverage consumption and weekly and daily consumption patterns.</li> <li></li> </ul>
<p>Insulin Use in Older Adults with Type 2 Diabetes: Changes to Treatment Over Time.</p>	<ul style="list-style-type: none"> <li>cross-sectional analysis of members of a large integrated healthcare delivery system in Northern California age 75 and older with type 2 diabetes.</li> <li>After gathering cross-sectional data on insulin use, we performed a retrospective longitudinal cohort of patients who turned 75 years old between 2009-2013 with type 2 diabetes in order to study outcomes associated with changes in insulin use among different patient groups.</li> </ul>
<p>Alcohol Use as a Moderator of the Relationship Between Perceived Neighborhood Disorder and Psychological Distress</p>	<ul style="list-style-type: none"> <li>survey of 1037 adults age 18 to 50 who presented to Highland Hospital Emergency Department in Oakland</li> <li>In-person interviews and surveys about health and health behaviors using computer assisted personal interview (CAPI) techniques with tablets running the Qualtrics platform.</li> </ul>
<p>Head injuries and head and spine surgeries increase risk of Streptococcus pneumoniae meningitis in adults</p>	<ul style="list-style-type: none"> <li>case-control study within the Kaiser Permanente Northern California patient population to evaluate the association of prior head injury (HI) or head or spine surgery (H/SS) with pneumococcal meningitis, between 2008 – 2017. A blinded chart review identified prior HI and H/SS and pneumococcal vaccination history.</li> </ul>

Understanding The State Of Oral Health In Rural And Sub-Urban Nepal	<ul style="list-style-type: none"> <li>Survey to assess levels of understanding of causes of oral health problems among adults in rural and sub-urban villages in Nepal, as well as current oral health norms and practices, availability of resources, and tangible interventions/ solutions applicable to the oral health problems</li> </ul>
Chronic disease and cancer screening in an underserved community: Improving population health programming through medical assistant (MA) education and empowerment.	<ul style="list-style-type: none"> <li>intervention aimed to increase MAs knowledge and self-efficacy regarding screening through education and empowerment, with a goal of improving chronic disease and cancer screening rates.</li> <li>monthly education sessions to give MAs concrete tools on giving feedback, teaching, and patient education. Topics included vaccines, colorectal cancer, cervical cancer, breast cancer, hepatitis C, diabetes, and hypertension screening.</li> <li>MA knowledge was assessed through pre-, post-, and final surveys, and clinic order rates were tracked over time using a population health database management system.</li> <li>A post-intervention focus group was held to assess MAs' perception of the program.</li> </ul>
Youth Civic Action Across the United States: Projects, Priorities, and Approaches	<ul style="list-style-type: none"> <li>Survey assessing action civics projects using classroom-level de-identified data from Generation Citizen records in January 2018 provided by involved democracy coaches and/or classroom teachers.</li> <li>Data included classes from spring 2012 through fall 2017 (S12-F17) semesters in schools located in six metropolitan regions of the USA</li> </ul>
Pediatric Paralysis: Host Risk Factors and Incidence of Acute Flaccid Myelitis in a Fixed Population	<ul style="list-style-type: none"> <li>evaluation of incidence data and epidemiological analysis of potential risk factors and outcomes on a retrospective cohort study at Kaiser Permanente Northern California (KPNC).</li> <li>Incidence, demographics, pre-existing conditions, clinical features, lab/MRI results, treatment, outcomes and proposed polio risk factors were assessed.</li> <li>This study provides more accurate incidence data than previous reports given the closed-population based design. Findings support previous reports of male predominance and prior medical history of asthma. Asian overrepresentation, September to December seasonality, and optimistic outcomes were unique to this study.</li> </ul>
Transitions: The Impact of Declining Opioid Prescribing and Increasing Stewardship Efforts	<ul style="list-style-type: none"> <li>study of 600 patients who have received OPRs in San Francisco</li> <li>Data collected combined that from a detailed computer-assisted interview (CAPI), which provided a historical reconstruction of illicit substance use and overdose, with electronic chart extraction that detailed prescription of OPRs and other controlled substances, adherence to care, exposure to opioid stewardship measures, and opioid-related emergency department utilization from 2012 through 2017.</li> <li>A nested cohort approach to evaluate associations between reduced or discontinued OPR dosage and the initiation of heroin or other illicit opioid use and overdose, patient interviews and chart extraction</li> </ul>

## Year 2017

Title	Methodology
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Assessing California's Progress: The Prescription Opioid Overdose Epidemic	<ul style="list-style-type: none"> <li>Policy review evaluating California's progress in addressing the opioid epidemic</li> <li>mixed methods approach, using strategic management practices of environmental scanning, elements of design thinking, and traditional concepts of policy analysis</li> <li>reviews how optimizing the Controlled-substances Utilization Review and Evaluation System (CURES), California's prescription drug monitoring program (PDMP), as a preventive tool is the most important first step to counter the progressing opioid epidemic.</li> </ul>
The Resurgence Of Polio In Nigeria: What Went Wrong? A Policy Analysis	<ul style="list-style-type: none"> <li>Policy review, analyzing past and current immunization policies regarding policy process in Nigeria, including recommendations for policy change and implementation to ensure that the country will reclaim and maintain a polio-free status</li> </ul>
Exploring The Mental Health Of Latinx Medical Students: A Qualitative Study	<ul style="list-style-type: none"> <li>Qualitative study, including focus groups and key informant</li> <li>Interviews conducted at the Latino Medical Student Association (LMSA) West Regional Conference,</li> </ul>
Factors Associated with Adherence to Hydroxychloroquine in SLE Patients	<ul style="list-style-type: none"> <li>Quantitative study, retrospective cohort study using Kaiser Permanente Northern California (KPNC) data.</li> <li>Medication adherence per medication possession ratio (MPR), patient demographics, socioeconomic status, comorbidities per Charlson Comorbidity Index, serum creatinine, eGFR, number of hospitalizations and outpatient rheumatology visits, and number of SLE-related prescriptions. Standard descriptive statistics and multivariable logistic regression were used for data analysis.</li> </ul>
A Special Supplemental Nutrition Program for Women, Infants, and Children Participation Trends for a Sample of Alameda County Cities: Berkeley, Fremont, Hayward, and Oakland	<ul style="list-style-type: none"> <li>Mixed methods approach</li> <li>secondary data analysis of WIC data for Alameda County through various sources, including the CDPH WIC Program Data Analysis, Research and Evaluation (DARE) Section.</li> <li>Good report on the challenges faced when contacting state officials and stakeholders in pursuit of (in theory) publicly available data</li> </ul>
Photovoice: Latino Migrant Stories	<ul style="list-style-type: none"> <li>Qualitative study suing Photovoice methodology</li> <li>in collaboration with the San Francisco Day Laborer Program (DLP) and the Women's Collective (WC)</li> <li>looking at the intersection of immigration, occupation and health</li> </ul>
An Analysis of U.S. Federal Policies and Administrative Actions on the Adoption and Implementation of Patient Reported Outcome Measurement: Jan. 2009 to 2017	<ul style="list-style-type: none"> <li>policy analysis seeking to analyze recent policies' effects on the healthcare IT ecosystem and their role in improving value, either through introducing cost-savings or through enhanced measuring and thus improving outcomes.</li> <li>This analysis approached the problem of confusing and complex health IT policy over the past decade by blending formal policy analysis paradigms with interviews with key IT stakeholders</li> </ul>

Addressing Racial Health Disparities Through Medical Education	<ul style="list-style-type: none"> <li>Qualitative pilot study seeking to understand how issues of race and racism can be meaningfully integrated into a medical school curriculum in order to train physicians equipped to address racial health disparities.</li> <li>Interviews with medical students using focus groups, semi-structured interviews with key informants who do racial consciousness trainings professionally, and participant-observation during classes.</li> <li>data was collected, transcribed, coded to identify prominent themes and significant deviations. Themes were analyzed and synthesized.</li> </ul>
Where is the Naloxone? Assessing Optimal Spatial Distribution of Pharmacy Dispensed Nonprescription Naloxone	<ul style="list-style-type: none"> <li>analysis using overdose death data from CDC database and census data from American Community Survey (ACS) and National Center for Health Statistics (NCHS) to define boundaries of California counties and to determine demographic characteristics per county.</li> <li>using Quantum GIS (QGIS), Matlab for spatial data analysis of pharmacy locations.</li> </ul>
An Analysis of Colon Cancer Screening Rates at MayView Community Health Center	<ul style="list-style-type: none"> <li>quantitative study exploring whether demographic characteristics could predict likelihood of completing recommended colon cancer screenings.</li> <li>874 patients at MayView Community Health Center</li> <li>Univariate and multivariate logistic regressions</li> </ul>
Lessons From The Island: Shared leadership for health in a community experiencing homelessness	<ul style="list-style-type: none"> <li>Qualitative study using oral history interviewing and observations from daily life</li> <li>seventeen interviews conducted along riverbanks, at park benches, inside tents, at cafes, and even while walking or bicycling along river trails, using recording device</li> <li>questions about experiences in traditional healthcare settings as well as health challenges while homeless</li> <li>audio recordings of nine interviews were transcribed and analyzed</li> </ul>
Impact Evaluation of an Intervention on Data Quality Collection and Effectiveness of the Medical Supervision Program	<ul style="list-style-type: none"> <li>quantitative data analysis of before/after training data collection</li> </ul>
An Analysis of Vaccination Policy in California	<ul style="list-style-type: none"> <li>policy analysis to evaluate the impact of AB 2109 and SB 277 on childhood immunization and exemption rates in California.</li> <li>secondary analysis of data from CA Department of Public Health (CDPH) kindergarten immunization annual reports.</li> <li>County-level census data from the 2011-2015 American Community Survey 5-Year Estimates, and from the 2010 United States Census Bureau.</li> <li>key informant interviews with people instrumental to the development, implementation, or enforcement of these policies about participant's role</li> </ul>
The Effect of Border Proximity on the Relationship between Acculturation and Mental Health Outcomes in Mexican-Origin Populations	<ul style="list-style-type: none"> <li>quantitative study nested in the U.S. Mexico Study of Alcohol and Related Conditions (UMSARC) (Borges et al., 2015; Cherpitel et al., 2015), of populations living along the border addressing alcohol use, using simultaneous data collection on both sides of the border.</li> </ul>

## Year 2016

Title	Methodology
<p>"It's Not Just Traditional Care, It's Loving Care": A study of best practices used in organizing a cultural, traditional, healing clinic</p>	<ul style="list-style-type: none"> <li>● mixed methods, drawing on elements of community-based participatory research, community assets-oriented assessment, and exploratory data analysis through inductive methods</li> <li>● "ground-up" methodology, using stories embedded in collected data to uncover themes and theories</li> </ul>
<p>Understanding and improving communication between community clinical providers and the Berkeley Public Health Division: A quality improvement project with the Berkeley Public Health Division</p>	<ul style="list-style-type: none"> <li>● Mixed methods</li> <li>● Quantitative: survey on a Qualtrics platform distributed to clinical providers</li> <li>● Qualitative: semi-structured interviews with staff members at the BPHD</li> </ul>
<p>Trachoma Elimination Strategies in Rural Ethiopia</p>	<ul style="list-style-type: none"> <li>● devise an improved means of grading trachomatous scarring, based on the original WHO trachoma grading schema</li> <li>● Ranking Conjunctival Scarring: Assessing internal and external validity, using photos of patients in Ethiopia</li> </ul>
<p>The Effect Of Breast Density Notification</p>	<ul style="list-style-type: none"> <li>● Data analysis with Northern California data from Kaiser Division of Research (DOR) and the Breast Cancer Tracking System (BCTS)</li> <li>● retrospective cohort study with quantitative analysis of a four-year period to calculate changes in screening practices (two-year period before legislation from April 2011 to March 2013 was compared to the two-year period post-legislation from April 2013 to March 2015)</li> </ul>
<p>Dissecting and Streamlining the Medical Record Acquisition Process in Death Investigation Systems</p>	<ul style="list-style-type: none"> <li>● needs assessment survey with the primary goal of investigating the medical record acquisition procedures at MDI systems around the nation, particularly surrounding the impact EMR has had on medical record acquisition.</li> <li>● examine whether and how current death investigators see their work fitting into the larger sphere of public health and safety.</li> <li>● mixed methods approach</li> </ul>
<p>Psychosocial Determinants and Effects of Flavored Smokeless Tobacco Use Among Rural Adolescent Males</p>	<ul style="list-style-type: none"> <li>● semi-structured, in-depth interviews exploring of rural adolescent male perceptions regarding flavored smokeless tobacco, with 55 participants from high schools in California.</li> </ul>
<p>Use Of Hemoglobin A1c To Predict Risk For Type 2 Diabetes Among Children And Adolescents</p>	<ul style="list-style-type: none"> <li>● retrospective cohort study of Kaiser Permanente Northern California (KPNC) pediatric members (n=3,675 children)</li> <li>● including inpatient and outpatient ICD-9 diagnosis codes, labs, pharmacies, and anthropometric measurements.</li> </ul>

High Deductible Insurance Under the Affordable Care Act and Patient Engagement in Type 2 Diabetes	<ul style="list-style-type: none"> <li>• retrospective cohort study using claims and medical chart information from Kaiser Permanente Northern California (KPNC).</li> <li>• Selected patients compared before and after enrollment into individual KPNC plans for the year of 2014 under the Bronze, Silver Plus and Silver plan types.</li> </ul>
Oral Health Indicators and Associated Factors Among Older Homeless Adults: Results from the HOPE HOME Study	<ul style="list-style-type: none"> <li>• longitudinal study of life course events, geriatric conditions, and their associations with health-related outcomes among older homeless adults.</li> <li>• From July 2013 to June 2014, we enrolled a population-based sample 83 of 350 homeless adults aged 50 years and older from all overnight homeless shelters in Oakland</li> </ul>
Economic feasibility of a clinic and hospital based intervention to improve pain self-efficacy in traumatic lower-limb amputees	<ul style="list-style-type: none"> <li>• mixed-methods study including analysis of economic as well as operational utility via both quantitative and qualitative methods.</li> <li>• Survey and key-informant interviews</li> </ul>
Low-Income Minority Population Access to Mental Health Services: Barriers and Gaps	<ul style="list-style-type: none"> <li>• Policy review</li> </ul>
Identifying The Risk And Protective Factors Of Emotional Wellbeing Of Minority Students During The College Transition	<ul style="list-style-type: none"> <li>• Mixed methods analysis providing recommendations for Youth Creating Change (YCC), a non-profit organization dedicated to helping disadvantaged youth develop life skills and achieve critical milestones on their way to independence and adulthood through Saturday workshops.</li> <li>• Semi-structured interviews with Community College SF students and key informants.</li> </ul>
Emergency Preparedness in the Kidney Transplant Community: A qualitative assessment of patients and providers and preparation of a survey instrument to study emergency preparedness	<ul style="list-style-type: none"> <li>• Qualitative analysis, key informant interviews</li> <li>• Bay Area patients of the transplant nephrology clinic at UCSF Medical Center and the General Nephrology clinic at the San Francisco General Hospital</li> </ul>
Superutilizers in the Safety Net: Achieving Success In Complex Care Management	<ul style="list-style-type: none"> <li>• Health Literacy Systems in the Safety Net (HEALSS) study based at the UCSF Department of Anthropology, History and Social Medicine,</li> <li>• using an ethnographic and interview-based approach to analyze the functionality and challenges of Complex Care Management (CCM) programs at San Francisco General Hospital and Highland Hospital, with a specific focus on characteristics in the safety net that promote or inhibit patient engagement.</li> <li>• 31 participants were surveyed at SFGH and 29 at Highland Hospital using convenience sampling, either when patients were in clinic for an appointment or through referral from CCM clinic providers and staff.</li> </ul>

The WHO Guidelines for the Management of Latent Tuberculosis Infection and National Policies of Middle and High Income Countries.	<ul style="list-style-type: none"> <li>● Policy review and comparison of existing national policies</li> </ul>
Prognosis Communication with Disabled Elders	<ul style="list-style-type: none"> <li>● develop a model for communicating prognostic information</li> <li>● qualitative analysis of interviews with participants recruited through UCSF Housecalls, On Lok Lifeways, and Institute on Aging in San Francisco, CA as well as the Over 60 Clinic in Berkeley, CA.</li> </ul>

## Year 2015

Title	Methodology
Impact of variations on EMS policies and procedures in Out-of-hospital cardiac arrest outcomes (2015)	<ul style="list-style-type: none"> <li>● mixed methods research <ul style="list-style-type: none"> <li>○ Quantitative Analysis of Kaisers dataset</li> <li>○ Interviews with key stakeholders</li> <li>○ Using GPS data</li> </ul> </li> </ul>
Informing a Resident Physician Nutrition Counseling Smartphone Application-Based Education Module: A Qualitative Analysis of Expert Nutritionist Opinion (2015)	<ul style="list-style-type: none"> <li>● Qualitative analysis with nutritionists</li> <li>● Development and testing of online application</li> </ul>
Assessment of the factors that contribute to the skewed distribution of doctor's specialties and geography in Japan and globally (2015)	<ul style="list-style-type: none"> <li>● Policy review</li> </ul>
Health Services Use among Medicaid Managed Care Enrollees Pre and Post ACA Implementation (2015)	<ul style="list-style-type: none"> <li>● Extensive quantitative analysis of Kaisers dataset</li> </ul>
Medical Error Reporting and Developing a Culture of Patient Safety : How Lean Management Could Improve Error-Reporting Systems (2015)	<ul style="list-style-type: none"> <li>● Policy review</li> <li>● Interviews with key informants</li> </ul>
The Role of Socioeconomic Origin on Student Service Patterns (2015)	<ul style="list-style-type: none"> <li>● Nationwide quantitative online survey of medical students</li> </ul>
Community Health Needs Assessment of a Tri-county Urban Health Organization in the San Francisco Bay Area (2015)	<ul style="list-style-type: none"> <li>● Mixed methods study</li> <li>● Questionnaire at Native American Health Centers in the Bay Area</li> </ul>
Factors Associated with Hepatitis B Knowledge Among Vietnamese Americans (2015)	<ul style="list-style-type: none"> <li>● Quantitative analysis of a large dataset of surveys from several thousand participants in Bay Area and DC.</li> </ul>

Needs Assessment of the California Juvenile Justice System: Perspectives From Key Informant Interviews (2015)	<ul style="list-style-type: none"> <li>Interviews with key informants</li> </ul>
Meeting Patient Needs in an Integrated Care Model: A Study of High-Utilizers of Primary Care Services at Community Health Center Ole, Napa (2015)	<ul style="list-style-type: none"> <li>Analysis of EHR data for clinic</li> </ul>
Evaluation of the East Oakland Innovators: Resident-Led Design Thinking Project in the Best Babies Zone (2015)	<ul style="list-style-type: none"> <li>Mixed methods approach <ul style="list-style-type: none"> <li>Analyzed survey data</li> <li>Interviews with key informants</li> </ul> </li> </ul>
Assessment of Economic Status in Trauma Registries: A New Algorithm for Generating Population-Specific Clustering-Based Models of Economic Status for Low-Resource Settings (2015)	<ul style="list-style-type: none"> <li>Quantitative analysis of a trauma dataset and developing models</li> </ul>
Utilizing Health Information Technology for Quality Improvement at the Alta Bates Summit Diabetes Center (2015)	<ul style="list-style-type: none"> <li>Key informant interviews</li> <li>Process mapping of EHR</li> </ul>

## Year 2014

Title	Methodology
Needs Assessment: Food security and food distribution planning in Cambodian and Karen refugees (2014)	<ul style="list-style-type: none"> <li>in collaboration with Asian Health Services in Oakland</li> <li>mixed methods survey among Karen and Cambodian populations in Oakland</li> <li>Descriptive statistics</li> </ul>
The convening authority: Using the multiple streams model to explore the opening of policy windows to effect change in military sexual assault (2014)	<ul style="list-style-type: none"> <li>Policy review</li> </ul>
The Impact Of Permanent Supportive Housing On Homeless Adults With Diabetes: Healthcare Utilization, Health Literacy And Diabetes Management (2014)	<ul style="list-style-type: none"> <li>mixed methods survey in collaboration with the San Francisco Department of Public Health and its Direct Access to Housing (DAH) Program</li> <li>Descriptive statistics, Chi-Square</li> <li>The provision of DAH housing resulted in fewer ED visits and hospital days among formerly homeless adults with diabetes. Using patterns of healthcare utilization before and after housing, this study shows that individuals with diabetes benefit from housing, which represents cost savings for hospitals and insurers.</li> </ul>
Understanding the Association Between Working Equine Health and Human Health in Rural Nicaragua (2014)	<ul style="list-style-type: none"> <li>cross-sectional quantitative survey of convenience-sampled animal owners at mobile clinic, collecting demographics, standard of living markers, access to health services, perceptions of working equine value and human personal</li> </ul>

	<p>health-related quality of life measures, anthropometric growth data on children, grading scale for measuring working equine.</p> <ul style="list-style-type: none"> <li>Results: socioeconomic status, wealth index and education as measures are insufficient measures to predict working equine health.</li> </ul>
A Qualitative Study of Barriers Preventing Pregnant Women From Obtaining Care at Health Care Facilities in Kembata Timbaro Zone, Timbaro District, Ethiopia (2014)	<ul style="list-style-type: none"> <li>Qualitative Study</li> <li>In collaboration with WEEMA</li> <li>Study assesses the barriers that exist for pregnant women seeking care in rural Ethiopia, and reveal intervention points that must be explored and considered for implementation.</li> </ul>
Needs Assessment for Novel Eye Care Intervention: The Ravenswood Family Health Center (2014)	<ul style="list-style-type: none"> <li>Mixed methods study in collaboration with East Palo Alto Community Health Center</li> <li>needs assessment survey collecting baseline knowledge and barriers to seeking eye care for diabetic adults, in order to plan the new eye clinic</li> </ul>
Nutrition Education And Dietary Counseling Practices In Internal Medicine Residency Training. (2014)	<ul style="list-style-type: none"> <li>quantitative, nation-wide online cross-sectional survey, completed by Internal Medicine program directors (n=40) and residents (n=133).</li> <li>Multimodal nutrition education in IM residency and better resident dietary habits are associated with higher frequency of dietary counseling for patients. Barriers such as lack of expertise and lack of personnel, faculty and interest in patient counseling need to be addressed.</li> </ul>
Transitioning the San Francisco Health Care Security Ordinance Under the Affordable Care Act (2014)	<ul style="list-style-type: none"> <li>Policy analysis</li> <li>examines how San Francisco will adjust its Health Care Security Ordinance, a policy designed to provide health care access to the city's uninsured and undocumented residents, in light of the national transition to the Affordable Care Act. The city aimed to maintain affordable coverage and close to universal health care access for all San Franciscans. A focus on the context, process, actors, and content that make up the policy triangle model provides a way to analyze the complexities of perspectives, debates, and legislation in the policy process.</li> </ul>
Concussion Knowledge Survey for Athletic Coaches and Instructors: A Pilot Study (2014)	<ul style="list-style-type: none"> <li>pilot survey to determine concussion knowledge before and after an educational module.</li> <li>target population: athletic coaches and physical education instructors, attending the ACT taught by CaCC</li> <li>sample size completing all three surveys, pre-test, post-test, and follow up surveys, was smaller than anticipated. (n=10), descriptive statistics</li> </ul>

Intervening at the Intersection: A Program Evaluation of Bay Area Girls Rock Camp (2014)	<ul style="list-style-type: none"> <li>• assisting BAGRC in Oakland with program evaluation and quality improvement</li> <li>• mixed methods program evaluation comprised of survey administration and focus groups from Girls Rock Afterschool Program (GRASP) and the Girls Rock Summer Camp, using Rosenberg self-esteem scale (RSES) and Brief sense of community scale (BSCS), n=25</li> </ul>
Assessing hospital re-admission for traumatic injuries after intervention by the SF Trauma Recovery center (2014)	<ul style="list-style-type: none"> <li>• quantitative data analysis of existing data set at Trauma Recovery Center (TRC) at San Francisco General</li> <li>• This study compares younger (under 30) and older (over 30) patients regarding race, gender, initial injury mechanism, and need for hospital admission, as well as incidence of reinjury and all-cause mortality over 1-, 5- and 10-year periods. Intervention group (TRC versus usual care) was also evaluated as a predictor of reinjury and mortality.</li> </ul>
Disparities in utilization of surgical treatment for medically refractory epilepsy among African Americans, Asian/Pacific Islanders and persons with limited English proficiency: A first-hand account from those affected. (2014)	<ul style="list-style-type: none"> <li>• In collaboration with Bay Area clinics, in-person and phone interviews</li> <li>• phone interview instrument consisting of both close- and open-ended questions asking patients about demographics, personal epilepsy history, health insurance status, general health, and quality of care.(n=18)</li> <li>• descriptive statistics</li> </ul>
A Data Quality Assessment of Primary Care Records in Haiti's Multi-Site Electronic Medical Record System (2014)	<ul style="list-style-type: none"> <li>• assessing baseline data quality for primary care records in iSanté across the system and across sites, with focus on TB indicators.</li> <li>• Overall, data quality appeared to be strong for accuracy but moderate to low for completeness. Reasons for underreporting, however, are likely complex, reflecting the reality of health care delivery in low-resource settings.</li> </ul>
Building Community and Empowerment Among San Francisco Seniors: Connection for Health Aging Workshops (2014)	<ul style="list-style-type: none"> <li>• Qualitative program evaluation using semi-structured interviews.</li> <li>• Conclusion: Community Living Campaign is a well-respected organization with a strong mission to create grassroots community change. Thematic analysis shows that the CHA workshops are successfully helping increase awareness of critical issues affecting seniors, encourages participants to feel more empowered to make health care decisions, promotes opportunities for social connection, and is a foundation for creating stronger communities.</li> </ul>

Developing a Geriatric Nutrition Curriculum for Public health Students: a qualitative approach (2014)	<ul style="list-style-type: none"> <li>• Multi-prong qualitative study</li> <li>• key informant interviews with experts in Geriatrics, Nutrition, and Public Health about geriatric nutrition.</li> <li>• Community focus group at North Berkeley Senior Center</li> <li>• Experiential observations of users of public nutrition programs (San Carlos Mobile Produce Market, Millbrae Senior Brown Bag distribution sites)</li> </ul>
Evaluation of the “Design Sprint” – a Design Thinking Pilot in the Castlemont Best Babies Zone in Oakland (2014)	<ul style="list-style-type: none"> <li>• human-centered design (HCD) or “design thinking” as a promising approach to develop programs that would begin to address social determinants of health.</li> <li>• 12-week design sprint including the design thinking phases of Understand and Ideate</li> </ul>

## Year 2013

Title	Methodology
Barriers to Mental Healthcare Utilization in Latino Immigrant Day Laborers (2013)	<ul style="list-style-type: none"> <li>• in collaboration with the Multicultural Institute in Berkeley, a non-profit organization which links Day Laborers with employers</li> <li>• quantitative survey with 50 participants</li> <li>• Descriptive statistics and Chi Square</li> </ul>
Barriers to Mental Healthcare Utilization in Latino Immigrant Day Laborers (2013)	<ul style="list-style-type: none"> <li>• in collaboration with the Multicultural Institute in Berkeley, a non-profit organization which links Day Laborers with employers</li> <li>• quantitative survey with 50 participants</li> <li>• Descriptive statistics and Chi Square</li> </ul>
Impact Evaluation: Rwanda Health Enterprise Architecture (RHEA) eHealth Implementation (2013)	<ul style="list-style-type: none"> <li>• designing an impact evaluation to evaluate the impact of technology on maternal and child health in Rwanda.</li> <li>• target audience for the impact evaluation is the Rwandan MOH</li> </ul>
Comparative Analysis and Critical Assessment of the Global Burden of Prostate Cancer in the Era of Prostate Cancer Screening (2013)	<ul style="list-style-type: none"> <li>• a comparative analysis of the global burden of prostate cancer from 1990 to 2010 in terms of deaths and disability using the 2010 Global Burden of Disease Dataset, and to infer the role of increasing life expectancy and prostate cancer screening on observed prostate cancer trends and its policy implications.</li> <li>• Data from the Institute of Health Metrics and Evaluation Global Burden of Disease Project, 2010.</li> <li>• Data was extracted and analyzed using the program R. Population estimates, population weights, and age-adjusted rates for prostate cancer death, DALYs, YLLs and YLDs, and life expectancy were determined for each region, age group and year</li> </ul>

Flammability Standards without Flame Retardants. A Policy Analysis (2013)	<ul style="list-style-type: none"> <li>• examines the original California flammability standard, known as Technical Bulletin 117 (TB 117) and the problems with this standard from a health and fire safety prospective.</li> <li>• reviews the arguments in favor of the standard and flame retardants in general, along with potential biases and questionable practices on the part of flame retardant manufacturers.</li> <li>• explores different alternative standards.</li> </ul>
Prescription Drug Overdose in Black & White: paradoxes of public health and the news (2013)	<ul style="list-style-type: none"> <li>• media analysis to evaluate whether the public gets an accurate representation of the problem of fatal prescription drug overdose by reading the news. Includes analysis of how news stories inform the public with useful facts, and examines variables in news stories that influence the public health message delivered</li> </ul>
Aging and Discrimination: The Mental, Social, and Physical Health of Bay Area South Asian Elderly Immigrants. (2013)	<ul style="list-style-type: none"> <li>• multi-method study to explore whether South Asian .5-generation immigrants experience discrimination post-September 11th, 2001 and how they perceive this affects their health.</li> <li>• In collaboration with two East Bay Sikh Temples, a South Asian Community Center in Silicon Valley</li> <li>• Qualitative interviews of community organizers and immigrants</li> <li>• proposes public health interventions, and lists future direction for research.</li> </ul>
Addressing complementary and alternative medicine use and medication adherence among Street Level Health Project allopathic clinic patients: A survey-based needs assessment. (2013)	<ul style="list-style-type: none"> <li>• mixed method study in collaboration with "Street Level Health Project [(SLHP)] using their designed questionnaire</li> <li>• needs assessment survey,</li> <li>• data analysis of survey results, recommendations and identifying potential interventions based on the survey results, survey design guidelines for future survey</li> </ul>
Resident Physician Knowledge of Health Reform and Career Impact (2013)	<ul style="list-style-type: none"> <li>• online survey for medical residents, using the Qualtrics survey software, for 18 residency programs in the greater San Francisco Area and Sacramento.</li> <li>• collecting demographic information, knowledge assessment questions, inquiry about intended practice, comfort with health reform, prior health policy education, and preferred educational method of health care policy and reform.</li> <li>• IRB exempt status, survey completely anonymous with no identifying data collection.</li> <li>• Primarily descriptive statistics</li> </ul>

Disparities in the Use of Surgery Among Minority Patients with Temporal Lobe Epilepsy (2013)	<ul style="list-style-type: none"> <li>• Retrospective Chart Review, single unmatched retrospective cohort study</li> <li>• examine whether race/ethnicity and limited English proficiency (LEP) are associated with the following health disparities: 1) underutilization of anterior temporal lobectomy (ATL) as a treatment for medically refractory epilepsy in the setting of MTS (Logistic regression and generalized linear models); 2) longer delays from the time of diagnostic work-up to the date of ATL (Survival models).</li> <li>• Multivariate Logistic Regression and Generalized Linear Models</li> </ul>
Do homes make children sick? The case of acute respiratory illness in Myanmar.	<ul style="list-style-type: none"> <li>• quantitative analysis of existing data set from Population Services International (PSI)</li> <li>• questions: incidence of ARI for children under age 5, statistically significant difference in incidence rates between north and south townships?</li> </ul>

## Year 2012

Title	Methodology
The Role of Wildlife in Human Nutrition in Central Africa (2012)	<ul style="list-style-type: none"> <li>• Cross-sectional household survey in Cameroon, cluster sampling by village (20 villages with 527 household interviews), use of survey instrument student had piloted in 2006</li> <li>• Surveys conducted by 8 Cameroonian grad students in 2007</li> <li>• Descriptive statistics</li> </ul>
A Further Comparison of Medi-Cal and Healthy Families: The Role of Insurance Type in California's Pediatric Oral Health Disparities (2012)	<ul style="list-style-type: none"> <li>• Sacramento Employment Training Agency Head Start data from 2010-2011, assessing unmet need by insurance type (n=1399) <ul style="list-style-type: none"> <li>◦ Comparing children with no insurance, Medical/healthy Families/ or private insurance</li> <li>◦ Multivariate analysis adjusting for demographics</li> </ul> </li> </ul>
Volunteering By Older Americans: Findings from the Healthy Aging Network Walking Study (2012)	<ul style="list-style-type: none"> <li>• Data from Healthy aging network (HAN) walking study (PI: UCB Professor Satriano)</li> <li>• Interviews with 884 participants</li> <li>• Most important variables assessed influence by volunteer work: walking, caregiving, depression, education, gender&amp;race, social ties</li> </ul>

Understanding the Interface Between Surgery and Global Public Health: A Case Study of Inguinal Hernia in Ghana (2012)	<ul style="list-style-type: none"> <li>● Extensive literature review on current dialogues in Global Surgery, definitions, priorities</li> <li>● Targeting a Priority 1 condition: Inguinal hernia in Ghana <ul style="list-style-type: none"> <li>○ Scope of problem, modeling extent and surgical capacity in Ghana using US NHANES data, resulting in projected backlog of 2.2 million surgeries over 10 years</li> <li>○ Developing innovative solutions for low tech surgery (mosquito net mesh – Indian example; COSECSA from South Africa example; Humanitarian Hernia Surgery like British 'Operation Hernia')</li> </ul> </li> <li>● Very little data is presented on capacity of Ghana health system</li> </ul>
Fast Food at UCSF (2012)	<ul style="list-style-type: none"> <li>● Landscape analysis on eating options at UCSF Parnassus Medical Campus, mixed methods <ul style="list-style-type: none"> <li>○ Cross sectional study with convenience sample, 26 questions administered on ipad</li> <li>○ 6 Semi-structured interviews with key informants</li> <li>○ Ongoing data collections since 03/2012</li> </ul> </li> </ul>
Health Outcomes Related to Tobacco Use in Patients with Tuberculosis in Santa Clara County (2012)	<ul style="list-style-type: none"> <li>● Collaboration with Santa Clara County PHD</li> <li>● Chart review of suspected TB patients in 2009 and 2010, identification of patients with confirmed TB (n=250)</li> <li>● Retrospective population based cross-sectional study, outcome variables: demographics, length and extent of tobacco use, other exposures (foreign travel), homeless ness, alcohol and other risk factors</li> <li>● Univariate and multivariate logistic regression</li> </ul>
Easy as 1, 2, 3: Population Specific Strategies to Lower the Barriers to Valley Care Enrollment in the Santa Clara Valley Health and Hospital System (2012)	<ul style="list-style-type: none"> <li>● Data collected from Valley Care database, analyzing financial assets of applicants to determine eligibility</li> <li>● Tool: Design thinking Framework (Empathize, define, ideate, prototype, test)</li> <li>● During 15 visits of 4 hours each by student, office procedures were observed; later semi-structured interviews (n~50) with enrollees and counselors and potential enrollees</li> <li>● Development of materials for enrollee intake (nice folder for potential enrollees to assemble necessary documentation; also a pocket guide), streamlining process, budget calculations for implementation</li> </ul>

Quality Matters: The implementation and evaluation of a disease registry in a free homeless clinic. (2012)	<ul style="list-style-type: none"> <li>● Creating Diabetes patient registry for free clinic for homeless in Santa Clara County, serving over 600 patients           <ul style="list-style-type: none"> <li>○ Chart review</li> <li>○ Identifying primary health providers for diabetic patients</li> <li>○ Preparing diabetic patient list (n=47 patients) for the primary health providers to facilitate tracking patients after missed apt etc.</li> <li>○ Evaluating the disease registry process, including interviews with providers and strategies for financial sustainability of the registry</li> <li>○ Preparing results and recommendations in video format for involved providers</li> </ul> </li> </ul>
The Role of Local Policy in Creating Healthy Good Zones Around Schools: An Analysis of Issues and Opportunities (2012)	<ul style="list-style-type: none"> <li>● Developing a causality framework,           <ul style="list-style-type: none"> <li>○ assessing the role of (local) policy,</li> <li>○ extrinsic issues and alternative policies</li> <li>○ serving size, availability of unhealthy food</li> <li>○ conclusions: current policy environment, the role of advocacy</li> </ul> </li> </ul>

## Year 2011

Title	Methodology
Accountable Care Organizations in the American Health Reform 2010: Its Challenge and Implications for Japan (2011)	<ul style="list-style-type: none"> <li>● Policy analysis, gathering information on American Health Care Reform and examining implications for ACPs/ Medical Shared Savings Program in Japan</li> <li>● Key informant interviews in California, Washington DC, and Japan</li> </ul>
Can Mindfulness Meditation Help Prevent Post-Traumatic Stress Disorder? (2011)	<ul style="list-style-type: none"> <li>● Secondary data analysis using data from The Heart and Soul Study from the SF Veterans Administration</li> <li>● Data collected in 2000-2010, n=1024 followed for psychological factors and association with cardiovascular events after completing mindfulness meditation intervention</li> <li>● Using validated Hospital Anxiety and Depression Scale</li> </ul>
Program Evaluation of the Health Care for Homeless Veterans Program for the San Francisco VA Medical Center Downtown Clinic (2011)	<ul style="list-style-type: none"> <li>● Initially planned study to evaluate program effect at improving housing proved impossible to implement</li> <li>● Instead review of literature on homeless housing, develop best practices, additionally compilation of summary data on the program, costs and detailed recommendations for modifications</li> </ul>
Use of Incentives for Behavior Change in Environmental Health Interventions: Lessons for Improved Cookstove Dissemination (2011)	<ul style="list-style-type: none"> <li>● Literature review and key informant interviews</li> </ul>
Restoring Justice in Public Health: A proposal for preventing youth violence (2011)	<ul style="list-style-type: none"> <li>● Literature review</li> <li>● Action plan to bring Family Group Conferencing to juvenile justice in Alabama</li> <li>● Planning concept for program, including budget for 138 FGC</li> <li>● Also including evaluation component</li> </ul>
Continuing Care for Patients for Alcohol and Other Drug Disorders (2011)	<ul style="list-style-type: none"> <li>● Collaboration with Kaiser' Division of Research</li> <li>● 18 key informant interviews for regional data and online provider survey (n=73) on knowledge of available resources, attitudes of working with AOD patients, barriers and cost savings</li> </ul>
Evaluation of a Substance Abuse, HIV and Hepatitis Prevention Initiative for Urban Native Americans: The Native Vision Program (2011)	<ul style="list-style-type: none"> <li>● Mixed method outcome evaluation of Native Voices (prevention organization of urban American Indians in the SF Bay Area)</li> <li>● N=100 youth on 4-day retreat, outcome measures: knowledge, risk perception, ethnic identity, sexual risk behavior - using scales and items from National Minority Substance Abuse Initiatives Instrumentations (SAMHSA) and qualitative interviews</li> <li>● Also: evaluating the Gathering of Nations Curriculum</li> </ul>

The Nutrition Transition in Rural Bolivia: Addressing Diabetes and Obesity in the Context of Food Insecurity (2011)

- Partnering with local community organization, assess nutritional status in rural community, barriers to healthy eating, train health workers to promote improved nutrition
- Health screenings (obesity, glucose levels, stunting, blood pressure, eating habits) and focus groups

Shifting the Paradigm of Emergency Care in Developing Countries: The Need for Community-Health Worker Administered Emergency Services in Fort Liberte, Haiti (2011)	<ul style="list-style-type: none"> <li>Medical record review to assess burden of emergency disease, and community survey to assess barriers to care seeking</li> <li>Location: Fort Liberte Hospital Haiti, 2000 medical records reviewed from 2009-2010, community survey in 50 households</li> <li>DALY framework for analysis</li> </ul>
The Ashland Youth Center Health and Wellness Center. A Youth-led collaborative project (2011)	<ul style="list-style-type: none"> <li>Center developed and run by Clinica de la Raza and Alameda County</li> <li>Project aimed to community and youth needs assessment, strategic planning of vision, mission and outcomes/ indicators for center, conduct inventory of existing services, recruitment and training of youth advisors for center</li> <li>Interview process of selected youth, developing model for replicable youth leadership panel,</li> <li>Good example for how project focus shifted and for initially difficult and then improving relations with the collaborating agency</li> </ul>
Safer e-mining: Situational Analyses and recommendations for tackling the electronic waste recycling issues, globally and locally (2011)	<ul style="list-style-type: none"> <li>Developing educational toolkit to train workers how to safeguard their health</li> <li>Collaboration with Silicon Valley Toxics coalition in San Jose</li> <li>Situational analysis methodology globally (lit review, interviews with experts) and locally (visiting e-waste facility in CA, e-waste drop-off centers, interview local experts and NGOs as well as local stakeholders), exposure assessment</li> <li>Deliverables: an educational video, poster, manual for workers,</li> </ul>
Facebook, Seniors, activity and health. Can social networking empower frail elders? (2011)	<ul style="list-style-type: none"> <li>Part 1: detailed Literature review,</li> <li>Part 2: Setting up a pilot with North Berkeley Senior Center and develop a provider webpage for them <ul style="list-style-type: none"> <li>Recruit 20-30 seniors</li> <li>Baseline survey, teach use of Facebook, follow- up survey after 6 weeks</li> <li>Evaluate use of provider's page and participants use of their FB page to connect with provider and each other</li> </ul> </li> <li>Part 3: Proposal for a next step for a Norwegian setting</li> <li>Good example of IRB and MoU process with collaborating organization</li> </ul>
The Nutrition Transition in Rural Bolivia: Addressing Diabetes and Obesity in the Context of Food Insecurity (2011)	<ul style="list-style-type: none"> <li>Partnering with local community organization, assess nutritional status in rural community, barriers to healthy eating, train health workers to promote improved nutrition</li> <li>Health screenings (obesity, glucose levels, stunting, blood pressure, eating habits) and focus groups</li> </ul>

## Year 2010

Title	Methodology

An Ethnographic Study of Latino Children's Dental Health in Oakland/Hayward CA (2010)	<ul style="list-style-type: none"> <li>• Ethnography studying 21 Latino families recruited at Clinica De la Raza</li> <li>• Surveying parents and children on breast feeding, eating and sleeping habits, oral hygiene, living conditions, dental care</li> </ul>
Housing as a Health Intervention for Homeless People Living With AIDS: A Health Care Utilization and Cost Analysis in SF (2010)	<ul style="list-style-type: none"> <li>• Identified 69 homeless PLWA by linking registries from SFDPH</li> <li>• Determining healthcare visits, hospital stays etc for 24 months before and after entrance into housing program</li> </ul>
The Utility of Incorporating Religious Leaders into Disaster Mental Health Preparedness, Response, and Recovery (2010)	<ul style="list-style-type: none"> <li>• Very detailed literature review</li> <li>• Qualitative interviews with 5 religious leaders in New Orleans, despite massive recruitment efforts through church listservsm snowballing etc. – conducted over telephone, recordings, transcriptions</li> </ul>
Bicycle-Related Traumatic Brain Injury in Sonoma County 2004-2009 – Epidemiology, Helmets and Public Health (2010)	<ul style="list-style-type: none"> <li>• Generate statistics for TBI for Sonoma County and assess helmet utilization patterns and demographic characteristics, also hospitalization rates and cost analysis</li> <li>• Retrospective cohort study using data from Santa Rosa Memorial Hospital 2004-2009, n=279</li> </ul>
Geriatrics for Family Caregivers: an Online Education Pilot (2010)	<ul style="list-style-type: none"> <li>• Collaboration with caring.com website</li> <li>• Development of online case studies as blogs in narrative format (case, challenge, solution),</li> <li>• after 6 months online preliminary analysis of user experience - interviews of 4 site users (care givers for dementia)</li> </ul>
Sexual Violence and Accountability (2010)	<ul style="list-style-type: none"> <li>• Developing the Sexual Violence and Accountability project with the Human Rights Center</li> <li>• Review of barriers to accountability in 5 countries: <u>Kenya</u>, DR Congo, Colombia, Kashmir, Sudan</li> <li>• 20 interviews with victims/first responders in the Bay Area, followed by pilot in Kenya, with 50 informants there</li> </ul>
Improving Quality of Primary Care for Low Income Minority Patients: Current Perspectives on Medical Home Policy (2010)	<ul style="list-style-type: none"> <li>• Policy review</li> </ul>
Barriers to Healthcare Utilization in Latino Immigrant Day Laborers (2010)	<ul style="list-style-type: none"> <li>• Convenience sample of 50 day laborers in 2 Bay Area cities (with Multicultural Institute in Berkeley)</li> <li>• 30 item questionnaire, previously validated on health care utilization, barriers, immigration status, demographics</li> <li>• Attached are questionnaire and CHR forms (useful sample)</li> </ul>
The Health Impact of the Deficit Reduction Act (2010)	<ul style="list-style-type: none"> <li>• Monte Carlo simulation and Markov structure projecting costs for future pregnancies</li> <li>• 2 page self-assessment states: Plans to compare utilization of FP clinics 18 months before and after documentation</li> </ul>

Risk Perceptions Around Walking  
and Biking to School

- developed a framework to understand risk perceptions in a comparative analysis (risk assessment model)

## Year 2009

Title	Methodology
Transportation self-efficacy for older adults, related health outcomes, and the role of social networks (2009)	<ul style="list-style-type: none"> <li>● focus group and survey (n=41) in convenience sample from North Berkeley Senior Center</li> <li>● Statistical analysis: frequencies, t-test, regression to measure factors influencing transportation self-efficacy and health outcomes</li> <li>● Detailed self-designed questionnaire</li> </ul>
Injury Patterns and Assessment of Effectiveness in Pre-Hospital Interventions in Uganda (2009)	<ul style="list-style-type: none"> <li>● UCSF-Uganda collaboration, IRB approved</li> <li>● PART 1: <ul style="list-style-type: none"> <li>○ Prospective cross-sectional study</li> <li>○ database for Kampala, dataset from 2007</li> <li>○ very short result section, mainly frequencies (male/female, type of injury)</li> </ul> </li> <li>● PART 2: <ul style="list-style-type: none"> <li>○ Prospective cohort study</li> <li>○ Developing first-aid curriculum, first responder training</li> <li>○ Knowledge baseline of trainees before training, compared to after training in short, self-developed survey</li> <li>○ short analysis, frequencies</li> </ul> </li> </ul>
Extending Access to Rural Hospice Care: Are Volunteer Hospices the Solution? (2009)	<ul style="list-style-type: none"> <li>● Detailed intro on history of hospice care in the US</li> <li>● Methods: <ul style="list-style-type: none"> <li>○ qualitative interviews; transcribed and coded. Post-interview journaling by interviewer.</li> <li>○ County in Northern California with 4 volunteer and 1 Medicare-certified hospice</li> <li>○ interviews at all 5 hospices with directors and key informants</li> <li>○ first round of analysis to extract and sort information, second round re-analyzed per grounded theory</li> </ul> </li> </ul>
Microbiological Evaluation of a Three Week Hygiene Education and Hand Washing Intervention Among School Children in an Urban Slum Setting in Mumbai, India (2009)	<ul style="list-style-type: none"> <li>● Had to come up with new project in Mumbai after fire destroyed infrastructure for first study (product survey of water treatment products)</li> <li>● With PSI Mumbai, pilot hygiene training for school children, giving out soap, to increase hand washing, n=29</li> <li>● Result reported on tested hand rinse cultures</li> </ul>
Clinically Significant Trauma Symptoms in San Jose-Based Cambodian Khmer Refugees Interested in Meditation (2009)	<ul style="list-style-type: none"> <li>● planned as prospective cohort study, but later altered since consistent follow-up proved impossible, no control group established</li> <li>● weekly course for 12 weeks</li> <li>● cohort recruited from UNITED Khmer Krom Temple in San Jose, N=13</li> <li>● baseline questionnaire (PTSD checklist and others, all validated)</li> <li>● detailed analysis of demographics, PTSD subscales, correlations, reliability, but small sample size</li> </ul>

Disparities in Referral for Liver Transplantation Among African Americans: An Update and Public Health Approach to Fixing the "Referral" Speed Bump (2009)	<ul style="list-style-type: none"> <li>• detailed literature review on process and disparity in referral system for organ transplant in US</li> <li>• based on this, developing a public health approach to improving referral for liver transplants for African Americans (planning ecological framework for interventions following recommendations in the literature)</li> </ul>
Community Out-of-School Promotion of Healthy Norms in Children (2009)	<ul style="list-style-type: none"> <li>• analyzes data after school programs in Alameda County to exam program for learning healthy norms (4/5<sup>th</sup> graders)</li> <li>• 47-item questionnaire from Kansas State Community Health institute measuring self-efficacy for eating habits, physical activity for children and their families</li> <li>• Analysis of demographic and socio-economic variables</li> </ul>
Planning a Malaria Abatement Project in Rural Kenya: The Matitbabu Foundation Malaria Initiative (2009)	<ul style="list-style-type: none"> <li>• Outlines plan for 3 year project to improve malaria therapy provision and use of insecticide treated bednets, staff and community education, referral of pregnant women to treatment</li> <li>• Baseline assessment of existing malaria prevention and its reach was performed earlier</li> <li>• Proposal includes objectives (85% U5 children with treatment and bednets, behavior change communication) and strategies.</li> <li>• visited 11 of 15 district facilities in Kenya and conducted needs assessment, 270 questionnaires to clients</li> </ul>
Mexico City Barriers to Accessing Abortion Services in the Public Sector and Policy Recommendations (2009)	<ul style="list-style-type: none"> <li>• conduct and analyze qualitative interviews for policy recommendations</li> <li>• extensive literature review</li> <li>• 11 key informant interviews in Mexico City and Morelos</li> <li>• Results broken into sections based on findings (barriers, cost, patient autonomy, providers, discrimination by medical staff etc), recommendations</li> </ul>
ASHA Assist: A Mobile Phone Based Teaching Tool for Community Health Workers in Rural India (2009)	<ul style="list-style-type: none"> <li>• Randomized cluster controlled pilot study to gather preliminary data to assess if intervention has impact (acceptability, feasibility, improved knowledge) to warrant larger trial in rural villages</li> <li>• Randomized into 5 groups (1 control, 4 interventions)</li> <li>• Measure before and after intervention: knowledge of anemia and corresponding iron intake, birth preparedness, client satisfaction</li> <li>• Self developed survey instruments, first version modified after interviews with pregnant women</li> <li>• Study will be conducted 09/2009 (in the future, after MPH completion)</li> </ul>
Quantitative Assessment of Delay in Cataract Surgery Uptake in Eastern Nepal and Bordering India (2009)	<ul style="list-style-type: none"> <li>• Gender or degree of impairment influencing delay?</li> <li>• Cross sectional study</li> <li>• Questionnaire with 14 items plus demographics, revised after piloting on 40 people, final sample n=447</li> <li>• Statistics: multivariate regression</li> </ul>

Considerations for Effective Hospice Outreach: Addressing Disparities in Hospice Care (2009)

- 2 Focus groups with hospice staff (n=4)and community members (n=7)
- Transcripts, coding, Atlas.ti
- Results: identifying 20 different concepts

## **INTERDISCIPLINARY MPH PROJECT TITLES, AUTHORS AND YEARS**

### **2003-2008**

#### **2008**

Risk Factors for Child Malnutrition in a Rural Highland Mayan Population of Guatemala (2008)

Vulnerabilities to HIV Seroconversion Among Biologically Female and Male-to-Female Transgender Prostitutes in San Francisco: A Qualitative Analysis (2008)

Needs Assessment for Pediatric Services in Native American Populations of Northern California Relative to the Scope of Services of Shriners Hospitals for Children Northern California (2008)

The Role of Breastfeeding in Prevention of *Helicobacter pylori* Infection: A Meta-Analysis (2008)

Sociodemographic Predictors of Prostate Cancer Risk Category at Diagnosis—Unique Patterns in Those With Significant and Insignificant Disease (2008)

From Features to Functions: A discourse analysis of physicians' communication practices in colorectal cancer screening discussion (2008)

A Public Health Approach to Addressing Adolescent Mental Health in California (2008)

National Trends of Complication Rates During Hospitalization in the US from 1998-2005 (2008)

Cervical HPV Incidence and Persistence in a Community-Based Cohort of HIV-Negative Women in Zimbabwe (2008)

Integrative Epidemiology May Reveal Key Roles for Brain Plasticity and Borderline Intellectual Functioning in Health Inequities (2008)

A Snort in the Dark? Non-Injection Drug Implements and Hepatitis C (2008)

Assessment of Malaria Diagnostic Test in the Remote Settings and Implication for Its Application in the Malaria Eradication Program with Special Reference to Vanuatu (2008)

Asthma and School Achievement in California: A Data Analysis (2008)

Experimental Cost Effectiveness Analysis of Misoprostol Distribution Methodologies for the Prevention of Post-Partum Hemorrhage in Nigeria: A proposal for a Cluster Randomized Controlled Trial (2008)

Campaign to Remove Trans Fats from Kaiser (2008)

A Geospatial Approach to Characterizing the Environmental Public Health Profession in California: New Strategies for New Perspectives on Old Challenges (2008)

HIV/AIDS in Migrant Communities Along the US-Mexico Border (2008)

Using Music Therapy to Improve Cognition in Patients with Alzheimer's Disease: A Meta-Analysis (2008)

An Evaluation of Training Issues for the Preparation of Health Care Providers in the Event of a Large-Scale Disaster (2008)

## **2007**

The Role of Social Support, Self-Efficacy and Health Status on Depression in HIV-Positive Women: A Theoretical Research Approach (2007)

Naloxone Distribution For Out of Hospital Overdose Prevention (2007)

Study of Patients' Satisfaction on Complete Denture Rehabilitation (2007)

Developing a Criteria for Discharge from an Adult Day Care Center for Dementia Patients (2007)

A Review of Process Evaluation and Its Role in an Assessment of PRISMA (2007)

Homeless Veterans and VA Health Care (2007)

A Legislative Advocacy Plan: New Legislation to Improve California's Health Through Mandating Regulation and Reduction of Tropospheric Ozone and Diesel Emissions (2007)

Self-Rated Health and Physical Functioning Among Chinese American Seniors (2007)

A School-Based Mandate for the HPV Vaccine—The Right Cure for Cervical Cancer Inequities in California? (2007)

Permanent Exits from Foster Care: Informing Measures Over Time (2007)

Vasectomy Perceptions Among Tricycle Drivers in Quezon City (2007)

Barriers to Female Education and Family Planning: A survey of two rural villages outside Peshawar, NWFP, Pakistan (2007)

Wellness Reports: New Opportunities in Consumer Health Information (2007)

Reproductive Health Qualitative Surveys with Female Sex Workers in Karnataka, India (2007)

The Preparedness of Biochemical Terrorism in Japan (2007)

Faster, Smaller, Cheaper: The Promise of Point-of-Care Diagnostics (2007)

Displacement Within Displacement: Developing a Deeper Understanding and Responsible Policy for Addressing the “Night Commuter” Phenomenon in Kitgum Town, Northern Uganda (2007)

Developing a Trauma Research Center to Reduce Accidents and Injuries in Jamaica, West Indies (2007)

## 2006

An Assessment of Information Resources for Families of Children with Special Health Care Needs at Glankler Medical Therapy Unit, Alameda County California Children’s Services (2006)

HPV Vaccine – Key Informant Interviews (2006)

Effectiveness of the Influenza Vaccine in Preventing Laboratory-Confirmed Flu in Infants: A Matched Case Control Study (2006)

Dentists’ Attitude, Knowledge and Practices Towards Diabetes in Dental Setting: Understanding and enhancing the dentists’ extent of current contribution to this public health issue (2006)

A Review of Mind-Body Medicine with a Focus on the Staying Well Study: A Clinical Trial of Mindfulness Based Stress Reduction (MBSR) or Education Groups for HIV Infection (2006)

The Incidence and the Estimated Direct Cost of Sexually Transmitted Infections Among Young People in California, 2005 (2006)

UGTA1A1 Genetic Testing to Avoid Adverse Reactions to Irinotecan: A Pharmacogenomics Study (2006)

Built Environment and Health Specialty Area – A Proposal (2006)

Adolescent Childbearing in Nicaragua: A Quantitative Assessment of Associated Factors (2006)

Knowledge, Attitudes and Acceptability of Vaginal Microbicides Among Health Care Providers (2006)

Medical Students: A Snapshot of Disorders, Coping Methods and Utilization of Mental Health Services (2006)

Japanese American Internment: Coping and the Sense of Coherence (2006)

Assessment of Barriers to Care to in Prevention of Parent-to-Child HIV Transmission Programs in Karnataka, India (2006)

Access to Pain Medication in Neighborhood Pharmacies of Fresno, CA (2006)

Hospital Based Peer Intervention Program for Violently Injured Youth Reduces Involvement in the Criminal Justice System (2006)

Rising C-Section Rates: Trends and Implications (2006)

Effect of Mass Antibiotic Treatment on the Prevalence of Infectious Trachoma in Ethiopia (2006)

## **2005**

California's Uninsured Children: Health Implications (2005)

Oral Health Status of San Francisco Kindergarteners, 2000-2004 (2005)

Infectious Correlates of HIV-1 Shedding in the Female Upper and Lower Genital Tracts (2006)

Improving Public Health Surveillance of Child Maltreatment Deaths in California with Child Protective Services Data (2005)

Comparing Diagnostic Strategies for Chlamydia, Gonorrhea and Trichomoniasis: Data from an Urban Primary Health Care Center Sao Paolo, Brazil (2005)

Evaluation of Clinical STD Training for Health Care Providers (2005)

Prior Antimalarial Use Among Patients Presenting for Enrollment in Clinical Trials: Data Analysis from Eight Sites in Uganda (2005)

California Medical Student Attitudes Toward Health Insurance and Health Education Policy (2005)

Feasibility Analysis of Universal Birth Dose Immunization for Hepatitis B in California (2005)

Smoking in College Students: A Focus on Asian and Pacific Islander Students (2005)

Needs Assessment of Clients Seeking Homeless Services in Palo Alto, CA (2005)

A Cost-Effectiveness Analysis of Hysteroscopic versus Laparoscopic Female Tube Sterilization (2005)

Contraceptive Patterns at School-Based Health Centers in Alameda County (2005)

## **2004**

Cancer Screening Practices and Perceived Discrimination Among California Adults: Research Findings and Policy Implications of Analysis of the California Health Information Survey (2004)

Sexual Violence and Women Refugees: Determination of Incidence and Prevalence (2004)

Risk Factors Associated with Trachoma Among Children in Nepal (2004)

An Inquiry into the Effectiveness of Asthma Teaching in a Community-Based Organization (2004)

- Tobacco Industry Manipulation of FCTC Negotiations (2004)
- A Survey evaluating knowledge and misconceptions around HIV/AIDs in Guatemala (2004)
- Stigma and the HIV/AIDs Epidemic (2004)
- Understanding Informed Consent in the Land of the Snows: Lessons Learned from a Randomized Control Trail in Tibet Autonomous Region, PRC (2004)
- The Human Right to Water (2004)
- An Analysis of the Applicability of U.S. Guideline for the Prevention of Surgical Site Infection in Low Resource Countries (2004)
- Water in Malawi: The Sustainability of Shallow Wells (2004)
- Historical Trauma Among Native Americans: A Public Health Perspective (2004)
- Anti-Racism and Indigenous Australians (2004)
- Canadian Survey on Abortion Training in Obstetrics and Gynecology Residency Programs (2004)
- Homicides in Oakland 1990-2003: Examining Unemployment, Causes, and Solutions (2004)
- Storytellers and Storycollecting: Their Roles in Health Advocacy (2004)
- DNIF Rates in Air Mobility Command Aircrews During the Initial Implementation of the US Military Smallpox Vaccination Program (2004)
- Association Between Birth Weight and Childhood Acute Lymphocytic Leukemia in the Northern California Childhood Leukemia Study (2004)
- 2003**
- Prehospital Care of Road Traffic Injuries in Chang Mai, Thailand (2003)
- Health Services in the Lugufu I Refugee Camp: Looking Back Six Years After Deployment of the Basic Health Care Emergency Response Unit (2003)
- Regional Variations in the Use and Awareness of the California Poison Control Center (2003)
- Religion and Health in Alameda County Korean Americans (2003)
- Discussion of Moods and Emotions in Primary Healthcare: Examining Patient and Provider Factors in the Adolescent Population (2003)
- Mifepristone Reimbursement in the United States: Evaluation and Development of a Model Coverage Policy (2003)

Benefit Perceptions and Household Demand for Improved Woodburning Stoves in Highland Guatemala (2003)

Getting a Grip on Pesticide Drift: A Study of California County Responses (2003)

Targeted Tuberculosis Skin Testing for Teachers: A Cost Effective Analysis (2003)

Video as an Education Tool for Responding to Health Care Needs of Asian Massage Parlor Workers in San Francisco (2003)

How Do Young Adolescents Make Decisions Regarding Sexual Activity and Safer Sex? (2003)

An Exploratory Analysis of Precursors of Contraceptive Use Among Latino Adolescents: A Case Study of Rural Teens of Mexican Descent (2003)

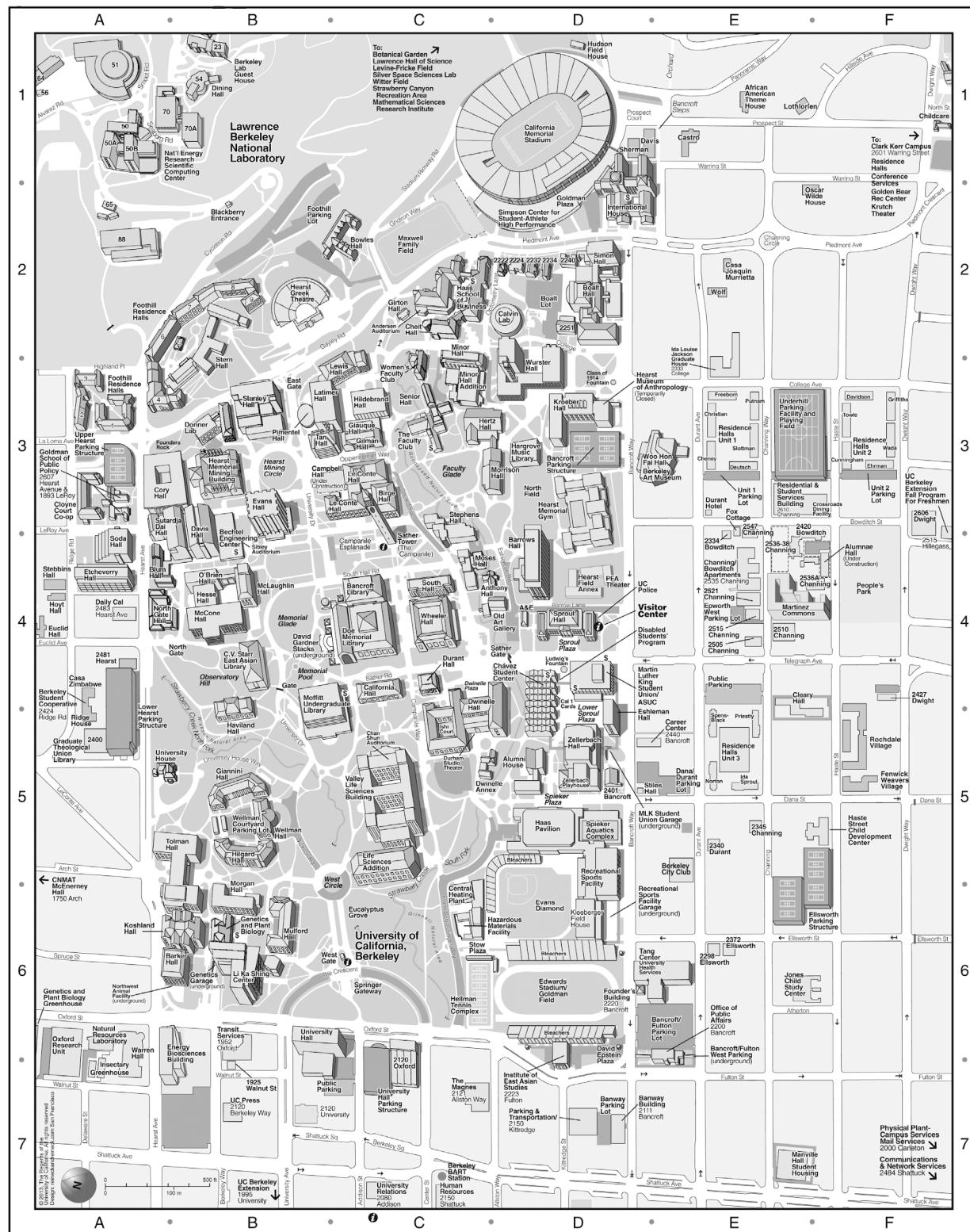
Predictors of Change in Cardiovascular Risk Factor Reduction Intervention (HEART Health Education and Risk Reduction Training Program) (2003)

Needs Assessment: Access to Nutritious Foods in East Oakland and South Hayward (2003)

Reducing Environmental Asthma Triggers for Children in Sonoma County: A role for School Policy? (2003)

# UC BERKELEY CAMPUS MAP KEY

Alumni House, D-5	Cinnonhouse, A-7	Pollio, UKC (Sprout Hall), D-1
Andersen Auditorium (Haas School of Business), C-2	Grinnell Natural Area, C-6	Recreational Sports Facility, D-5/6
Anthony Hall, C/D-4	Haas Pavilion, D-5	Residence Halls
Architects and Engineers (A&E), D-4	Haas School of Business, C-2	Bowles Hall, C-2
Bancroft Library, C-4	Hangrove Music Library, D-3	Clark Kerr Campus, F-1
Barway Bldg, D-7	Iaiste Street Child Development Center, F-5	Cleary Hall, D/F-4/5
Barker Hall, A/B-6	Iavoland Hall, D-4/5	Foothill Residence Halls, A/B 2/3
Barrow Lane, D-4	Hazardous Materials Facility, C/D 6	Ida Louise Jackson Graduate House, F 2/3
Barrows Hall, D-4	Hearst Field Annex, D-4	Martinez Commons E/F-4
BART Station, C-7	Hearst Greek Theatre, D-2	Stern Hall, D-2/3
Bechtel Engineering Center, B 3/4	Hearst Memorial Gymnasium, D-3	Unit 1, F-3
Berkeley Art Museum, C-6/7	Hearst Memorial Mining Bldg, B-3	Unit 2, F-3
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Article

# Obesity and Obesogenic Behaviors in Asian American Children with Immigrant and US-Born Mothers

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**Abstract:** Child obesity is understudied in Asian Americans, which include a growing population of recent immigrants. We examined the relationship between maternal nativity and time in the US, and obesity and obesogenic behaviors among Asian American children. We analyzed public-use data from the 2013–2016 California Health Interview Survey for Asian American children ages 2 to 11 years. We used logistic regression to determine the odds of obesity and obesogenic behaviors associated with maternal nativity and time in the US. This study included n = 609 children. Children of US-born mothers had lower odds of obesity (adjusted odds ratio, AOR, 0.12; 95% CI 0.02 to 0.91) and lower fruit intake (AOR 0.15, 95% CI 0.03 to 0.81) than children of recent immigrants (< 5 years in the US). Asian American children with recent immigrant mothers are more likely to be obese and eat less fruit than children with US-born mothers. Efforts to prevent obesity and increase fruit consumption are particularly important for this vulnerable population of children of recent immigrants.

**Keywords:** obesity; immigrants; nativity; Asian American; children

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## 1. Introduction

Asian American children are under-investigated in obesity research. In 2015–2016, 23.2% of Asian American children in the United States (US) were overweight, and 10.7% were obese [1]. While the prevalence of overweight/obesity is relatively low in this population compared to other racial/ethnic groups [1–3], there is a need to better understand risk factors for elevated body mass index (BMI) in Asian American children for several reasons. First, some Asian American ethnic subgroups have a higher prevalence of overweight/obesity than others [4–7]. One study found that Filipino and Vietnamese American children are more likely to have elevated BMI than their white peers [7]. Second, the prevalence of elevated BMI is increasing in some Asian American children. The national prevalence of obesity among Asian American girls increased sharply from 5.6% in 2011–2012 to 10.1% in 2015–2016 [1]. Third, a substantial proportion of Asian individuals are at risk of cardiometabolic disease at BMIs below the threshold for overweight [8], so the relatively low prevalence of overweight/obesity in this population may not be reassuring. Finally, Asian immigrants comprise the largest proportion of new arrivals to the US [9], and Asian Americans are the fastest growing racial/ethnic group overall [10]. With the growing Asian American population, it is increasingly important to examine the health of this group, particularly among recent immigrants.

One factor that may affect child BMI is maternal acculturation. As immigrants settle in the US, they may adopt Western obesogenic behaviors through acculturation, a complex process through which individuals from one culture adopt the practices of another [5,11]. Given the role of maternal influence on dietary [12–15] and sedentary behaviors [16–18], mothers may pass obesogenic habits

onto their children and increase their obesity risk. Exploring how acculturation might influence obesity and obesogenic behaviors may identify opportunities for intervention.

### 1.1. Maternal Acculturation and BMI

The small body of literature exploring the relationship between maternal acculturation and BMI in Asian American children is mixed. Maternal acculturation, as measured by English proficiency, has been shown to be a risk factor for consistent overweight/obesity in early elementary school children with less educated mothers but a protective factor in those with more educated mothers [5]. Another study found that Asian American preschool-age children with immigrant mothers had a lower obesity risk than those with US-born mothers [7]. Several studies by Chen et al. found an association between a lower maternal acculturation score on a multi-item questionnaire and elevated BMI in Chinese American children 8–10 years old [19–22]. These studies tended to be small and recruit from after-school programs and foreign-language schools in the San Francisco Bay Area [19–22], which may not represent the broader population.

### 1.2. Maternal Acculturation and Obesogenic Behaviors

Few studies directly assess the association between maternal acculturation and obesogenic behaviors in Asian American children [11,23]. Studies by Chen et al. found that a higher maternal acculturation score was associated with low sedentary activity [21], while both a lower maternal acculturation score and unhealthy food choices were risk factors for elevated BMI [22] in Chinese American children. Another study found that Chinese American parents (predominantly mothers) with a higher acculturation score tend to practice an indulgent feeding style, impose less restriction of unhealthy foods, and apply less pressure to eat healthy foods [24]. One study described the eating habits of Chinese American preschoolers whose caregivers had generally low acculturation scores but did not directly assess the relationship between caregiver acculturation and child diet [25]. Again, these studies tended to be small and/or recruit from after-school programs, foreign-language schools, and childcare centers, which may not be broadly representative. There is also a need to study the relationship between maternal acculturation and a wider range of obesogenic behaviors.

This study examined the association between two proxies of maternal acculturation (nativity and time in the US), and obesity and several obesogenic behaviors in a relatively large sample of Asian American children in California. We assessed whether children whose mothers were born in the US or have been in the country longer are more likely to be obese and engage in obesogenic behaviors (low fruit and vegetable intake, high sugar-sweetened beverage and fast food intake, and high sitting activity).

## 2. Materials and Methods

### 2.1. Data

This cross-sectional study examined public-use data from the California Health Interview Survey (CHIS), a continuous survey on various health topics [26]. The datasets generated and analyzed in this current study can be accessed on the CHIS website [26]. CHIS is the largest state health survey and provides representative data on all 58 counties in California [27]. CHIS uses a geographically stratified random-digit-dial telephone sampling strategy to randomly select households within counties and then one adult per household [28]. If present, children (birth to 11 years old) and adolescents (12–17 years old) may be interviewed separately [29]. Children are interviewed by proxy through the parent/guardian most knowledgeable about their health [29]. CHIS oversamples Korean and Vietnamese households [30] and conducts interviews in several languages [31] to increase Asian American representation.

## 2.2. Sample

We pooled public-use data from the 2013–2016 CHIS for children 2–11 years old. These years were chosen to represent the most recently available datasets that include the variables of interest and define them similarly. We excluded children < 2 years because they have different BMI thresholds for overweight/obesity than older children [32]. Since obesity was a primary outcome, we excluded children with no reported weight. The data were otherwise complete for the variables of interest. To account for biologically implausible anthropometric data and reduce misclassification bias in BMI categorization due to parental misreporting, we excluded children with weights or heights beyond 1.5 times the interquartile range for age and sex. We included all remaining children that were reported as being non-Hispanic Asian (exclusive of mixed-race children), which we referred to as “Asian American”.

## 2.3. Measures

We used two proxies for maternal acculturation: nativity and time in the US. Maternal nativity was a binary variable: immigrant and US-born. Maternal time in the US was an ordinal variable with five levels: < 5 years, 5–14 years, 15–24 years, ≥ 25 years, and US-born. US nativity and increasing time in the US served as proxies for acculturation, similar to larger studies in Asian American populations [5,6,33–36] in which acculturation questionnaires were not administered.

BMI was organized into three categories based on age- and sex-specific guidelines from the Centers for Disease Control and Prevention [32]: not overweight/obese (BMI < 85th percentile), overweight (BMI 85th to < 95th percentile), and obese (BMI ≥ 95th percentile). In multivariate analyses exploring obesity as the outcome, children with BMI < 85th percentile served as the reference group.

Dietary behaviors were dichotomized based on literature using CHIS data to examine Asian children’s obesogenic dietary practices [6]. Fruit and vegetable intake were determined by the number of caregiver-defined servings consumed yesterday. Given the low prevalence of soda and sweetened fruit drink consumption in the sample and the conceptual similarity of these drinks, they were combined into sugar-sweetened beverages (SSBs). SSB intake was determined by the number of glasses or cans of SSBs consumed yesterday. Fast food intake was defined as the number of times fast food was eaten in the past week. Similar to prior literature [6], consuming < 2 servings of fruit yesterday, < 2 servings of vegetables yesterday, ≥ 1 serving of SSB yesterday, and ≥ 1 serving of fast food last week were considered “obesogenic behaviors”.

Sedentary behavior was measured by sitting activity, defined as the number of hours spent sitting and watching TV, playing computer games, talking with friends, or doing other sitting activities on a typical weekday. Sitting activity was dichotomized, defining > 2 hours per day as an “obesogenic behavior” based on literature linking this amount of childhood TV time with adult overweight status [37].

Family income was identified as an important covariate and defined as a percentage of the federal poverty level (FPL): 0%–99% FPL, 100%–199% FPL, 200%–299% FPL, and ≥ 300% FPL. Besides child age and sex, there were no other relevant covariates, including ethnic subgroup and maternal education level, that were consistently available in the 2013–2016 public-use dataset.

## 2.4. Analyses

We computed descriptive statistics of the participants’ characteristics. Bivariate analyses were conducted using chi-square tests with the Rao–Scott second-order correction to account for the complex survey design. These analyses examined the associations between maternal nativity and time in the US, and child BMI and obesogenic behaviors. Separate multivariate logistic regression models examined the association between maternal nativity and time in the US, and child obesity and obesogenic behaviors, while adjusting for family income. Replicate weights provided by CHIS were used in all analyses to account for the complex survey design. All analyses were conducted using STATA/IC

Version 15.1 (2019, StataCorp LLC, College Station, TX, USA), with statistical significance defined as  $p < 0.05$ .

### 2.5. Human Subjects

The University of California, Berkeley Institutional Review Board confirmed that this study was secondary analysis of a publicly available, de-identified database, which is not considered human subjects research. This study was conducted in accordance with the Declaration of Helsinki.

## 3. Results

### 3.1. Sample

Asian American children accounted for 8.4% of the 8507 children ages 2–11 years in the 2013–2016 CHIS dataset. From this subset, excluding those without a reported weight ( $n = 65$ ) or an implausible weight/height ( $n = 39$ ) yielded a sample of 609 children.

### 3.2. Demographics

Table 1 displays the participants' characteristics. Among the children, 55.4% were boys, and the mean age was 7 years. Most families (62.9%) were in the highest income bracket, and most mothers (76.2%) were foreign-born. Among immigrant mothers, 15.2% had been in the US for < 5 years, 36.6% for 5–14 years, 21.4% for 15–24 years, and 26.8% for  $\geq 25$  years.

**Table 1.** Weighted characteristics of Asian American children ages 2 to 11 years old and their mothers ( $n = 609$ ): California Health Interview Survey (CHIS) 2013–2016.

Child Age, Mean Years (sd <sup>1</sup> )	7.0 (2.8)
Child sex, %	
Male	55.4
Female	44.6
Family income, %	
0%–99% FPL <sup>2</sup>	12.5
100%–199% FPL	16.2
200%–299% FPL	8.4
$\geq 300\%$ FPL	62.9
Maternal nativity, %	
Immigrant	76.2
US-born	23.8
Maternal time in US, %	
<5 years	11.6
5–14 years	27.9
15–24 years	16.3
$\geq 25$ years	20.4
US-born	23.8
Child BMI category, %	
Not overweight	65.7
Overweight	9.6
Obese	24.7
Obesogenic behaviors, %	
<2 servings of fruit yesterday	49.0
<2 servings of vegetables yesterday	55.8
$\geq 1$ serving of SSB <sup>3</sup> yesterday	28.9
$\geq 1$ serving of fast food last week	64.9
>2 sitting activity hours per day	28.1

<sup>1</sup> standard deviation, <sup>2</sup> federal poverty level, <sup>3</sup> sugar-sweetened beverage.

### 3.3. Child BMI

Table 2 shows the children's characteristics by BMI category and the results of related bivariate analyses. Overall, 9.6% of children were overweight, and 24.7% were obese. There was a significant association between income and BMI, with the lowest income group having more than 2.5 times the prevalence of obesity as the highest income group.

**Table 2.** Weighted characteristics of Asian American children ages 2 to 11 years old by BMI category ( $n = 609$ ): CHIS 2013–2016.

	Not OW/OB <sup>3</sup>	Overweight	Obese	p-Value
Children, %	65.7	9.6	24.7	—
Child age, mean years (sd <sup>1</sup> )	7.1 (2.8)	8.2 (3.0)	6.3 (2.4)	—
Child sex, %				
Male	63.9	6.0	30.2	0.154
Female	67.9	14.1	17.9	
Family income, %				
0%–99% FPL <sup>2</sup>	37.7	12.7	49.6	
100%–199% FPL	49.6	6.8	43.7	0.018 *
200%–299% FPL	89.9	7.2	2.9	
≥ 300% FPL	72.1	10.1	17.8	
Maternal nativity, %				
Immigrant	60.9	10.0	29.1	0.066
US-born	81.1	8.4	10.6	
Maternal time in US, %				
< 5 years	33.9	9.3	56.8	
5–14 years	62.8	10.1	27.1	
15–24 years	69.0	7.7	23.3	0.155
≥ 25 years	67.1	12.1	20.8	
US-born	81.1	8.4	10.6	

<sup>1</sup> standard deviation, <sup>2</sup> federal poverty level, <sup>3</sup> overweight/obese, \*  $p < 0.05$ .

### 3.4. Maternal Nativity

In the multivariate analyses (Table 3), there was a trend toward children with US-born mothers having lower odds of obesity than those with immigrant mothers ( $p = 0.055$ ), after adjusting for income. Higher income was significantly associated with lower odds of obesity. There were no associations between maternal nativity and obesogenic behaviors in either the bivariate or multivariate analyses.

**Table 3.** Association between maternal nativity and maternal time in the US and obesity among Asian American children ages 2 to 11 years old (n = 609): CHIS 2013–2016.

	OR <sup>3</sup> (95% CI <sup>5</sup> )	p-Value	Overall p-Value	AOR <sup>4</sup> (95% CI)	p-Value	Overall p-Value
Maternal nativity						
Immigrant (ref <sup>1</sup> )	1.00	—	—	1.00	—	—
US-born	0.27 (0.09–0.81)	0.020 *		0.31 (0.10–1.02)	0.055	
Family income						
0%–99% FPL <sup>2</sup> (ref)				1.00	—	
100%–199% FPL				0.69 (0.11–4.54)	0.700	0.001 *
200%–299% FPL				0.03 (0.00–0.25)	0.001*	
≥300% FPL				0.20 (0.04–1.05)	0.058	
Maternal time in US	OR (95% CI)	p-value	overall p-value	AOR (95% CI)	p-value	overall p-value
< 5 years (ref)	1.00	—		1.00	—	
5–14 years	0.26 (0.05–1.30)	0.100	0.054	0.34 (0.05–2.28)	0.267	0.267
15–24 years	0.20 (0.04–1.12)	0.067		0.34 (0.04–2.72)	0.307	
≥ 25 years	0.19 (0.02–1.56)	0.121		0.27 (0.02–2.96)	0.282	
US-born	0.08 (0.01–0.41)	0.003 *		0.12 (0.02–0.91)	0.040 *	
Family income				1.00	—	
0%–99% FPL (ref)				0.67 (0.07–6.55)	0.727	0.008 *
100%–199% FPL				0.03 (0.00–0.39)	0.007 *	
200%–299% FPL				0.24 (0.03–2.13)	0.201	
≥ 300% FPL						

<sup>1</sup> reference group, <sup>2</sup> federal poverty level, <sup>3</sup> odds ratio, <sup>4</sup> adjusted odds ratio (controlling for family income), <sup>5</sup> confidence interval, \*  $p < 0.05$ .

### 3.5. Maternal Time in the US

In the multivariate analyses (Table 3), children with US-born mothers had 88% lower odds of obesity than children with recent immigrant mothers (< 5 years in the US), after adjusting for income ( $p = 0.040$ ). Higher income was significantly associated with lower odds of obesity.

In the bivariate analyses, there was a trend for the prevalence of low fruit intake (< 2 servings yesterday) to decrease with increasing maternal time in the US ( $p = 0.052$ ). This finding was significant in the multivariate analyses (Table 4); compared to children of recent immigrants, children whose mothers had been in the US for  $\geq 25$  years had 89% lower odds of low fruit intake ( $p = 0.011$ ), and children of US-born mothers had similarly lower odds ( $p = 0.027$ ), after adjusting for income. There were no associations between maternal time in the US and other obesogenic behaviors.

In the multivariate analyses, children whose mothers had been in the US for 5–14, 15–24, or  $\geq 25$  years had similar odds of obesity (Table 3) and low fruit intake (Table 4), which were lower than for children of recent immigrants. We performed post-hoc analyses to examine whether these three groups could be considered one homogenous group. We re-coded maternal time in the US into three levels: < 5 years,  $\geq 5$  years, and US-born. The odds of obesity and low fruit intake for the combined  $\geq 5$  year group were essentially unchanged and remained lower than for the < 5 year group, though only the difference in fruit intake was significant. Specifically, children whose mothers have been in the US for  $\geq 5$  years had lower odds of low fruit intake (adjusted odds ratio, AOR, 0.19; 95% CI 0.04 to 0.90) than children of recent immigrants, after adjusting for income.

**Table 4.** Association between maternal time in the US and obesogenic behaviors among Asian American children ages 2 to 11 years old (n = 609): CHIS 2013–2016.

	< 2 Servings of Fruit Yesterday		< 2 Servings of Vegetables Yesterday		≥ 1 Serving of SSB <sup>4</sup> Yesterday		≥ 1 Serving of Fast Food Last Week		> 2 Sitting Activity Hours Per Day	
	AOR <sup>5</sup> (95% CI <sup>6</sup> )	p <sup>7</sup>	AOR (95% CI)	p	AOR (95% CI)	p	AOR (95% CI)	p	AOR (95% CI)	p
Mat <sup>1</sup> time in US										
< 5 years (ref <sup>3</sup> )	1.00 0.25 (0.05–1.25)	— 0.091	1.00 0.36 (0.06–2.21)	— 0.269	1.00 5.50 (0.78–38.64)	— 0.086	1.00 0.78 (0.13–4.53)	— 0.782	1.00 0.33 (0.06–1.92)	— 0.218
5–14 years	0.21 (0.04–1.14)	0.071	0.76 (0.12–4.71)	0.766	6.07 (0.85–43.22)	0.071	0.96 (0.15–6.06)	0.964	0.12 (0.02–0.80)	0.028 *
15–24 years										
≥ 25 years	0.11 (0.02–0.60)	0.011 *	0.56 (0.08–3.80)	0.553	4.72 (0.49–45.13)	0.178	0.97 (0.13–6.96)	0.973	0.53 (0.07–4.24)	0.549
US-born	0.15 (0.03–0.81)	0.027 *	0.52 (0.08–3.37)	0.489	2.10 (0.26–17.19)	0.489	0.97 (0.15–6.39)	0.979	0.61 (0.10–3.83)	0.594
Overall p (ob <sup>2</sup> behaviors)	0.111		0.672		0.213		0.995		0.165	
Overall p (family income)	0.999		0.343		0.679		0.712		0.875	

<sup>1</sup> maternal, <sup>2</sup> obesogenic, <sup>3</sup> reference group, <sup>4</sup> sugar-sweetened beverage, <sup>5</sup> adjusted odds ratio (controlling for family income), <sup>6</sup> confidence interval, <sup>7</sup> p-Value, \* p < 0.05.

#### 4. Discussion

This study explored the relationship between maternal nativity and time in the US, and child obesity and obesogenic behaviors in Asian Americans. Children with US-born mothers were not more likely to be obese than those with immigrant mothers as a whole. This finding differs from a study showing that Asian American preschool-age children with immigrant mothers are less likely to be obese than those with US-born mothers [7]. The contrast may be due to mothers being particularly influential on the diet [15] and physical activity [18] of younger children. The older children included in our study might be more influenced by external factors that attenuate any protective effects of having immigrant mothers.

The likelihood of obesity did not increase with increasing maternal time in the US. The only significant difference in the odds of obesity was between children of recent immigrants (< 5 years in the US) and children with US-born mothers. Using less time in the US as a proxy for lower acculturation, this result strengthens several studies in Chinese American children linking lower maternal acculturation scores with elevated BMI [19–22]. This study highlights children of recent immigrants as a vulnerable group that should be addressed in future obesity prevention research and interventions and challenges the notion that lower acculturation is protective. While prior studies have shown Asian American children as a whole to have a relatively low risk of elevated BMI [1–3], this study adds nuance to the literature by suggesting that the risk of obesity is not homogenous in this population. Specifically, a subgroup of children with recent immigrant mothers have a higher risk of obesity than peers with US-born mothers. It is unclear whether children of recent immigrants tend to arrive in the US already obese or adopt obesogenic behaviors as they are exposed to a Westernized environment. Children of recent immigrants may also tend to come from countries where they experience food insecurity and encounter dietary excess upon arrival in the US [38]. This abrupt change in dietary environment may lead to an initially higher risk of obesity, which may stabilize or decrease as they spend more time in the US. These processes are important to explore further.

Few studies directly assess the relationship between maternal acculturation and obesogenic behaviors in Asian American children [11,23], and this study adds to the literature by exploring several behaviors. Children whose mothers were US-born or have been in the country longer were not more likely to engage in obesogenic behaviors. Children of recent immigrants were actually more likely to have low fruit intake than those whose mothers were US-born or have been in the US for ≥ 25 years.

This finding aligns with literature suggesting that maternal acculturation explains differences in fruit consumption among Asian ethnic groups [6].

In post-hoc analyses, children whose mothers have been in the US for  $\geq 5$  years were less likely to have low fruit intake than children of recent immigrants. This finding adds complexity to the literature by highlighting the heterogeneity in dietary behavior among Asian American children and specifically identifying children of recent immigrants as a nutritionally vulnerable subgroup. Recent immigrants may consider fruit a special occasion item that is less important than other foods [39]. Culturally preferred fruits may also be more costly or difficult to find [40]. Increasing access to affordable, culturally acceptable fruits may improve intake in children of recent immigrants.

There are several reasons why children whose mothers are US-born or have been in the country longer may not be more likely to engage in obesogenic behaviors. With the rise of caloric processed foods in Asian countries due to globalization and urbanization [41,42], recent immigrants may already have obesogenic behaviors upon arrival and have a similar or higher risk of obesity than US-born peers. Additionally, increased time in the US may not equate to increased adoption of Western behaviors. Recent immigrants may come from countries with a heavy Western influence and already have obesogenic practices before arriving. Conversely, mothers who have lived in the US for decades may maintain a traditional diet and expose their children to these foods. Finally, maternal and child diets may differ [23,38,43], despite parental efforts to retain a traditional diet [38,43], particularly in older children.

Lower income was consistently associated with a higher odds of obesity. Adjusting for income attenuated the initially significant difference in the odds of obesity between children of immigrant versus US-born mothers. This finding reinforces the link between low income and elevated BMI [4] and the interconnectedness of socioeconomic status and acculturation [5] in Asian American children. While Asian Americans are the highest earning racial/ethnic group, they are the most economically divided, partly due to different sociopolitical histories and immigration policies that shape their experiences [44]. Furthermore, low acculturation is associated with food insecurity in most Asian American subgroups [35], and participation in the Supplemental Nutrition Assistance Program (SNAP) is low in this population [35]. Providing financial assistance to low income, less acculturated families and addressing barriers to SNAP participation may help reduce obesity in Asian American children. Community-based interventions that are sensitive to cultural food preferences can also be helpful in promoting healthier dietary habits in Asian American populations [45].

This study has several strengths. We used a dataset designed to be representative of a state with a large Asian American population, with oversampling of less represented subgroups. The sample was larger than many studies exploring the relationship between maternal acculturation and obesogenic behaviors in Asian American children. We examined two proxies for acculturation, which are important to distinguish, and several obesogenic behaviors.

In terms of limitations, causal relationships cannot be established in this cross-sectional study. Caregiver-reported data may reduce internal validity, including in BMI classification [46], though we did attempt to reduce misclassification bias by omitting biologically implausible data. Additionally, asking caregivers to describe children's fruit, vegetable, or SSB intake over the past day may not capture their typical diet. Other dietary assessment methods, such as 7-day food records, may be more representative but potentially more burdensome. We were unable to conduct ethnic subgroup analysis because this information was not consistently available in the public-use CHIS dataset for children in 2013–2016. Studies have noted interethnic variation in the risk of child obesity and obesogenic behaviors [4–7]. Thus, care should be taken in extrapolating our findings to a particular subgroup, and further studies are needed to assess the replicability of our results in different Asian American ethnicities. Given the limitations of the dataset, we were also unable to examine the effects of maternal education level, which has previously been described as an important factor in the relationship between maternal acculturation and child BMI [5]. Additionally, we used proxies that do not fully capture the concept of acculturation. Acculturation is a complex process that affects beliefs, attitudes,

and behaviors [21] and can manifest in multiple dimensions of life [20] in varying ways. Smaller studies have used multi-item acculturation questionnaires [19–22,25], but nativity and time in the US have been used as proxies in larger studies in Asian American populations in which detailed acculturation scales were not administered [5,6,33–36]. Finally, we used data from 2013–2016, which may not be representative of the current population. However, there is a lag in the availability of yearly data in the public-use CHIS dataset, and we needed to pool multiple years given the small number of Asian American children. This limitation speaks to the need for larger datasets on the health of Asian American children for future research.

## 5. Conclusions

While Asian American children are known to have a relatively low risk of elevated BMI, a subgroup of children with recent immigrant mothers are more likely to be obese and eat less fruit than those with US-born mothers. Children of immigrants are not homogeneous, and efforts to prevent obesity and increase fruit consumption are particularly important for a more vulnerable population of Asian American children of recent immigrants.

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# #Vape: Measuring E-Cigarette Influence on Instagram With Deep Learning and Text Analysis

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E-cigarette use is increasing dramatically among adolescents as social media marketing portrays “vaping” products as healthier alternatives to conventional cigarettes. In September 2018, the Food and Drug Administration (FDA) launched an anti-vaping campaign, in U.S. high schools, on social media and other platforms, emphasizing “The Real Cost” of e-cigarettes. Using a novel deep learning approach, we assessed changes in vaping-related content on Instagram from 2017 to 2019 and drew an inference about the initial impact of the FDA’s Real Cost campaign on Instagram. We collected 245,894 Instagram posts that used vaping-related hashtags (e.g., #vape, #ejuice) in four samples from 2017 to 2019. We compared the “like” count from these posts before and after the FDA campaign. We used deep learning image classification to analyze 49,655 Instagram image posts, separating images of men, women, and vaping devices. We also conducted text analysis and topic modeling to detect the common words and themes in the posted captions. Since September 2018, the FDA-sponsored hashtag #TheRealCost has been used about 50 times per month on Instagram, whereas vaping-related hashtags we tracked were used up to 10,000 times more often. Comparing the pre-intervention (2017, 2018) and post-intervention (2019) samples of vaping-related Instagram posts, we found a three-fold increase in the median “like” count (10 vs. 28) and a 6-fold increase in the proportion of posts with more than 100 likes (2 vs. 15%). Over 70% of Instagram vaping images featured e-juices and devices, with a growing number of images depicting a “pod,” the type of discrete vaping device that delivers high concentration of nicotine and is favored by novice e-cigarette users. In addition, the Instagram analytics data shared by the vaping influencers we interviewed showed underage Instagram users among their followers.

**Keywords:** vape, vaping, e-cigarettes, social media, instagram, deep learning, images

## INTRODUCTION

Electronic nicotine delivery systems (ENDS), also known as e-cigarettes (National Institute on Drug Use, 2018), are now the most-commonly-used tobacco products among American teenagers (Centers for Disease Control and Prevention, 2019). According to the National Youth Tobacco Survey, the fraction of high-school students who reported using e-cigarettes jumped from 12% in 2017 to 28% in 2019 (Wang et al., 2019). In combination with stagnating declines in the use of other tobacco products, this considerable increase in e-cigarette consumption has reversed recent progress in controlling adolescent tobacco

use (The U.S. Food Drug Administration, 2018a; Gentzke et al., 2019; Wang et al., 2019). While the long-term health effects of e-cigarette consumption are not fully understood (American Cancer Society, 2017), e-cigarettes can harm the adolescent brain and increase susceptibility to tobacco addiction (The U.S. Department of Health Human Services, 2016; Fraga, 2019; Wang et al., 2019). As a result, youth who use e-cigarettes are more likely to subsequently try combustible cigarettes (The U.S. Food Drug Administration, 2018a). Beyond addiction, e-cigarettes pose a risk of breathing difficulties, inflammatory reactions, lowered defense against pathogens and lung diseases (Centers for Disease Control and Prevention, 2019a,b; The U.S. Food and Drug Administration, 2019d).

The design and portability of e-cigarette devices contribute to their growing popularity among young people. E-cigarettes deliver high concentrations of nicotine from a device the size of a USB flash drive (**Supplemental Figure 1**) while producing a *discreet* vapor cloud. Pod devices with disposable or refillable cartridge-based systems are particularly popular among beginner users due to their simple design and convenience (MistHub, 2015; Matt, 2018; Fraga, 2019). More experienced users may opt for larger tank systems (also called mods, box mods or sub-ohm devices) (MistHub, 2015; Smoketastic, 2016) that must be manually-refilled with liquid (also called E-juice or E-liquid).

Young adults are exposed to e-cigarette endorsements from peers and influencers (Carbone, 2018; Dyer, 2019; The U.S. Food and Drug Administration, 2019b; VaporDNA, 2019), on social media. Exposure to social media marketing and other forms of visual advertising have been associated with increased e-cigarette use among adolescents (King et al., 2016; Maloney and Cappella, 2016; Pokhrel et al., 2017; Kim et al., 2019b; Wang et al., 2019). Instagram is one platform popular with U.S. teenagers and young adults (Lee et al., 2015; Smith and Anderson, 2018; Clement, 2019) through which e-cigarette brands have used visual advertising to market their products (Philips, 2018; Hutchinson, 2019). Tobacco companies like JUUL (which controls 70% of the U.S. e-cigarette market) (Centers for Disease Control and Prevention, 2018; Richtel and Kaplan, 2018; Huang et al., 2019; Sherman, 2019) have used Instagram to promote vaping and to brand their products as safe alternatives to conventional cigarettes (Brodwin, 2018; Dyer, 2019), perpetuating a “cost-free” mentality (The U.S. Food Drug Administration, 2018a) toward e-cigarettes. In one national survey of high-school students, nearly 80% of the respondents perceived “no great risk of harm from regular use of e-cigarettes” (Johnston et al., 2019). One common misconception among users is that e-cigarette aerosol consists of innocuous water vapor (Richter, 2018). In reality, e-cigarette vapor can contain several harmful substances, including nicotine, lead, volatile organic compounds, and cancer-causing agents<sup>1</sup>.

In September 2018 the U.S. Food and Drug Administration (FDA) launched “The Real Cost” Youth E-Cigarette Prevention Campaign in U.S. high schools as well as on social media platforms, including YouTube, Spotify, Pandora, Facebook and

Instagram. The campaign aims to educate nearly 10.7 million youth aged 12–17 about the hazards of e-cigarettes. It is a nearly \$60 million effort funded by fees collected from the tobacco industry (The U.S. Food Drug Administration, 2018a).

To further discourage youth tobacco use (The U.S. Food Drug Administration, 2018b), in November 2018, the FDA announced a restriction on fruity- or sweet-flavored e-liquids sales, allowing them to be purchased only at age-restricted stores or through online merchants that use age-verification (Kaplan and Hoffman, 2018; Kirkham, 2018; Morean et al., 2018; Kaplan, 2019), and a requirement that all ENDS must “bear the addictiveness warning statements on product packages and advertisements,” including on social media (The U.S. Food and Drug Administration, 2019e). Despite this regulation, social media influencers have continued to post vaping content on behalf of e-cigarette manufacturers, often failing to include the required nicotine warning (The U.S. Food and Drug Administration, 2019b).

Here we provide a descriptive analysis of Instagram content related to e-cigarettes and comment on the initial impact of the FDA’s social media intervention to reduce vaping among youth. We analyze samples of Instagram posts BEFORE and AFTER the FDA introduced The Real Cost campaign and other anti-vaping measures to evaluate changes in the volume, themes, and user-engagement (number of likes) of vaping-related posts.

## MATERIALS AND METHODS

This mixed method study consisted of two parts: (1) Deep learning analysis of images and captions from Instagram posts; (2) focus groups with young social media users and interviews with Instagram vaping influencers. The goal of the focus groups and interviews was to reinforce, validate, and contextualize the data analysis. The study was approved by the Internal Review Board of the University of California, Berkeley Committee for Protection of Human Subjects (CPHS).

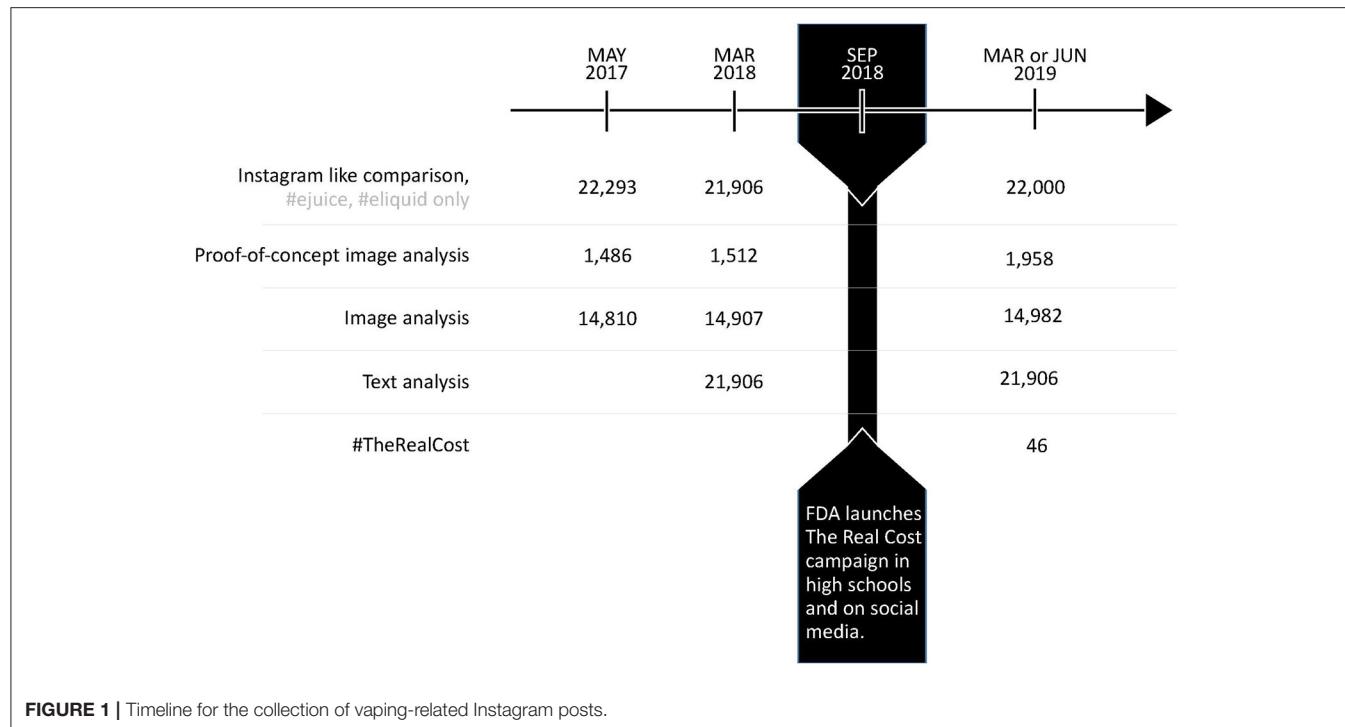
## Qualitative and Quantitative Analysis of Instagram Posts

### Instagram Data Collection

We collected vaping-related Instagram posts before and after the FDA started its anti-e-cigarette campaign and compared the pre-intervention (2017, 2018) and post-intervention (2019) samples. The posts were obtained by accessing the Instagram Application Programming Interface (API) using subscriptions to web-based applications designed for hashtag tracking. Access to the 2019 data was provided by the social network analyzer Keyhole (Toronto, Canada). The 2017 and 2018 data were collected as part of a prior study (Laestadius et al., 2019) that used the social network analyzer Netlytic (Toronto, Canada) and provided to the authors by the University of Wisconsin-Milwaukee.

For the 2019 sample, we collected **201,703** publicly available posts by tracking the following Instagram hashtags which were linked to the promotion and endorsement of vaping in previous content analysis (Laestadius et al., 2016, 2019; Chu et al., 2017): #vape, #ejuice, #eliquid, #vapecommunity, #vapefam, #vapelife, #vapelyfe, #vapenation, #vapeporn. We also collected **46** posts

<sup>1</sup>Centers for Disease Control and Preventions (2019): About Electronic Cigarettes. Last reviewed November 15, 2018. [https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/about-e-cigarettes.html](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/about-e-cigarettes.html).



**FIGURE 1 |** Timeline for the collection of vaping-related Instagram posts.

from the FDA campaign by tracking the hashtag #TheRealCost (**Figure 1**).

For the 2017 and 2018 samples (22,293 and 21,906 publicly available posts, respectively), Instagram posts were collected only if one of two hashtags—#ejuice or #eliquid—was among the terms used in the caption; however, at least several other hashtags (e.g., #vape or #vapenation) were always present as well.

Instagram posts were collected in real time during sampling periods of <2 weeks. Posts were captured 24 h a day at a rate determined by the API limit of about 100 posts per hour. The collected data included the URLs for images and videos, the date and time of posting, the like count and captions for each post.

### Number of “Likes” on Instagram

“Likes” is a metric of user engagement (Chu et al., 2017; Boogaard, 2018; Sunshy Group of Companies, 2018) and an important indicator of a post’s impact (Sherman et al., 2017; Martínez-Pecino and García-Gavilán, 2019). We compared the median “like” count and the proportion of posts with more than 100 “likes” on Instagram posts before and after the FDA campaign. For the purposes of this comparison, we replicated the protocol which was previously used by Laestadius et al. to collect the 2017 and 2018 Instagram samples (Laestadius et al., 2019), by restricting our June 2019 sample to the 22,000 Instagram posts containing #ejuice or #eliquid as one of the terms in the post’s caption (**Figure 1**).

### Image Analysis

We performed deep learning image classification analysis of #ejuice and #eliquid posts from the 2017 sample ( $N = 14,810$ ), the 2018 sample ( $N = 14,907$ ) and the June 2019 sample ( $N = 14,982$ ). These samples excluded any images that were removed

from Instagram by the posts’ authors during the data collection period (and prior to analysis). Based on image classification themes identified in the previous studies of vaping posts on Instagram (Laestadius et al., 2016, 2019; Chu et al., 2017) and the description of vaping devices available in the literature (MistHub, 2015; Smoketastic, 2016; Goniewicz et al., 2019), images were divided into the following six categories: (1) **man** and (2) **woman** (facial images of men or women, usually posing with vaping devices or vape juice bottles or exhaling smoke clouds), (3) **mod** and (4) **pod** devices, (5) **e-juice**, and (6) **other**. Male or female hands holding a vaping device or a bottle of e-juice were assigned to the appropriate vaping device categories.

Deep learning image classification analysis was based on the convolutional neural networks (CNN) framework (The University of Stanford, 2013; Keras, 2015; Deshpande, 2016; Zhang et al., 2018) that recognizes and classifies images by extracting features from an input image (as a matrix of pixel values) and generates a probability distribution over possible output classes (e.g., 0.80 for a man, 0.15 for a mod system device, and 0.05 for e-juice). For each image we selected the output class that had the highest predicted probability in our image classification analysis. We applied transfer learning and fine-tuning (TensorFlow, 2017) to create a customized image classifier capable of recognizing and classifying vaping images. We used the existing CNN called Inception v3<sup>2</sup> trained by Google on an image dataset consisting of over 1,000,000 images of about 1,000 different classes (ImageNet Library, 2016) as the basis for building our own classification model. We fine-tuned Inception

<sup>2</sup>Google Cloud: Advanced Guide to Inception v3 on Cloud TPU. <https://cloud.google.com/tpu/docs/inception-v3-advanced>.

v3 on a set of images identified on Google Images and Instagram using the query terms corresponding to the six identified classes (i.e., “man,” “woman,” “mod,” “pod,” “e-juice,” and “other”) and obtained via a Google Chrome extension downloader (Chrome Web Store, 2019), which allows for the rapid download of large batches of enumerated images. These images were manually reviewed, grouped and labeled according to the six identified classes. The resulting image dataset was divided into a training (1,745 images) and validation set (356 images) at a ratio of 5:1. To fine-tune the neural network we added a 128-unit dense layer, followed by dropout with 60% probability, and then a 6-unit output layer with softmax activation. The model was optimized for categorical cross-entropy loss over 8 epochs using stochastic gradient descent with a learning rate of 0.00001. The model achieved 0.90 validation accuracy and 0.32 validation loss (**Supplementary Figure 2**). The model was not trained to identify more than one class in a single image. For the images featuring more than one class (e.g., mod, e-juice, group of people), we considered the prediction correct if the classification was accurate for either of the classes.

The fine-tuned model was first evaluated on the smaller set of 4,956 images from the 2017 sample ( $N = 1,486$  posts), the 2018 sample ( $N = 1,512$  posts), and the March 2019 sample ( $N = 1,958$  posts), which were labeled manually. The model correctly classified above 90% of the images with men, women, e-juices, mod system devices across all samples. The model correctly classified 90% of the images with pod system devices in the 2019 sample, 64% of those images in the 2018 sample and 30% in the 2017 sample (**Supplementary Figure 3**). As a final analysis, we applied the fine-tuned model to generate label predictions on our complete data set: 44,699 unlabeled images from the 2017 sample ( $N = 14,810$ ), the 2018 sample ( $N = 14,907$ ) and the June 2019 sample ( $N = 14,982$ , **Supplementary Figure 4**).

We also manually reviewed 1,958 posts for the presence of a warning label and a geographic location, and 4,956 posts for the presence of sexually-explicit imagery.

## Text Analysis

We applied text mining and natural language processing methods using Tidytext software package in R to analyze and quantify the content of Instagram captions (Silge and Robinson, 2017). We counted the most frequently used words in Instagram captions from the pre- and post-FDA intervention samples. We ignored #eliquid and #ejuice as they were used in every caption (by design) as well as “stop words” such as connecting verbs, prepositions and articles in English and other languages (e.g., “the” “is,” “to”) that are not useful for analysis (Manning and Schütze, 1999). We also analyzed the context surrounding words commonly used in Instagram captions of the #eliquid and #ejuice posts compared to captions of #TheRealCost posts from the March 2019 sample. We used latent Dirichlet allocation (LDA) analysis topic modeling based on unsupervised clustering (Silge and Robinson, 2017). The LDA grouped the dataset of Instagram captions from our sampled posts into a mixture of topics by connecting similar words together and calculating the probability (Beta coefficient) that the grouped words would be part of a selected topic. The desired number of topics and the number

of words per topic are user-defined parameters in LDA. Since Instagram captions are sparse and short texts with diverse themes (Hong and Davison, 2010), good results have been achieved in previous studies (Steinskog et al., 2017; Maier et al., 2018) by using a higher number of topics than what is needed for larger, more coherent corpora. We used 50 clusters ( $K = 50$ ) and a threshold probability for topic inclusion of 2% ( $\text{Beta} = 1/K$ ). We reviewed the words with the highest probabilities for each topic (top words) and attempted to label the substantive content of the topic, as has been done previously (Hong and Davison, 2010; Steinskog et al., 2017; Maier et al., 2018).

## Focus Groups and Interviews With Instagram Influencers

The focus group participants were recruited in March-April, 2019 among undergraduate students of the University of California, Berkeley, and Berkeley City College and among other Berkeley residents who were not students. We included a racially-diverse group of male ( $N = 4$ ) and female ( $N = 4$ ) participants between 18 and 25 years of age who reported that they used social media daily. Although e-cigarette consumption was not an inclusion criterion, four of eight focus group participants reported vaping. The participants were asked to identify their preferred social media platform and the frequency of its use, as well as whether they often see social media posts related to vaping, including the FDA anti-vaping campaign images and videos. The participants were asked to share their impressions of a selection of images and videos related to vaping and the FDA campaign and were asked to describe what content they found most engaging.

We contacted ~100 influencers with public Instagram accounts to request an interview. The list of potential interviewees was seeded with popular influencers referenced in the literature and then expanded via algorithmic Instagram suggestions. Five influencers agreed to be interviewed. The group was comprised of three men and two women; one participant was from the U.K. and the other four were from the U.S. Group member followings ranged from 2,000 to over 200,000 Instagram users (Mean = 73000, SD = 74000). During the semi-structured interviews (Robert Wood Johnson Foundation, 2008) the participants were asked about their vaping habits, the motivation to promote vaping products, knowledge of influencers’ marketing strategies and collaboration with vaping brands. They were also asked to share Instagram analytics data, which provided information on the age distribution of their followers.

## RESULTS

As expected, our manual review of the posts and text analysis of the corresponding captions indicated that nearly all of the posts we collected by tracking #ejuice and #eliquid promoted or endorsed vaping. In contrast, the FDA posts featuring #TheRealCost hashtag were the only posts which we identified in our sample that contained anti-vaping sentiments.

## Number of “Likes” on Instagram

Since August 2018, the FDA-sponsored “anti-vaping” hashtag #TheRealCost has been used about 50 times per month on Instagram, whereas “pro-vaping” hashtags like #ejuice or #eliquid were used 1,000 times more often. Comparing the pre-intervention (2017, 2018) and post-intervention (2019) #e-juice and #e-liquid samples, we found a three-fold increase in the median like count (10 vs. 28 likes) (**Figure 2**) and a 6-fold increase in the proportion of posts with more than 100 likes (2 vs. 15%). The median like count for the FDA campaign posts was comparable (23 likes) although, again, the volume of posts was much smaller.

## Image Analysis

### Quantitative Image Analysis

We performed a deep learning image classification analysis of Instagram posts with captions containing hashtags #ejuice or #eliquid from the samples collected in 2017 ( $N = 14,810$ ), 2018 ( $N = 14,907$ ) and June 2019 ( $N = 14,982$ , **Table 1**). Over 85% of Instagram vaping images featured *Devices*, and the sub-category *E-juice* was the most prevalent subject in all three samples. The proportion of *E-juice* images remained relatively consistent in 2017 (36%), 2018 (41%), and 2019 (40%). The proportion of *Mod* images decreased in 2019 (21%) compared to 2018 (27%) and 2017 (30%); correspondingly, *Pod* images became more popular, increasing from 2017 (0.9%), to 2018 (2%), to 2019 (9%). We observed a 3-fold increase in the median like count in the 2019 sample compared to the 2017 and 2018 samples for each class of images, which was consistent with the overall 3-fold increase in the median like count presented in **Figure 2**. Images of women had the highest median like count in all three samples (**Table 1**).

### Qualitative Image Analysis

#### Warning labels

Despite the 2018 FDA requirement to add warning labels to tobacco-product advertising on social media, we found that

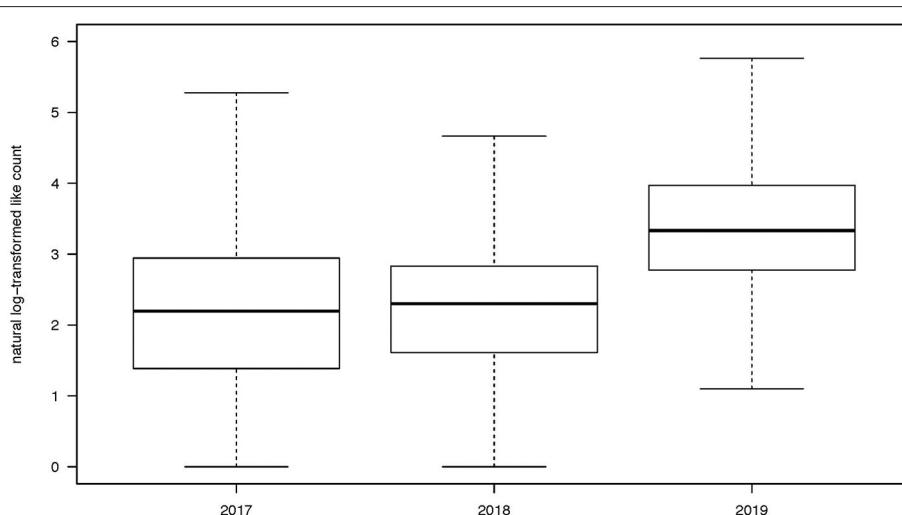
most of the images with the highest like count analyzed in our June 2019 sample ( $N = 1,958$  posts, likes > 100) did not contain warning labels in compliance with the FDA requirements (The U.S. Food and Drug Administration, 2019c). The images featuring e-juice had the highest prevalence of warning labels (11%), followed by images of women and pod devices (5%), mod devices (4%) and men (3%). We found fewer than 1% of images with warning labels in both 2017 and 2018 samples, before the warning requirement was introduced.

#### Sexually-explicit imagery

Overall, we found that – among Instagram posts featuring women – about 1 in 8 posts in the June 2019 and 1 in 4 posts in the 2017 and 2018 samples contained sexually-explicit imagery. The median like count for sexually-explicit imagery in the June 2019 sample (106 likes) were twice as high as the median like count for images with no sexually-explicit features (47 likes). In posts from 2017 and 2018, we found no difference in the median like count for sexually-explicit imagery compared to fully clothed women.

## Text Analysis

Several *E-juice*-related words were among the most frequently used in Instagram captions from the 2018 and March 2019 samples, with words like “juice,” “strawberry,” “flavor,” “liquid,” “sweet,” “eliquid,” and “60 ml” all used at least 500 times. Other words that were frequently used in both samples included “mod” and “kit.” The words “Nicotine,” “pod,” “salt,” (Innes, 2018) and “nic” appeared to grow in popularity from 2018 to March 2019. A comparative analysis of words that were used in the #TheRealCost campaign (46 posts, including the FDA and users’ comments), vs. words that were used in the #e-juice and #e-liquid posts showed very little overlap in the March 2019 sample (21,906 posts). Even in instances where a common lexicon could be identified (e.g., with frequently-used words like “Nicotine,” “time,” “brain,” “addictive,” “crave,” and “stop”), the context was different. In captions from the #TheRealCost posts these words



**FIGURE 2 |** Median like count for vaping-related Instagram posts collected during the 2017 sampling period ( $N = 22,293$ ), during the 2018 sampling period ( $N = 21,906$ ), and the June 2019 sampling period ( $N = 22,000$ ). The lower whiskers are shown as the 25th percentile–1.5\*IQR; the upper whiskers are shown as the 75th percentile + 1.5\*IQR.

**TABLE 1** | Predicted deep learning image classification for Instagram posts using #ejuice or #eliquid collected in 2017 ( $N = 14,810$ ), 2018 ( $N = 14,907$ ), and 2019 ( $N = 14,982$ ).

Classification of image/video	Number (%) of posts in each image/video classification			Number (%) of high-engagement posts (i.e., with 100+ "likes")			Median "like" count		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
<b>FACIAL IMAGES</b>									
Men	1,153 (8%)	1,096 (7%)	1,118 (7%)	42 (0.3%)	44 (0.2%)	225 (2%)	12	12	34
Women	825 (5%)	775 (5%)	829 (6%)	37 (0.2%)	49 (0.3%)	282 (2%)	13	15	48
<b>DEVICES</b>									
E-juice	5,316 (36%)	6,049 (41%)	6,043 (40%)	98 (0.7%)	90 (0.6%)	809 (5%)	9	9	27
Mods	4,404 (30%)	4,070 (27%)	3,102 (21%)	157 (1%)	131 (0.9%)	526 (4%)	10	11	32
Pods	130 (0.9%)	292 (2%)	1,335 (9%)	7 (0.05%)	13 (0.08%)	158 (1%)	8	10	24

Class "Other" is not included in the table.

**TABLE 2** | Commonly used words in captions of Instagram posts related to vaping from the March 2019 sample ( $N = 21,906$ ) and the U.S. Federal Food and Drug Administration anti-vaping campaign "The Real Cost" ( $N = 46$ ).

Commonly used words	#TheRealCost posts examples	Vaping posts examples
Nicotine	"Vaping can put nicotine in your brain, which can change the way your brain works, causing you to crave more and more."	"No nicotine" (in posts advertising e-juice without nicotine); "nicotine level: 30 mg bottle."
Time	"Don't be a guinea pig in an experiment ... only time will tell what the true effects."	"Giveaway time"; "Get ready for a great time..."
Addictive	"Nicotine—the highly addictive drug in most vapes—can create powerful cravings that make it hard to think about anything else."	"Warning: This product is intended to be used with e-liquid that may contain nicotine. Nicotine is an addictive chemical."
Crave	"Over time, nicotine can change the way your brain works, causing you to crave more nicotine and vape more frequently."	"Crave salt nic now available;" The post also describes craving e-juice.
Brain	"An epidemic is spreading. It can harm your brain."	"... this "brain coffee" is perfect!"
Stop	In reaction to one of the #TheRealCost posts, one Instagram user urged the campaign to "stop" the ads because they were making the user "cringe."	"Stop and stare." (in reaction to e-juice) "Stop smoking today" (as opposed to vaping.)

were used to warn of health consequences; whereas in captions from the #e-juice and #e-liquid posts these words promoted vaping content, promising a "high" and fun experience. The word "nicotine" was used both as a warning label and as a promotion in the pro-vaping captions (Table 2). The March 2019 sample included twice as many non-English-language topics (13 out of 50) compared to the 2018 sample (6 out of 50), including topics in German, Spanish, Italian, French, Malay, Indonesian, Japanese.

Based on the most commonly-used words from each of 50 caption topics detected via the latent Dirichlet Allocation analysis

(LDA) we identified four themes among the posts of March 2019: (1) *promotions*; (2) *flavors*; (3) *devices*; and (4) *user experience* (Figure 3). The themes in the May 2018 sample were very similar, except for the absence of Pod system-related and nicotine salts-related topics. LDA detected only pro-vaping topics. No anti-vaping topics were detected by LDA, presumably due to the relatively small number of anti-vaping posts ( $N = 46$ , Figure 3) identified in the #TheRealCost sample only.

## Focus Groups and Interviews With Instagram Influencers

Some focus group participants described e-cigarette users who follow vaping brands and influencers on Instagram as representatives of a sub-culture, different from mainstream e-cigarette users. They also viewed e-cigarette consumption as distinct from vaping saying that those who smoke e-cigarettes use more consumer-oriented, small, "low key" devices like JUUL, which is "cool" and not as "in your face" as vaping (Table 3). However, Instagram videos featuring smoke-cloud exhalation, aka *vaping tricks*, presented during the focus groups elicited the most positive reaction, while several videos and images related to the FDA intervention were perceived more negatively (Table 3).

Vaping Influencers reinforce the tobacco industry's sales pitch that e-cigarette use is a healthier alternative to conventional combustion-cigarette smoking. We inferred from their answers (Table 4) that vaping youth are motivated to become influencers and promote vaping products on Instagram by financial incentives. The interviews also suggested an increasing growth of vaping content on Instagram, confirming the findings of our quantitative analysis. In addition, the influencers we interviewed shared their Instagram analytics (Canning, 2018) data revealing that underage users comprised as much as 16% of their followings (Mean = 9%, SD = 7%, Range = 15%).

## DISCUSSION

This is the first study to apply large-scale deep learning image classification to social media posts about e-cigarettes. These deep learning methods allow for a fast, automated identification of



**FIGURE 3 |** The number of Instagram posts from the March 2019 sampling period belonging to each topic as defined by latent Dirichlet allocation analysis of caption text. Here, topics are further organized into informal themes based on the five most-commonly used words from each topic (representative words are displayed). For comparison, only 46 posts in this sample used the hashtag #TheRealCost. Words shown in italic font were translated to English from the original caption text composed in another language (i.e., from Spanish, German, French, Italian, Malay, or Indonesian).

Instagram images, which offers savings of time and money. This is also the first study focused on e-cigarettes to combine quantitative and qualitative Instagram content analysis with interviews of vaping influencers and focus groups of young social media users.

The analysis from different time periods (2017–2019) allowed us to assess the change of vaping content on social media during a period of time when both Instagram and e-cigarettes use were growing in popularity among youth (Wang et al., 2019). This study design also allowed us to draw an inference about the initial impact of the FDA's Real Cost campaign on Instagram.

### Assessing the Apparent Impact of the FDA Anti-vaping Campaign on Instagram Low Frequency of Posts

The FDA's Real Cost campaign was initially launched in 2014 to discourage smoking and the new anti-vaping focus was announced in September 2018 (The U.S. Food and Drug Administration, 2019a). Since then, pro-vaping Instagram hashtags like #vape were used up to 10,000 times more often than the FDA-sponsored hashtag #TheRealCost. Historically, the pro-vaping hashtags we tracked for this study have accumulated as much as 10 million posts, whereas there have been only 3,129

**TABLE 3 |** Quotes from focus groups with 18 to 25-year-old Berkeley residents ( $N = 8$ ).

1.1	[They are] particular kind of people that vape. Not all vapers are the vapers that engage in the vaping sub-culture on social media. [They wear] certain kind of clothing, speak in a certain way. They are usually men, in their teens or 20s. Vapers have skateboard, [they are] skinny.
1.2	JUUL is a new thing. It is like e-cigarettes, it is different than vaping. I see a lot of them on social media and it is not seen in a same way as vapers. JUUL is so ubiquitous, it is everywhere. It becomes normalized, it is like a cool new thing and everyone does it. When people look at you when you smoke a cigarette, they think that's bad for you and it is going to give you cancer. JUUL I guess is supposed to be healthier. JUUL is a different device, which produces less smoke and less vape. Design in general. JUUL is like slick. Not like a giant, really weird-looking devices. The design makes JUUL look low key. That is probably what draws people to it.
1.3	[The quote describes a video featuring a vaping influencer making a bubble out of e-liquid] With a bubble is a cool video, like a magic show.
1.4	I do not think this message is effective. It is super like a fancy way of reminding us that nicotine is addictive. I imagine myself scrolling on my phone, trying to enjoy myself and [the FDA anti-vaping campaign] is trying to tell me what to do.

#TheRealCost posts, including all of the anti-vaping and anti-smoking images and videos ever posted from the official FDA campaign account (~16%) as well as from other users (~84%). This stark imbalance in the volume of posts has caused the FDA message to be overwhelmed by direct and sponsored marketing from the vaping brands.

### Low Impact on User Interaction With Vaping Images and Low Engagement

When comparing the user interaction with the #e-juice and #e-liquid Instagram posts from before and after the initiation of the FDA Real Cost campaign, we found a large *increase* in the median like count and in the proportion of posts with more than 100 likes. Our results indicate that the number of Instagram users exposed to vaping images and videos could be still growing, despite the FDA's intervention efforts on social media. Despite accumulating a large amount of followers during the four years of its existence (62,000), the most recent (2017–2019) anti-smoking and anti-vaping images and videos posted by the TheRealCost account have had a low engagement rate (Canning, 2018; Plann, 2019) of just ~ 0.8% per post. For comparison, a good engagement rate on Instagram is considered to be between 3 and 6% (Plann, 2019). Infrequent posting and low engagement have the potential to seriously limit the impact of the FDA's efforts on social media.

### Persistence of Predatory Themes

There has been criticism of the predatory practice of e-cigarette and e-juice manufacturers to promote flavored nicotine products

**TABLE 4 |** Quotes from the interviews with the Instagram vaping influencers ( $N = 5$ ).

2.1	[Among vaping enthusiasts], everybody knows someone whose life was changed by vaping. That's a point of inspiration. For example, if you talk to my mother or my grandmother, they stopped smoking and switched to vaping and now they are healthier. And they are happy they did it.
2.2	I post videos of me doing vape tricks. They [vaping brands] reach out to me because I have a lot of followers and get a decent/good amount of views. If they want promotions then they message me, we work out a deal, they ship products and I make the post requirements. I've worked with companies in America, China, The UK and Malaysia. I wouldn't call myself a model, I just do vape tricks. It's more like a hobby you make money out of. But within my area there's about probably 10 people in my area that I'm friends with that do what I do. Guys and girls.
2.3	[Instagram] is like going to a car show to see what's new. It's one of the only ways that the manufacturers could show their new products. And there are new products weekly, if not daily. Manufacturers give them away as a mean of advertising. They send me something new—I show it off.

that appeal to youth on social media (directly or through influencers) (Associated Press, 2019; Kong et al., 2019). In 2017, Laestadius et al. (Laestadius et al., 2019) conducted a qualitative-content analysis of Instagram posts featuring e-liquid to identify common themes, claims and product promotions. The study found that about 60% of the 1,000 images and videos analyzed contained promotions of e-liquids. We found that *e-juice* remained the most prevalent topic in our samples before and after the FDA campaign, and the number of images featuring *pod* devices (commonly used by beginner e-cigarette users) has been growing. Aesthetically pleasing images of male and female models that could alter young users' perceptions (Harris and Bardey, 2019) were also frequent among the posts featuring vaping products in our samples. Moreover, Instagram analytics data collected from vaping influencers showed considerable proportions of underage (13–17 year-old) followers, indicating that youth will likely continue to be exposed to vaping content marketed on Instagram. This finding is consistent with a recent Kim et al. (Kim et al., 2019a) which demonstrated that over 40 percent of JUUL Twitter account followers are underage (13–17 years old). Exposure to potentially harmful social media content is even more concerning, as previous studies here demonstrated that teenagers often relate to Instagram influencers more than to their physical friends (Mañas-Viniegra et al., 2019).

### Non-compliance With Warning Label Requirements

Despite the 2018 FDA requirement that all ENDS "bear the addictiveness warning statements on product packages and advertisements" on social media, we found that, overall, only about 7% of the posts in our June 2019 sample contained warnings in compliance with the FDA requirements (The U.S. Food and Drug Administration, 2019c). Posts uploaded from locations within the U.S. had the highest prevalence of warning

labels, while posts uploaded from other countries were less likely to include warnings. Most of the international posts featured vaping products distributed in the U.S. and would therefore still be subject to compliance with the FDA warning-label regulations (The U.S. Food and Drug Administration, 2019c). This finding indicates that there should be increased enforcement of the warning-label regulation, especially among the international network of influencers, distributors and retailers.

## Participatory Strategies for Discouraging Youth Vaping

One major challenge facing the FDA's anti-vaping campaign is the common perception among youth that vaping is a harmless activity (Kim et al., 2019b; Wang et al., 2019), a misconception perpetuated by tobacco-industry marketing (Huang et al., 2019). In an attempt to disabuse teenagers of this "cost-free" mentality toward vaping (The U.S. Food Drug Administration, 2018a)<sup>1</sup>, the FDA campaign features images and videos of distorted faces and brains that are meant to reveal the real (but hard to see) detrimental health effects (The U.S. Department of Health Human Services, 2016, 2017; American Cancer Society, 2017; Chung et al., 2018; Centers for Disease Control and Prevention, 2019; Gentzke et al., 2019; Wang et al., 2019) of e-cigarette consumption. Most of our focus-group participants found these images and videos repulsive and scary; however, seeing them did not motivate any e-cigarette users in our group ( $N = 4$  of 8) to quit vaping. Generally, appealing to fear in order to raise awareness about health concerns such as smoking can be a valid approach if the messaging is based on evidence or reason (Simpson, 2017). However, fear-inducing tactics can only be effective when an intervention target is perceived as a threat (Albarracin et al., 2005). While smoking is viewed by many consumers as a risky behavior, vaping is not. Some Instagram users responded to the FDA warnings about the danger of vaping aerosol with comments disputing the FDA claims of damaging health effects from nicotine or by asking public health officials to provide a list of toxic chemicals that are present in e-cigarettes as a proof of their harmfulness. The users also referred to the FDA campaign as "propaganda" that people should not take "seriously" and suggested that the campaign's anti-vaping ads just scared people without actually encouraging them to quit vaping.

Previous research (Albarracin et al., 2005) indicates that participatory, active intervention strategies could be more effective than passive educational campaigns. Indeed, our focus-group participants suggested that sharing vaping experiences in group discussions might be an alternative cessation strategy. Similar interventions were described as effective elsewhere (Ramo et al., 2014). Vaping brands are already using participatory strategies to effectively engage both legal-age and underage vapers as social-media promoters and brand ambassadors. In exchange for posting images featuring vaping products on social media, brands offer influencers commissions on sales of vaping products (VaporDNA, 2019), promotional giveaways and prospects of online exposure. Our interviews indicate that vaping enthusiasts and influencers view these incentives as alluring. Perhaps, public

health officials could use participatory interventions to thwart the vaping brands' marketing strategies and engage youth in developing and market-testing anti-vaping messages.

## Legislative Intervention for Discouraging Youth Vaping

National, state, and local programs have been shown to reduce and prevent youth tobacco use (Centers for Disease Control and Prevention, 2019), for example by raising taxes for tobacco products or by raising the minimum age of sale to 21 years. The legal minimum age to purchase e-cigarettes differs by state, ranging from 18 to 21, but a majority of states have no legislative restrictions in place prohibiting the use of e-cigarettes by youth who have not yet reached the legal minimum age of sale. Businesses violating restrictions on the sale of e-cigarettes to youth can face a range of minor penalties including a simple warning (in 3 states), a fine (in 31 states), or a misdemeanor criminal charge (in 16 states) (Centers for Disease Control and Prevention, 2019c). Only a handful of states have excise tax on e-cigarette sales (Centers for Disease Control and Prevention, 2019c). Youth E-cigarette use could be further discouraged by raising the legal age for e-cigarette purchase to 21 in all states, by introducing stricter penalties for underage sales or use, and by increasing taxes on products.

## LIMITATIONS AND FUTURE RESEARCH

Although the classification accuracy of the deep learning image analysis was sufficient for descriptive content analysis, it was not perfectly accurate. For device classification, the model was only trained to recognize one class per image, whereas some images had two classes (e.g., "e-juice" and "mod"). Distinguishing pod and mod systems by machine algorithm was also a challenging task as some traditional mod devices are being redesigned to resemble smaller modern pod devices. Additional model training would be required to enable further deep learning image analyses to conduct the following tasks: more precise gender detection of blurred images and recognition of full-body background, identification of faces obscured by smoke, prediction of more than one class in a single image, and integration of post image pixels and post texts to evaluate compliance with the FDA requirements to add warning labels and sponsorship disclosures.

To assess Instagram-user engagement with vaping posts we focused on "like" count as a surrogate for Instagram-user engagement with vaping posts; however a "like" does not necessarily indicate a user's approval of or support for e-cigarette use. Still, since "likes" are often perceived by adolescent users as determinants of appropriate social behavior (Sherman et al., 2017), the exposure to social media vaping images with many "likes" could be interpreted by youth as a signal of approval of a risky behavior, e.g., vaping.

We did not calculate engagement rates (Canning, 2018; Plann, 2019). Engagement rate per post depends on the follower count of the poster, data which were not available in our samples

due to Instagram's data-access restriction policy. Similarly, data-access restrictions prohibited us from identifying the geographic locations for ~ 80% of the posts. As data-access policies on social media platforms grow increasingly restricted, collaborations between platforms like Instagram and academic institutions will be necessary to conduct ethical, responsible, and useful research about the impacts of social media.

Our interviews and focus groups indicate that the followers of Instagram vaping accounts might represent a subculture of avid enthusiasts, who enjoy watching vape tricks and monitoring the latest models of vaping devices (mostly *mods* that produce vaping clouds). This group of enthusiasts may not be representative of most young e-cigarette users (including the teenagers targeted by the FDA campaign) who tend to prefer consumer-oriented devices like JUUL *pods* (and other non-sub ohm devices) (Matt, 2018; Tolentino, 2018). Further study is warranted to characterize the broader influence of social media marketing on youth e-cigarette use: by measuring the attention that youth pay to vaping advertising, by analyzing the emotional intensity of young people reacting to these stimuli, and by conducting focus groups and surveys among diverse groups of adolescents to gauge their perceptions of this content. Likewise, because our analysis of the initial impact of the FDA campaign was based on a limited number of Instagram comments and responses from a small number of focus group participants from one location of Berkeley, CA, a more comprehensive study of the effect of the campaign in middle and high schools (The U.S. Food Drug Administration, 2018a) is warranted. Finally, further study is warranted to include interviews with a larger number of vaping influencers.

## DATA AVAILABILITY STATEMENT

The 2019 raw data supporting the conclusions of this manuscript will be made available by the authors, without undue reservation and in compliance with the IRB protocol, to any qualified researcher. The 2017 and 2018 data analyzed in this study was obtained from the University of Wisconsin-Milwaukee. Requests to access these datasets should be directed to Linnea Irina Laestadius, llaestad@uwm.edu.

## ETHICS STATEMENT

The studies involving human participants were reviewed and approved by The Internal Review Board of the University of California, Berkeley Committee for Protection of Human Subjects (CPHS). The patients/participants provided their written informed consent to participate in this study.

## AUTHOR CONTRIBUTIONS

JV developed the study idea and design, collected and analyzed the social media data, conducted the deep learning image

classification and text analysis, organized and conducted the focus groups and interviews, wrote the manuscript. CM provided guidance in the IRB application process, reviewed the study and provided critical feedback. CK assisted with the deep learning text and image classification. TW collaborated on developing the study idea, supervised the data analysis, edited the manuscript, and designed Figures 1, 3.

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## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fcomm.2019.00075/full#supplementary-material>

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## Increased Risk of Late-onset *Streptococcus pneumoniae* Meningitis in Adults With Prior Head or Spine Surgeries

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In a case-control study within the Kaiser Permanente Northern California adult population, prior head or spine surgery was associated with increased *Streptococcus pneumoniae* meningitis outside of the postoperative period (no prior head or spine surgery; odds ratio, 6.0 [95% confidence interval, 1.9–18.6]). Among the cases, only 33.3% had received any prior pneumococcal vaccinations.

**Keywords.** meningitis; *Streptococcus pneumoniae*; neurosurgery; spine surgery; vaccines.

*Streptococcus pneumoniae* meningitis is a severe illness with changing epidemiology over the last 2 decades as a result of the introduction of pneumococcal vaccines. Currently, 57% of bacterial meningitis cases are caused by *Streptococcus pneumoniae* [1]. Although there are >90 *S. pneumoniae* serotypes, much of invasive pneumococcal disease (IPD) is due to a small subset of serotypes included in the 2 pneumococcal vaccines used in the United States [2].

Known risk factors for IPD among adults that are also indications for pneumococcal vaccination include immunocompromising conditions; asplenia; chronic heart, lung, liver, or renal disease; cigarette smoking; cochlear implants; and cerebrospinal fluid (CSF) leaks [3]. However, there are a number of case reports of pneumococcal meningitis occurring in patients many years after a head injury (HI), presumably as a result of an injury-related cranial defect [4–6]. A retrospective review of 2013–2014 California hospital discharge data found that individuals with prior HI or brain surgery had an increased risk of pneumococcal meningitis [7].

In the United States, 13-valent pneumococcal conjugate vaccine (PCV13) is a routine childhood vaccination, and PCV13 and 23-valent pneumococcal polysaccharide vaccine (PPSV23) are routinely recommended for all persons ≥65 years of age [8].

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Adults aged 19–64 years with specific risk factors are also recommended to receive 1 or both pneumococcal vaccines [3, 6].

The objective of this study was to determine whether prior HI or head or spine surgery (H/SS) is associated with pneumococcal meningitis among adults. Healthy US children have been recommended to receive 7-valent pneumococcal conjugate vaccine since it was introduced in 2000; PCV13 was recommended in 2010. Therefore, most of the current healthy adult population is unvaccinated against pneumococcal disease. Pneumococcal vaccination coverage among high-risk adults aged 19–64 years old is suboptimal. In 2016, coverage in this group was estimated at 24%; coverage among adults ≥65 years old was 67% [9].

### METHODS

This case-control study was conducted within Kaiser Permanente Northern California (KPNC). Potential cases were patients ≥18 years of age with an *International Classification of Diseases, Ninth Revision or Tenth Revision* diagnosis of bacterial or pneumococcal meningitis between 1 January 2008 and 31 October 2017. Cases were included if they had (1) a positive CSF culture for *S. pneumoniae*, or (2) CSF white blood cell count >10 leukocytes/µL and a positive blood culture or polymerase chain reaction (PCR) for *S. pneumoniae* within the same hospitalization. Exclusion criteria included oncologic or rheumatologic conditions with immunosuppressive treatment within 3 months prior to the date of the positive culture or PCR, asplenia, human immunodeficiency virus infection, the presence or history of cochlear implants, or the presence or history of an intracranial shunt. Controls were matched 2:1 to cases by age, sex, KPNC facility, and KPNC membership length.

A blinded medical record review was performed for cases and controls to identify HI and H/SS history, comorbidities, and pneumococcal vaccination history. HIs were defined as concussions, facial fractures, and skull fractures. H/SSs were defined as any surgical history involving the skull or the spine such as nasal surgery, mastoidectomy, or posterior spinal fusions. Patients aged 19–64 years with clinical indications for pneumococcal vaccination were considered “high-risk” patients.

The association between each individual demographic characteristic, clinical characteristic, and history of HI or H/SS and case (pneumococcal meningitis) status was evaluated using separate bivariate conditional logistic regression models. Statistical analysis was performed using SAS version 9.3 (SAS Institute, Cary, North Carolina).

### RESULTS

Eighty-four patients ≥18 years of age with pneumococcal meningitis were identified and matched with 168 controls. The

median age was 60 years (range, 19–86 years); 32 (38.1%) were male (Table 1). Comorbidities did not differ significantly among cases and controls. Two of the 84 (2.4%) cases had recurrent episodes of meningitis. One patient had 2 episodes of otogenic meningitis, both occurring >20 years prior, and a more recent mastoidectomy 6 years prior to the meningitis episode in 2013. The other patient had 2 episodes of meningitis during the study period, and was found to have chronic right CSF otorrhea with multiple skull base defects in the middle fossa floor, thought to be secondary to repeat episodes of mastoiditis.

Fifteen of the 84 (17.9%) cases and 6 of the 168 (3.6%) controls had prior HI or H/SS (Table 1). Cases had 5.6 times higher odds of having a history of HI or H/SS (95% confidence interval [CI], 1.94–12.89). Separately, the odds remained significantly elevated for H/SS (odds ratio [OR], 6.0 [95% CI, 1.94–18.60]), but not for HI (OR, 3.0 [95% CI, .50–17.95]). HI consisted of concussions only as no facial or skull fractures were identified.

The median time period between HI or H/SS and pneumococcal meningitis onset was 5 years (range, 0–30 years) among the 15 cases with HI or H/SS.

Prior H/SS procedures were aneurysm clip (1), chordoma excision (1), craniopharyngioma excision (1), decompressive laminectomies of the thoracic and lumbar regions (4, 2 of which also included thoracic and/or lumbar fusions), encephalocele removal (1), encephalocele removal and cribriform plate defect repair with a known CSF leak (1), nasal septoplasty (2), and unknown (1). The nasal septoplasties and decompressive laminectomies were elective. No known CSF leaks were present postoperatively in any patients; the patient with the cribriform plate defect had subsequent CSF leak studies that were negative.

One case developed pneumococcal meningitis during the postoperative period (defined as within 30 days of the procedure) and was symptomatic on postoperative day 1 after an elective nasal septoplasty. No active infection was present at

**Table 1. Unadjusted Odds Ratios for Associations Between Clinical and Demographic Characteristics, Vaccine History, and Prior Head Injury or Head/Spine Surgery With *Streptococcus pneumoniae* Meningitis**

Characteristics	Streptococcus pneumoniae Case (n = 84)	Control (n = 168)	Unadjusted OR (95% CI)	P Value
Median age, y (range)	60 (19–86)	60 (19–86)	...	...
Patient sex				
Male	32 (38.1)	64 (38.1)	...	...
Comorbidities <sup>a</sup>				
Cigarette smoking	6 (7.1)	15 (8.9)	0.8 (.3–2.1)	.618
Diabetes mellitus	12 (14.3)	29 (17.3)	0.8 (.4–1.7)	.533
CSF leak	0 (0.0)	0 (0.0)	...	...
Heart disease	12 (14.3)	16 (9.5)	1.7 (.7–4.1)	.232
Liver disease	0 (0.0)	1 (0.6)	...	...
Lung disease	15 (17.9)	22 (13.1)	1.4 (.7–2.9)	.327
Renal failure	2 (2.4)	1 (0.6)	4.0 (.4–44.1)	.258
Injury or surgery types <sup>b</sup>				
Head injury or surgery	15 (17.9)	6 (3.6)	5.6 (1.9–12.9)	<b>&lt;.001</b>
All head injuries <sup>c</sup>	3 (3.6)	2 (1.2)	3.0 (.5–18.0)	.229
Concussion	3 (3.6)	2 (1.2)	3.0 (.5–18.0)	.229
All head/spinal surgeries	12 (14.3)	4 (2.4)	6.0 (1.9–18.6)	<b>.002</b>
Spinal surgery	5 (6.0)	1 (0.6)	10.0 (1.2–85.6)	<b>.036</b>
Mastoidectomy	2 (2.4)	1 (0.6)	4.0 (.4–44.1)	.258
Nasal surgery	3 (3.6)	1 (0.6)	6.0 (.6–57.7)	.121
Neurosurgery	4 (4.8)	1 (0.6)	8.0 (.9–71.6)	.063
Immunization history <sup>d</sup>				
Any pneumococcal vaccination	28 (33.3)	70 (41.7)	0.6 (.3–1.1)	.107
≥1 polysaccharide vaccine dose received				
All	28/84 (33.3)	69/168 (41.1)	0.6 (.3–1.2)	.134
High-risk 19–64 y old	7/18 (38.9)	15/38 (39.5)	...	...
≥65 y old	19/31 (61.3)	47/61 (77.0)	0.4 (.1–1.4)	.152
≥1 conjugate vaccine dose received	2 (2.4)	7 (4.2)	0.4 (.04–3.4)	.360

Data are presented as No. (%) unless otherwise indicated. Bolded P values are statistically significant (<.05).

Abbreviations: CI, confidence interval; CSF, cerebrospinal fluid; OR, odds ratio.

<sup>a</sup>For each comparison by comorbidity, the referent is not having that comorbidity.

<sup>b</sup>For each comparison by injury or surgery type, the referent is not having that injury or surgery type.

<sup>c</sup>No facial or skull fractures were noted.

<sup>d</sup>For each comparison by immunization, the referent is not having that immunization.

the time of the nasal surgeries and 1 of the 2 mastoidectomies. The second mastoidectomy was performed 8 years prior to the meningitis incident, and additional information regarding the surgical indication and presence of active infection at the time of that surgery was unavailable.

Twenty-eight (33.3%) cases and 70 (41.7%) controls had received at least 1 dose of a pneumococcal vaccine; almost all doses were PPSV23 (Table 1). Among high-risk patients 19–64 years old, 7 of 18 cases (38.9%) and 15 of 38 (39.5%) controls received at least 1 dose of a pneumococcal vaccine. Among those ≥65 years old, 19 of 31 (61.3%) cases and 47 of 61 (77.0%) controls received at least 1 dose of PPSV23. Two case patients (1 high-risk patient between the ages of 19 and 64 years, and 1 patient ≥65 years old) received PPSV23 vaccine <2 weeks prior to their meningitis diagnosis. There was no significant difference in pneumococcal vaccination status between cases and controls when stratified by age and vaccination indication. Because *S. pneumoniae* serotyping was not performed, it is unclear if any vaccinated cases had vaccine-preventable infections.

## DISCUSSION

A history of H/SS was associated with significantly increased odds of developing pneumococcal meningitis among this adult population. Large studies for neurosurgery and SS have identified acute, postoperative central nervous system infection rates to be approximately 1%–10% and 0.2%–2.1%, respectively [10, 11]. In our study, 1 (1.2%) case who underwent H/SS developed postoperative pneumococcal meningitis, consistent with the incidence rate from the literature. Our results suggest that a history of H/SS increases the pneumococcal meningitis risk far beyond the postoperative period. Traumatic injury to the blood-brain barrier (BBB) has been shown to lead to BBB dysfunction years after the initiating event [12]. A direct anatomic connection from the nasopharynx to the intracranial compartment resulting from prior head surgery, and transient bacteremia leading to meningitis via a dysfunctional BBB, could explain the increased risk of pneumococcal meningitis seen in patients with prior H/SS. Concussion was not found to be significantly associated with the development of meningitis.

While pneumococcal meningitis is a rare condition, our sample size was adequate for many statistical comparisons. However, the study was underpowered for a close analysis of HI and H/SS types. No patients had a history of facial and skull fractures; therefore, it was not possible to evaluate the risk of these types of HIs. Childhood concussions may not have been documented, although incomplete documentation should have been similar for cases and controls.

This is the first published study demonstrating an association between a history of H/SS and pneumococcal meningitis outside the 30-day postoperative period. IPD, including meningitis, is largely a vaccine-preventable disease [2]. Among both cases and controls aged 19–64 years with clinical indications for pneumococcal vaccination, less than half of the patients had been vaccinated. This study emphasizes the need for provider education to improve overall adult pneumococcal vaccination rates. Given the significantly increased OR, H/SS should be considered as a potential risk factor for pneumococcal meningitis among adults. Additional investigations are needed to confirm these results, as this was a relatively small study. Future investigations are also needed to explore the risk of facial and skull fractures, as well as the risk of developing other neuroinfectious diseases in persons with prior H/SS. In the meantime, pneumococcal vaccination is a safe and efficacious intervention, and we would recommend vaccinating patients with prior or upcoming elective H/SS, particularly if they are in a risk group already recommended for vaccination.

## Notes

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## Article

# Optimizing the Distribution of Pharmacy-Dispensed Naloxone Using Spatial Mapping Techniques in Rural Areas

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[sagepub.com/journals-permissions](http://sagepub.com/journals-permissions)DOI: [10.1177/0022042620945673](https://doi.org/10.1177/0022042620945673)[journals.sagepub.com/home/jod](http://jod.sagepub.com/home/jod)**Somalee Banerjee, MD, MPH,<sup>1,2</sup> **

## Abstract

With the worsening opioid epidemic, recent changes allow pharmacies to sell naloxone through standing orders to reverse opioid overdoses. This study assesses direct dispensed naloxone availability through pharmacy chains in California in 2016, and utilizes spatial analysis techniques to suggest optimal stocking of naloxone. Rural counties were less likely to have a pharmacy selling naloxone even though overdose death rates were higher in rural counties (odds ratio [OR] = 0.225; 95% confidence interval [CI] = [0.059, 0.854]). Pharmacies closest to the center of the population in these rural counties were identified as ideal stocking locations. Rural counties with high overdose death rates have the lowest rates of naloxone, but spatial analysis can determine pre-existing chain pharmacies that can stock naloxone.

## Keywords

naloxone, mapping, pharmacy, geospatial, rural

## Introduction

The opioid epidemic and opioid-associated mortality within the United States has recently gained increasing attention as a public health crisis due to the skyrocketing number of opioid overdose deaths with a 200% increase since 2000 (Paulozzi et al., 2011; Rudd et al., 2016). Strategies to reduce mortality from the opioid epidemic have taken multimodal approaches including harm reduction methods, such as opioid overdose reversal with naloxone. Naloxone hydrochloride is a  $\mu$ -opioid receptor competitive antagonist that quickly reverses opioid effects temporarily, and thus prevents respiratory depression and death due to an opioid overdose (Beheshti et al., 2015). Historically, naloxone was only administered in medical facilities; however, over the last two decades, liberalizing naloxone access has been used as a means of community harm reduction in the opioid epidemic. Previously this was limited to first responders and community distribution programs, and access had been concentrated in urban areas (Hawk et al., 2015; Wheeler et al., 2015). The National Institutes of Health (NIH) and the U.S. Food & Drug Administration (U.S. FDA) have recommended the use of naloxone, a common opioid reversal agent, to reduce opioid

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overdose risk (National Institute on Drug Abuse, 2015). Recent evidence has highlighted the increased burden of opioid-related morbidity and mortality in rural communities with a persistent lack of access to medications for treatment of opioid use disorder (Haffajee et al., 2019). Naloxone distribution through pharmacy chains can be a means to ensure greater access in rural areas. Pharmacy chains with a pervasive presence in urban and rural areas around the country are well poised to deliver this life-saving intervention in the most needy communities.

To expand access to naloxone, the U.S. FDA (2015) fast-tracked the 2015 approval of an easy-to-use nasal spray and an auto-injector version for naloxone that can be dispensed from outpatient pharmacies. Since 2012, most states have passed naloxone access laws that allow for patients who use opioid and their close contacts to buy naloxone directly from pharmacies with trained pharmacists through universal standing prescription programs (Davis, 2015). However, even in states with more established standing prescription naloxone programs, availability is far from universal. Recent studies in Massachusetts and Pennsylvania reported naloxone stocking rates of only 45% and 8.7%, respectively (Burrell et al., 2017; Stopka et al., 2017). In 2014, the governor of California signed AB 1535, the Pharmacy Naloxone bill, into law to allowed over the counter (OTC) sale of naloxone throughout the state through standing prescriptions (Drug Policy Alliance, 2014). In 2015, a large pharmacy chain started carrying standing order dispensed naloxone with an initial rollout of only 58 of the 867 chain pharmacies carrying naloxone with plans to expand across the state (Drug Policy Alliance, 2015, n.d.). Prior studies have explored the optimal routes of prehospital naloxone distribution with mixed results (Dworkis et al., 2018). Recently, geospatial mapping techniques have begun to be used to study to optimize the planning of resource deployment for the opioid epidemic (Centers for Disease Control and Prevention [CDC], n.d.; Dodson et al., 2018). There is limited evidence regarding optimal spatial distribution of direct naloxone availability through retail pharmacies. A spatially directed effort to improve distribution of direct dispensation naloxone in pharmacy chains can efficiently get naloxone into the hands of people who can prevent the next opioid overdose death. This study will assess the spatial distribution of early wave standing order naloxone availability in a large pharmacy retailer chain in California, particularly rural areas with high opioid-associated mortality, to determine how to best focus resources in rural areas with the greatest need for access to naloxone.

## Materials and Methods

### *Study Population and Data Sources*

The patient population studied included adults who died in the state of California from 2000 to 2014, as this time period included the greatest rate of increase of opioid-related deaths in the country (Rudd et al., 2016). Opioid overdose death data were obtained from the open source CDC Multiple Causes of Death 1999–2014 database, with mortality data based on death certificates in the 50 states and the District of Columbia (Dodson et al., 2018). For the purposes of this analysis, counties with deaths less than 10 total per year were reported as 0. Opioid overdose deaths were identified as deaths with cause listed as tenth revision of the International Statistical Classification of Diseases and Related Health Problems (ICD 10) codes under T40: poisoning by opioids and other psychedelics. Four specific years of data were illustrated for at regular intervals for clarity over time, however data from 2014 only was used for the detailed regression analysis described below. Boundary data for mapping counties within California were obtained from the government of California (CDC, n.d.). Census data from the 5-year American Community Survey (ACS) (U.S. Census Bureau & Social Explorer, 2015) were utilized to determine demographic characteristics per county (California Open Data, 2019). The baseline demographic characteristics studied included total county population and categorical variables defining age, race, gender, employment status, median income, health insurance status, and inequality within the

county as measured by the Gini Index. The urban/rural nature of a county was defined using the National Center for Health Statistics (NCHS, n.d.) urban–rural classification scheme for counties in 2014. Urban areas were defined as counties with largely metropolitan areas, while rural areas were defined as nonmetropolitan areas according to NCHS classifications. Locations for the 58 pharmacies stocking standing order naloxone in 2016 in California were obtained through open source data obtained via phone survey by The Drug Policy Alliance, and were defined as pharmacies that confirmed that naloxone was available for purchase at the facility without any individual provider prescription (Weaver et al., 2018). Geographical data for these pharmacies were extrapolated through geo-locating the pharmacies with a Google Maps Application Programming Interface.

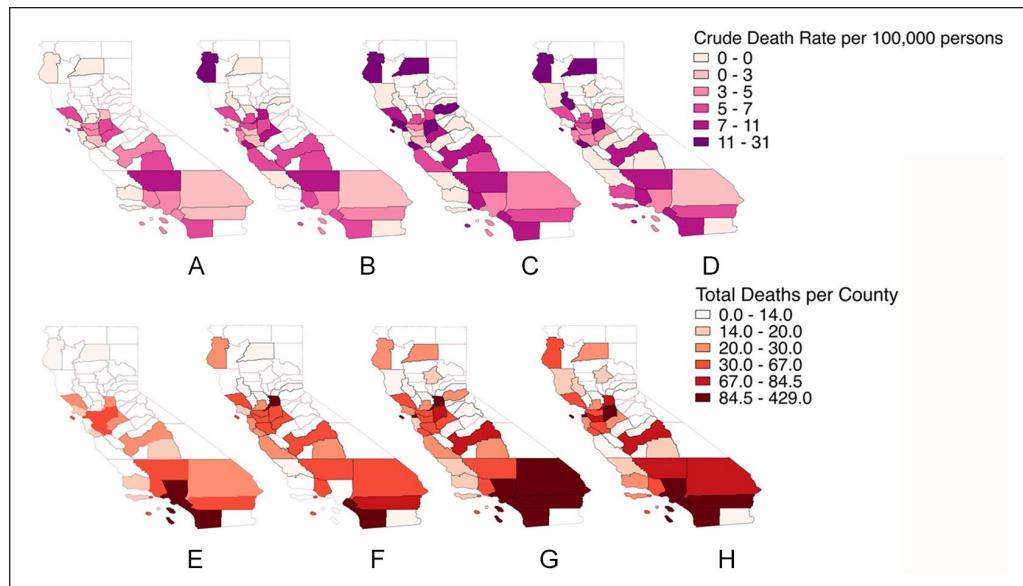
### *Outcomes and Data Analysis*

Opioid death data in total opioid deaths and crude death rates by population per county were joined and mapped using Quantum GIS (QGIS) for the years 2000, 2005, 2009, and 2014 to illustrate the periodic change in death associated with opioids over the state. These years were chosen as interval markers during the acute worsening of the opioid epidemic with 2009 marking a significant inflection point in the rate of increase of opioid-related deaths per the CDC (Rudd et al., 2016). MATLAB (Natick, MA, USA) was used for spatial data analysis. Pharmacies claiming standing order naloxone availability in 2016 were mapped, and their presence in counties with high need was determined. Multivariable logistic regression analyses were utilized to examine the likelihood of counties having a pharmacy selling standing order naloxone with the primary outcome of the crude death rate per county from 2014. Demographic characteristics noted above were used as covariates to adjust these models. Counties with high need were defined using histograms of total deaths and death rates. If a chain pharmacy stocking OTC naloxone was not present in one of these high need counties, the population-weighted centroids of these counties were determined. The centroid was determined using census tract population data of each census tracts within the county and finding the population weighted mean latitude and longitude point. The closest existing pharmacy per Google Maps data to that centroid as measured by the shortest geographical distance was identified as the suggested location to expand standing order naloxone stocking and advertising. This study was determined to be exempt from review by the University of California, Berkeley institutional review board.

## **Results**

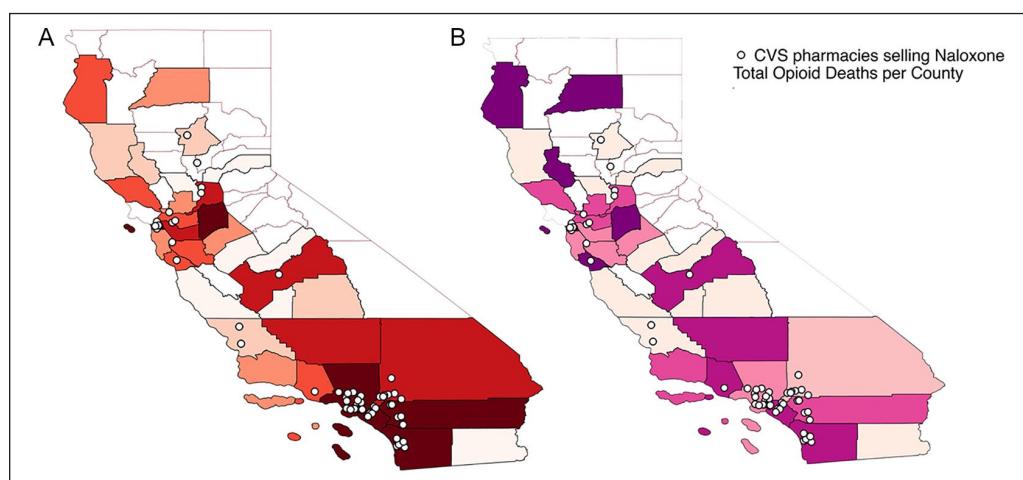
### *Spatial Distribution of Overdose Deaths and Naloxone Availability*

The distribution of drug overdose deaths in California has overall increased substantially since 2000. The largest increases in overdose deaths were in the more rural counties in northern California that have some of the highest rates of overdose deaths in the state (Figure 1). Unadjusted and adjusted logistic regression analyses were conducted to ascertain characteristics associated with the likelihood of a county having a pharmacy with standing order naloxone within its boundaries. There was no significant association between rates of opioid overdose death rates and the odds of having a pharmacy carrying standing order naloxone (odds ratio [OR] = 1.083, 95% confidence interval [CI]: [0.821, 1.427]). As suggested by the spatial results (Figure 2), rural counties as determined by NCHS classification had lower odds of having a pharmacy selling standing order naloxone (OR = 0.330, 95% CI = [0.146, 0.745]; adjusted OR = 0.225, 95% CI = [0.059, 0.854]). Multivariate logistic regression did not show any significant association between naloxone-carrying pharmacy locations and the following demographic factors in the area: White race, median income, insurance status, higher education attainment, inequality, or unemployment.



**Figure 1.** Temporal trend of drug overdose deaths in California.

Note. Crude drug overdose death rate per county shown in (A) 2000, (B) 2005, (C) 2009, and (D) 2014. Total deaths due to drug overdose per county shown in (E) 2000, (F) 2005, (G) 2009, and (H) 2014.

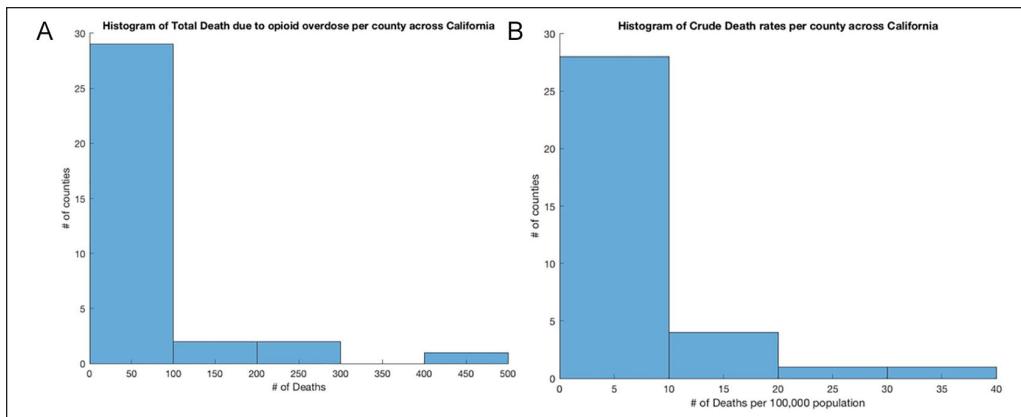


**Figure 2.** Pharmacies stocking OTC naloxone in California in 2016 with (A) total deaths from opioid overdose per county and (B) crude death rate from opioid overdose per 100,000 population in 2014, legend identical to Figure 1.

Note. OTC = over the counter.

### Optimization of Naloxone Availability

Counties with high naloxone need were defined by identifying clear outliers with the highest number and rates of deaths due to drug overdose. A few outlier counties accounted for the highest rates of drug-related deaths (Figure 3). The thresholds of greater than 100 total deaths per county and 10 deaths per 100,000 people per county were used as the definition for counties with high



**Figure 3.** Histograms of county drug death distribution highlighting the skew of death rates in 2014: (A) distribution of total counts of opioid deaths per county and (B) distribution of counts of crude opioid death rates per county.

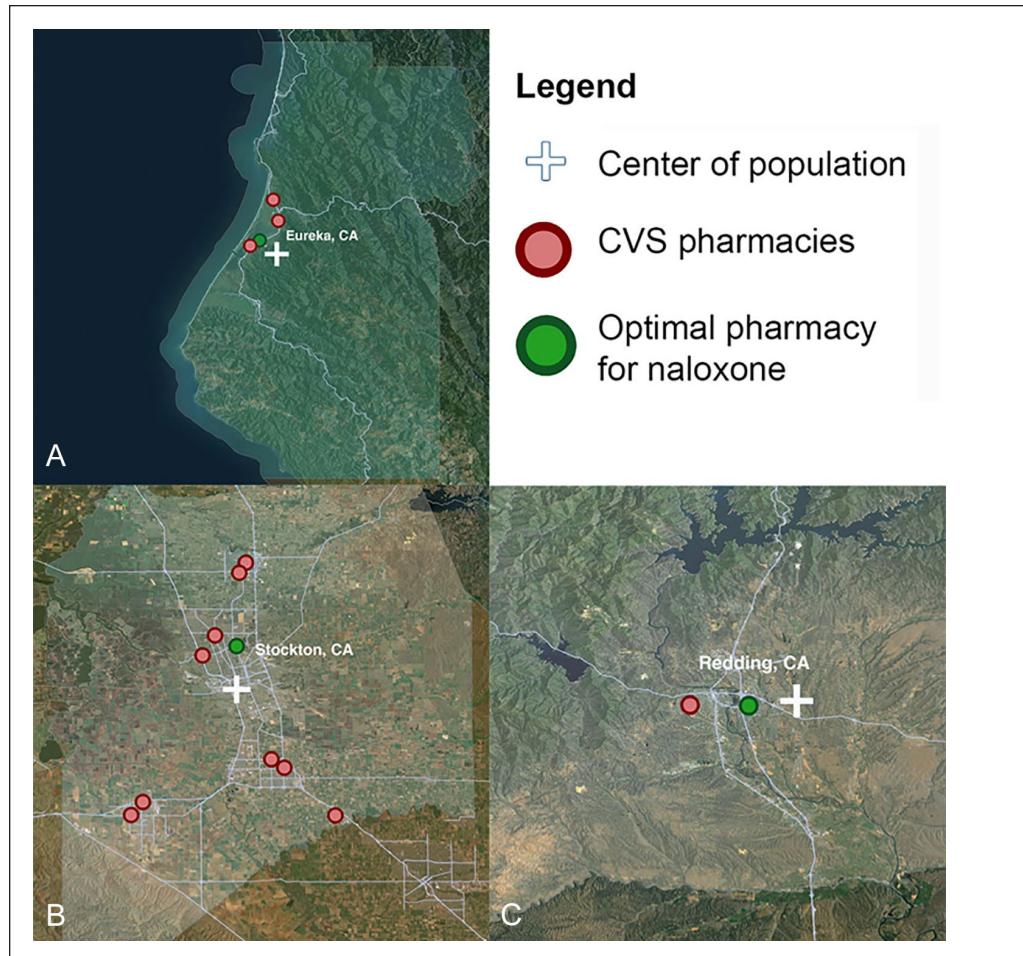
naloxone need. The counties with the highest total death counts already had early introduction of standing order naloxone, and these counties had larger more urban populations. However, four of the six counties with the highest need as defined by high crude death rates did not have pharmacies selling standing order naloxone. In the two counties with high needs with existing availability of naloxone, the pharmacies carrying naloxone were already near the centroid of population. To determine the optimal pharmacy to carry naloxone, we located the pharmacy closest to this population centroid in the following four counties in Northern California: Lake, Humboldt, San Joaquin, and Shasta counties. The optimal pharmacies are shown in Figure 4.

## Discussion

Rural counties in California are currently suffering from the worst of the ravages of the opioid epidemic, but the initial roll out of standing order pharmacies through a pharmacy chain was not concentrated in these areas of highest need. Pharmacies with naloxone in stock to be dispensed through standing order prescriptions were more likely to be located in urban areas, with rural areas being neglected despite the higher rates of opioid associated deaths in rural areas. No other clear socioeconomic indicators were found to be associated with the likelihood of a county having a naloxone carrying pharmacy. It is likely that pharmacies in urban areas were targeted to carry naloxone due to an increased concentration of resources and perceived demand in urban areas. This study illustrates the benefits of using spatial analyses as an aid to evidence-based decision-making regarding where to emphasize stocking and advertising of standing order naloxone. Training and stocking resources can be concentrated in the suggested pharmacies that are already present in the rural counties that lack access.

The results from this study echo previous evidence showing a greater increase in rates of opioid overdose deaths in rural areas compared with urban areas nationwide (Gupta et al., 2016; Keyes et al., 2014; Paulozzi & Xi, 2008). Suggested factors contributing to this geographic difference in opioid use include greater environmental stressors and availability of opioid prescriptions in rural areas (Keyes et al., 2014). In California, Cerda et al. (2017), found a spread of more rural opioid overdose hotspots to urban areas with rural hotspots associated with increases in opioid prescriptions associated with workplace injuries.

Standing order naloxone is one of the many approaches in stemming the increasing mortality from the opioid epidemic. Pharmacy chains have taken initiatives to help stem the opioid epidemic,



**Figure 4.** Locations of branch pharmacies closest to population centers in counties with highest drug-related death rates that are optimal for naloxone stocking in California in 2016.

Note. Suggested locations in the following counties: (A) Humboldt County, (B) San Joaquin County, and (C) Shasta County.

and are well poised to provide a large-scale intervention in rural areas where other community or governmental interventions may be lacking. However, without purposeful, evidence-based direction of where to improve stocking, the current urban bias of naloxone availability may persist. Recent studies in Pennsylvania and Massachusetts, where standing order naloxone has been available for a longer time than California, show limited penetrance of naloxone availability in rural areas as previously mentioned (Burrell et al., 2017; Stopka et al., 2017). Since community organizations that provide a bulk of the standing order naloxone are more frequently serving densely populated urban areas, pharmacy stocking in rural areas could be a means to improve access to naloxone (Wheeler et al., 2015). Recent initiatives by the Centers for Disease Control and the Department of Health and Human Services to promote provider prescriptions of naloxone with opioids could increase access to naloxone through co-prescribing standards that would increase the need for prescription outpatient naloxone as well (U.S. Census Bureau & Social Explorer, 2015).

The role of pharmacies in harm reduction in opioids mirrors their role in syringe access programs. Historically syringe exchange programs in the community were the most established

methods of harm reduction, but pharmacy sales have been suggested as a method for increasing access in rural areas (Beheshti et al., 2015). Syringe access programs continued to be concentrated in more urban areas as compared with rural or suburban areas where the need is increasing (Wheeler et al., 2015). However, pharmacies in some states are increasing their stock with 97% of pharmacies in Massachusetts having syringe exchanges (Stopka et al., 2017). There could be a similar push to improve stocking of naloxone in rural and suburban pharmacies to match their communities' increasing needs especially because urban areas already have increased access to naloxone through community and provider driven initiatives. There is some debate on the safety of universal naloxone use through standing prescriptions, but the increasing evidence base shows significant opioid overdose reversals in the community without directly increasing opioid use (Beheshti et al., 2015; Doe-Simkins et al., 2014). The cost of naloxone may be significant barrier that improving access may not solve (Doe-Simkins et al., 2014). The future of naloxone use is also dependent on future policy as a roll back of current addiction treatment coverage laws could lead to a worsening in the opioid epidemic (Friedmann et al., 2017).

This study does have limitations. First, our analyses focused on mapping early efforts of major pharmacy retailer in California, a state that has lower rates of opioid overdoses compared with other states, such as Kentucky and West Virginia. The results regarding factors associated with pharmacy availability of naloxone may not have full external validity, as no clear evidence was available from the pharmacy chain regarding their decision-making. Although more detailed geographic data regarding opioid overdoses at the zip code level would lead to improved predictions about naloxone needs, these data are difficult to collect due to relatively low numbers in rural areas and the need for privacy. Pharmacy availability of naloxone was obtained through publicly available survey data from the Drug Policy Alliance, but temporal changes in the availability of naloxone was not captured and thus could not be included in the analyses.

Rural counties in California have limited access to life saving naloxone through pharmacy chains even though they have some of the highest need. Since other community methods of naloxone delivery are also lacking in rural areas, these geographic regions may particularly benefit from policy focused on improving access to pharmacy-based standing order naloxone as large pharmacy retailers already have a presence in these areas. Spatial mapping methods provide an important tool that can assist large retail pharmacies as well as public health officials in focusing their efforts to areas of greatest need to maximize public health impact. This can lead to an integrated effort to improve naloxone advertising and training to increase public education about this live saving intervention.

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## REVIEW ARTICLE

### Gynecology

# Eradicating cervical cancer: Lessons learned from Rwanda and Australia

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### Abstract

Both Rwanda and Australia have made significant strides to eradicate cervical cancer. To understand the successes in Rwanda and Australia, a comparative policy analysis was conducted based on key informant interviews and a review of peer-reviewed literature and policy briefs. Notable findings were identified that offer lessons for countries across the income spectrum. To address cervical cancer, low- and middle-income countries can leverage foreign aid, international collaboration, and strong political advocacy, as Rwanda did. High-income countries can invest in translational research that builds capacity from basic science research to implementation of novel and impactful health products and services, as Australia did. All countries can consider rolling out HPV vaccination by targeting the social and/or physical environment (e.g., a school-based vaccination program, as both Rwanda and Australia did). Cervical cancer is preventable, and eradication is within reach for countries across the income spectrum around the world. Cervical cancer screening programs are needed to minimize the incidence of and mortality from cervical cancer in the short term, and HPV vaccination programs are the best strategy to eradicate cervical cancer in the long term.

#### KEY WORDS

Australia, cervical cancer, cervical cancer screening, HPV vaccination, policy analysis, Rwanda

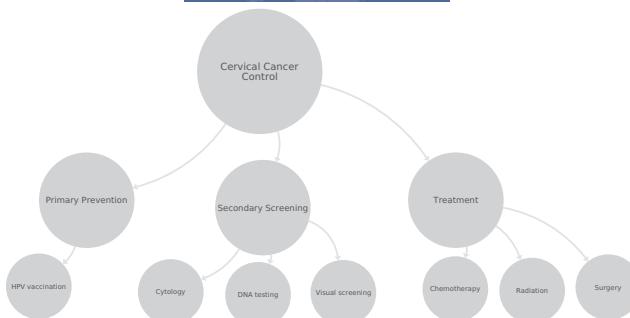
## 1 | INTRODUCTION

Every year, 300 000 women die from cervical cancer, and 90% of these cases occur in low- and middle-income countries (LMICs).<sup>1,2</sup> Nearly all cases of cervical cancer are caused by human papillomavirus (HPV), a common sexually transmitted viral infection.<sup>3</sup> Half of all HPV strains are "high-risk" for serious sequelae, and untreated high-risk HPV infections can result in cancer. Cervical cancer typically appears many years after HPV infection. HPV also causes the majority of anal, vaginal, oropharyngeal, vulvar, and penile cancers.<sup>3</sup>

There are three facets of cervical cancer control (Figure 1): prevention, screening, and treatment.<sup>2</sup> Prevention and screening are the two pathways to avert or treat cervical pre-cancer, meaning that cervical cancer incidence can be avoided altogether.

Two countries, Rwanda and Australia, have made great strides to eradicate cervical cancer.<sup>4,5</sup> Rwanda (an LMIC) and Australia (a high-income country) therefore provide case studies of successful widespread cervical cancer eradication efforts. This paper aims to understand the successes in Rwanda and Australia, and to share lessons learned for countries across the income spectrum.

This policy analysis first provides an overview of HPV vaccination and cervical cancer screening and then applies two policy analysis tools, Kingdon's policy window model and the force field analysis, to understand the specific strategies employed in Rwanda and Australia. It then closes with recommendations for other countries to improve their capacities for HPV vaccination and cervical cancer screening.



**FIGURE 1** Three facets of cervical cancer control

## 1.1 | HPV vaccination

There are several vaccines that can prevent high-risk HPV strains. The bivalent (Cervarix<sup>®</sup>), quadrivalent (Gardasil<sup>®</sup>), and nonavalent (Gardasil 9<sup>®</sup>) HPV vaccines prevent infection for (respectively) two, four, and nine HPV strains.<sup>6</sup> The availability of these vaccine types varies by country and facility. The HPV vaccination is most effective when administered to a person before their first exposure to HPV during sexual activity, and the WHO recommends adolescent girls (between 9 and 14 years old) as the priority group for HPV vaccination.<sup>7</sup>

The HPV vaccine is safe and effective at preventing a person from contracting high-risk HPV, and the vaccine is predicted to reduce cervical cancer deaths by up to 76%.<sup>8,9</sup> Despite the high effectiveness of the HPV vaccine, uptake remains limited around the world.<sup>10</sup> Global public concerns about the HPV vaccine include side effects, safety, efficacy, interactions, and the potential of HPV vaccination to promote sexual activity.<sup>10</sup> These concerns have been largely proven to be unfounded.<sup>10</sup> LMICs face additional constraints in implementing HPV vaccination, including the challenge of creating a vaccine delivery infrastructure within existing health systems and of ensuring the long-term sustainability of HPV vaccine programs.<sup>11,12</sup> Since the HPV vaccination was introduced in 2006, there has been an increase in the number of national HPV vaccination programs, but these programs tend to be located in higher-income countries, where the burden of cervical cancer is lower.<sup>10</sup>

## 1.2 | Cervical cancer screening

There are several cervical cancer screening methods, including cervical smear, HPV DNA screening, colposcopy, and visual inspection with acetic acid (VIA) or with Lugol's iodine (VILI).<sup>13</sup> Cervical smear requires a laboratory and a well-trained analyst, usually a pathologist, to perform cytology testing. HPV DNA testing looks for the presence of HPV DNA in a woman's sampled cervical cells. Colposcopy requires a high-powered microscope that a highly trained practitioner uses to view a patient's magnified cervix to look for precancerous lesions and abnormalities. VIA and VILI are used in "screen-and-treat" approaches, where a trained practitioner can see if a patient's cervix appears precancerous, and then treat them on the spot by using carbon dioxide gas to freeze off (cryotherapy), by

applying heat to burn off (thermocoagulation), or by using an electrified wire to cut out suspected deeper precancerous lesions (loop electrosurgical excision procedure).

Cervical cancer screening remains limited in LMICs. The cervical smear, HPV DNA testing, and colposcopy pose resource challenges, including high costs, reliance on a laboratory, and/or reliance on highly trained practitioners.<sup>14-16</sup> Visual inspection methods (VIA and VILI) are recommended for use in LMICs but uptake remains limited because of a lack of healthcare providers who are trained in administering and interpreting a visual examination.<sup>13,17</sup>

## 2 | METHODS

The objectives of this policy analysis are to: (1) describe the context of HPV vaccination and cervical cancer screening, (2) analyze effective policy strategies to eradicate cervical cancer in Rwanda and Australia, and (3) propose recommended policy interventions to eradicate cervical cancer globally.

To address these objectives, several activities were completed. First, a literature review was conducted to understand strategies employed in Rwanda and Australia to eradicate cervical cancer. Second, a member of the Vaccine Preventable Diseases Division of the Rwandan Ministry of Health and a member of Australia's Cancer Council New South Wales were interviewed. These key informant interviews do not constitute human-subject research and therefore institutional review board approval was not sought. Third, Kingdon's policy window model was applied, and a force field analysis was conducted in order to understand the key policy strategies employed in Rwanda and Australia. Kingdon's policy window model posits that there are three "streams" of events related to an issue that operate largely independently: the problem stream (scope of the issue), the processes stream (availability or paucity of solutions), and the politics stream (political will). When these streams coincide, the importance and urgency of the issue are magnified, a "policy window" opens, and there is an opportunity to successfully implement a new policy strategy.<sup>18</sup> The force field analysis, originally developed by Lewin,<sup>19</sup> maps the driving and restraining forces of a policy strategy. A policy strategy can be successfully implemented when the drivers outweigh the restraints. Fourth, the similarities and differences in Rwanda's and Australia's approach were compared and recommendations were developed for other countries to eradicate cervical cancer.

## 3 | RESULTS

### 3.1 | Strategies to eradicate cervical cancer in Rwanda

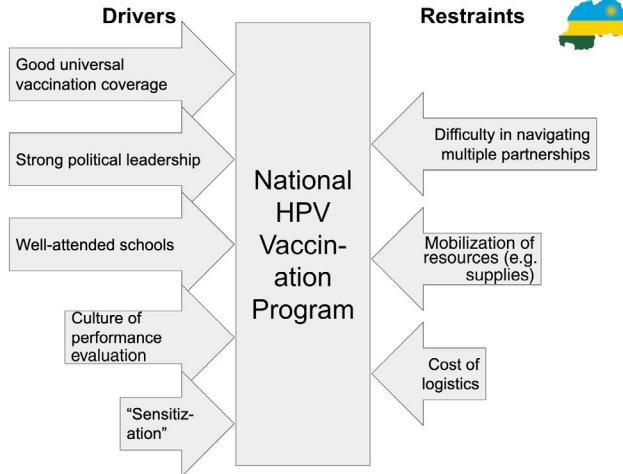
Rwanda is a low-income country in sub-Saharan Africa with a population of 12.6 million people.<sup>20</sup> In 1994, Rwanda suffered a devastating genocide that killed over 1 million people and destroyed the

country's infrastructure, including their health system. Following the genocide, the Rwandan government introduced a new constitution and focused on rebuilding the health system with an equity agenda, strengthening infrastructure and delivery of care.<sup>21</sup> Specifically, Rwanda focused on improving maternal and child health.<sup>22</sup>

### 3.1.1 | HPV vaccination in Rwanda

In 2011, the age-standardized incidence rate of cervical cancer in Rwanda was 34.5 cases per 100 000 women, and the age-standardized mortality rate was 25.4 cases per 100 000 women.<sup>23</sup> Cervical cancer was the leading cause of cancer death among Rwandan women. Beginning in 2009, the First Lady of Rwanda, Jeannette Kagame, began to advocate for HPV vaccinations and lobbied the pharmaceutical company Merck to provide free HPV vaccinations in Rwanda.<sup>23</sup> The Minister of Health at the time, Agnes Binagwaho, wrote that "the Ministry of Health considered the overwhelmingly positive evidence of the effectiveness of the HPV vaccine to be a call to action".<sup>24</sup> In 2010, Merck and Rwanda's Ministry of Health jointly developed a national cervical cancer prevention strategy. The target population to receive the HPV vaccination was girls aged 9–14 years (per WHO guidelines),<sup>7</sup> and the Ministry of Health felt that the only way to reach most girls within their target age group was to vaccinate girls in school.\* Therefore, HPV vaccination was introduced in Rwanda in 2011 in a school-based program targeted at sixth-grade girls. The Ministry of Health coordinated with the Ministry of Education and with teachers to effectively implement HPV vaccinations.\* The national HPV vaccination program achieved 93% coverage of the full three-dose HPV vaccination schedule among sixth-grade girls.<sup>24</sup> This effort was the first HPV vaccination program in Africa.<sup>25</sup> These events are shown in Figure 2.

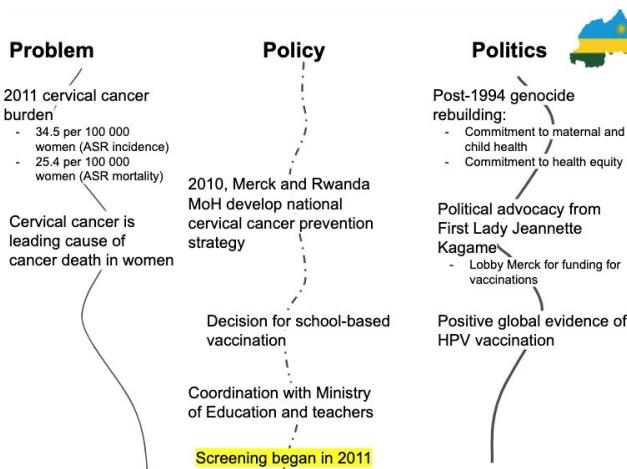
There were several drivers of success in the development and implementation of the HPV vaccination program in Rwanda (Figure 3). First, the government built upon Rwanda's rich history of



**FIGURE 3** Force field analysis of the national HPV vaccination program in Rwanda

vaccination. Since 2000, Rwanda has achieved 92% vaccination coverage in children under 5 years of age for major vaccine-preventable diseases.<sup>26</sup> Second, the government demonstrated strong political leadership in partnering with Merck and in coordinating across the health and education sectors to successfully implement the vaccination program. Third, Rwanda has an extremely well-attended school system, and 93% of all eligible sixth-grade girls were in school during the vaccination campaign.<sup>24</sup> Fourth, Rwanda has a unique culture of performance evaluation: as a group of authors analyzing Rwanda's successes in childhood vaccination coverage note, "the uniquely Rwandan practice of *imihigo*, which involves leaders at all levels of government (centrally and locally) signing performance contracts to achieve certain targets, enhances accountability and ownership".<sup>27</sup> Fifth, the government engaged in a media "sensitization" campaign before implementing the HPV vaccination which informed the public of the need for vaccination in their local language.\*

There were several restraints in the development and implementation of the HPV vaccination program in Rwanda (Figure 3). First, there were difficulties in navigating multiple partners, including the Ministry of Health, the Ministry of Education, teachers, community health workers, and Merck. Second, mobilizing resources (especially supplies and community health workers) to all Rwandan schools was difficult and required significant planning. Third, although Merck covered the cost of all three HPV vaccination doses, the cost of logistics (e.g., co-ordinated sensitization, mobilization of resources) was still quite high.



**FIGURE 2** Kingdon's three streams leading to the creation of a national HPV vaccination program in Rwanda (highlighted in yellow)

### 3.1.2 | Cervical cancer screening in Rwanda

Before the implementation of HPV vaccination in Rwanda, no formal cervical cancer screening program existed in the country. In 2013, Rwanda's Ministry of Health built on the success of the HPV vaccination program and developed a comprehensive national cervical cancer screening plan.<sup>23</sup> According to the plan, screening would be

decentralized across 30 public hospitals and 100 health centers and would include HPV DNA screening (with donated equipment) and VIA.

Currently, there are limited data on the implementation or the effectiveness of the national cervical cancer screening plan.<sup>4</sup> Given the lack of available information, Rwanda's cervical cancer screening program was not analyzed here.

### 3.1.3 | Current state of cervical cancer in Rwanda

Since the initial 2011 HPV vaccination campaign, Rwanda's government has continued to vaccinate sixth-grade girls in schools. Merck continued to pay for three HPV vaccination doses for all sixth-grade girls in Rwanda through 2014.<sup>23</sup> Since 2014, Gavi has paid for HPV vaccinations in Rwanda, and Rwanda switched from a three-dose HPV vaccination schedule to a two-dose schedule.<sup>23</sup>

Currently, the age-standardized incidence rate of cervical cancer in Rwanda is 31.9 cases per 100 000 women, and the age-standardized mortality rate is 24.1 death per 100 000 women.<sup>1</sup> This is a slight improvement from 2011 (34.5 cases per 100 000 women, 25.4 deaths per 100 000 women).<sup>23</sup> Given the long gap between HPV infection and cervical cancer, the rate of cervical cancer in Rwanda is expected to drop significantly over the next several decades as the girls who have been vaccinated since 2011 grow older.

## 3.2 | Strategies to eradicate cervical cancer in Australia

Australia is a high-income country with a population of 25.3 million people.<sup>20</sup> Australia is an exemplar of healthcare quality and access, providing universal health insurance and offering free or low-cost access to public hospitals for Australian residents.<sup>28</sup>

### 3.2.1 | Cervical cancer screening in Australia

In the late 1980 s, a study commissioned by the Australian Health Ministers' Advisory Council found that an organized cervical cancer screening approach could prevent 90% of cervical cancer in the country.<sup>29</sup> At the time, the age-standardized incidence rate of cervical cancer was 13.3 cases per 100 000 women and the age-standardized mortality rate was 2.7 deaths per 100 000 women.<sup>30,31</sup> In 1991, Australia introduced a national cervical screening program to realize the goals put forth by the Australian Health Ministers' Advisory Council report.<sup>29</sup> The program encouraged eligible women to be screened for cervical cancer every 2 years. The national screening program also set up a cervical smear infrastructure across the country, including cervical smear "registers" for data collection.<sup>29</sup> The introduction of a national cervical screening program spurred a surge of research on cervical cancer and HPV in Australia.

In 2017, Australia's government revised the national screening program to move away from the cervical smear towards HPV DNA testing. This change was made, in part, to better complement the national HPV vaccination program implemented in 2007.<sup>32†</sup> The new program recommends HPV DNA testing every 5 years, as opposed to cervical smear testing every 2 years. The HPV DNA screening approach was found to be more effective at catching cervical pre-cancer and more cost-effective than the cervical smear in Australia.<sup>33</sup> These events are marked with "AuS" (Australia Screening) in Figure 4.

There were several drivers of success in the development and implementation of the cervical screening program in Australia (Figure 5). First, Australia's universal healthcare system enables access to cervical cancer screening, as most patients do not pay to receive screening. Second, the universal healthcare system incentivizes the government to invest in prevention instead of treatment efforts. The government is the primary payer of health care, and screening is

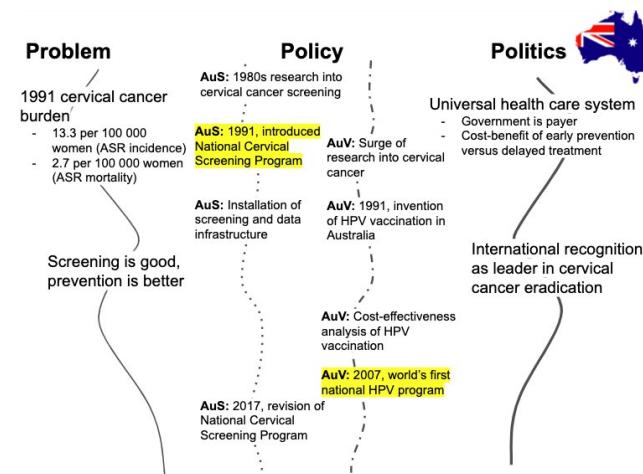


FIGURE 4 Kingdon's three streams leading to the creation of a national cervical screening program (AuS, highlighted in yellow) and a national HPV vaccination program (AuV, highlighted in yellow) in Australia

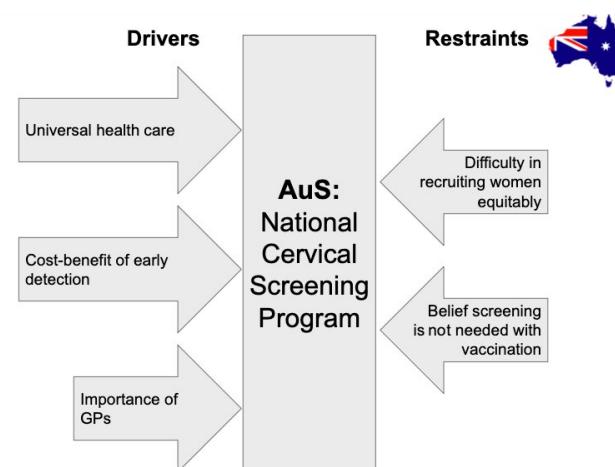


FIGURE 5 Force field analysis of the national cervical screening program in Australia

more cost-effective than cancer treatment. Third, the health system has a strong network of general practitioners (GPs), and these GPs act as a patient's first point-of-contact to the rest of the health system.<sup>28</sup> When the government established a national cervical screening program, GPs were well-positioned to take on the responsibility of informing their patients of the need to receive regular cervical cancer screening and of administering cervical cancer screening to patients.

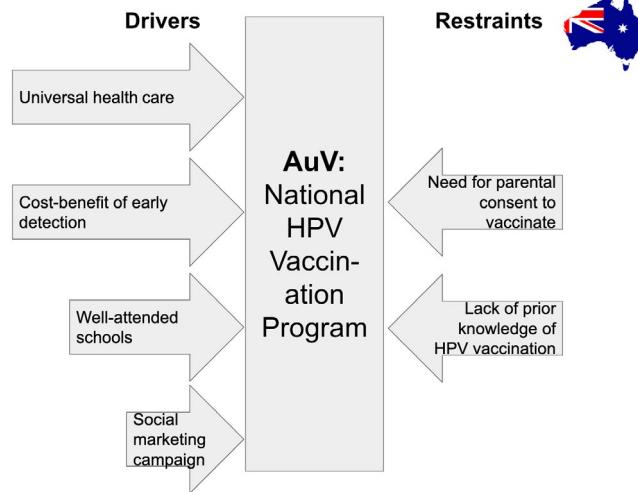
There were a few restraints in the development and implementation of the cervical screening program in Australia (Figure 5). First, the national cervical screening program did not reach all women in Australia equitably. Australia's indigenous population remains underserved in the national cervical screening program. This highlights inequities in recruitment and in providing access to treatment following a positive screening result.<sup>29</sup> Second, the advent of HPV vaccination created a false sense of security and an untrue belief that cervical cancer screening is not required for women who have received the HPV vaccination.<sup>29</sup>

### 3.2.2 | HPV vaccination in Australia

The long-standing commitment to cervical cancer screening in Australia led to a surge of research into cervical cancer and HPV. Dr. Ian Frazer and his colleague Dr. Jian Zhou developed the HPV vaccine in Australia, and filed an Australian patent for the HPV vaccination in 1991.<sup>34</sup> The US Food and Drug Administration approved the first HPV vaccination in 2006.<sup>35</sup> Australia then consulted experts and considered the cost-effectiveness of the vaccine before launching the world's first national HPV vaccination program in April 2007.<sup>36</sup> This program prioritized vaccinating girls between 12 and 17 years old in schools, and achieved moderately high coverage, with 73% of 12- to 13-year-old girls, 72% of 14- to 15-year-old girls, and 66% of 16- to 17-year-old girls receiving a full three-dose HPV vaccination schedule. These events are marked with "AuV" (Australia Vaccination) in Figure 4.

There were several drivers of success in the development and implementation of the HPV vaccination program in Australia (Figure 6). Similar to the drivers of success in Australia's national cervical screening program, a universal healthcare system simultaneously allows for Australians to receive the HPV vaccination free of charge and incentivizes the government to invest in early preventive efforts. Additionally, Australia's schools are well-attended, and the school-based vaccination program was built on Australia's history of school-based vaccination programs, which dates back to the 1970s.<sup>36</sup> Finally, the program included a social marketing campaign aimed at educating adolescent girls and their mothers about the importance of the vaccination.<sup>36</sup>

There were also several restraints in the development and implementation of the HPV vaccination program in Australia (Figure 6). First, the parents of the adolescent girls receiving the vaccination needed to provide consent, which posed a significant logistical challenge to administering the vaccination during the school day.<sup>36</sup> Second, at the time there was low awareness that HPV was the



**FIGURE 6** Force field analysis of the national HPV vaccination program in Australia

cause of cervical cancer, which created a challenge in convincing people to receive the HPV vaccination to prevent cervical cancer.<sup>36</sup>

### 3.2.3 | Current state of cervical cancer in Australia

Since the launch of HPV vaccination in 2007, Australia has instituted HPV vaccination within the National Immunization Program, which provides vaccinations to eligible people for free.<sup>37</sup> Vaccinations are offered through schools (for 12-to-13-year-olds),<sup>38</sup> through GPs, through Aboriginal Medical Services, and through workplaces.<sup>39</sup>

Currently, the age-standardized incidence rate of cervical cancer is 6.0 cases per 100 000 people and age-standardized mortality rate is 1.7 deaths per 100 000 people.<sup>1</sup> This is a substantial improvement from 1991 (13.3 cases per 100 000 people,<sup>30</sup> 2.7 deaths per 100 000 people<sup>31</sup>), effectively halving the incidence rate and decreasing mortality by a third.

## 4 | DISCUSSION

Rwanda and Australia offer critical lessons in cervical cancer eradication. Rwanda demonstrates that a devastating tragedy offers an opportunity to rebuild a nation with intentionality, as shown by Rwanda's prioritization of health equity and maternal and child health following the 1994 genocide. Additionally, Rwanda received beneficial foreign aid from Merck and later Gavi, underscoring the utility of international collaboration and strong political advocacy by LMIC governments. Australia shows the manifold benefits of universal health care in enabling access to preventive health services and in incentivizing the government to invest in disease prevention and screening. Additionally, Australia exemplifies the benefits of investing in translational research: Australia's basic science research enabled the invention of the HPV vaccination and

Australia was then the first country to implement a national HPV vaccination program.

Rwanda and Australia shared success in school-based HPV vaccination programs. A school-based vaccination program is an example of an “environmental” intervention, in that it seeks to facilitate HPV vaccination by changing the social and/or physical environment of HPV vaccination (i.e., it improves the accessibility of the vaccination location).<sup>40</sup> Environmental interventions have been found to be the most successful cervical cancer eradication strategies, but still must be accompanied by informational campaigns in order to address patient misconceptions about HPV and the vaccine.<sup>40</sup> Both Rwanda and Australia paired their HPV vaccination campaign with a sensitization or marketing campaign. The successes of Rwanda's and Australia's school-based vaccination programs demonstrate the effectiveness of environmental interventions to implement HPV vaccination.

This policy analysis was confined primarily by limited data available on the history and policy-making processes related to cervical cancer screening and HPV vaccination in Rwanda and Australia. Another limitation of this analysis was the limited number of key informant interviews conducted on the history and current practices and policies regarding cervical cancer screening and HPV vaccination in Rwanda and Australia. Additional key informants were identified, but the author was unable to successfully schedule an interview time with these informants, due in large part to the onset of the coronavirus disease 2019 pandemic.

## 5 | CONCLUSION

This policy analysis describes how Rwanda and Australia have taken steps to become on track to eradicate cervical cancer. There are a range of strategies to address cervical cancer mortality, including prevention, screening, and treatment. Prevention through the HPV vaccination and screening through the cervical smear, HPV DNA testing, colposcopy, and visual inspection are pathways to avert cervical cancer incidence.

A number of countries, including Rwanda and Australia, have successfully launched a national HPV vaccination program. Although there are limited data on the implementation and effectiveness of Rwanda's national cervical cancer screening plan, the success of Australia's cervical cancer screening demonstrates why screening remains crucial. The HPV vaccination is not 100% effective and there are significant parts of the populations of people in Rwanda and Australia not vaccinated against HPV and therefore are still at risk of developing cervical cancer.

This analysis of cervical cancer eradication efforts in Rwanda and Australia gives rise to a number of policy recommendations for other countries around the world. Countries should consider school-based vaccination programs, as these programs target the WHO's highest priority age group. Additionally, countries should include strategies for reaching marginalized populations without access to health care or education. HPV vaccination programs are the best

strategy to eradicate cervical cancer in the long term, and cervical cancer screening programs are needed to minimize the incidence and mortality of cervical cancer in the short term.

Rwanda and Australia found success applying an environmental intervention for HPV vaccination, and researchers agree that this is an effective global policy.<sup>11</sup> Environmental interventions, like school-based vaccination, still pose challenges for global implementation. These interventions rely on buy-in from policy makers at the national and/or local level. Environmental interventions to implement HPV vaccination and/or cervical cancer screening should be tailored for the specific context in which they are developed. Each country therefore must develop their own contextualized plan that builds on existing resources to improve HPV vaccination and cervical cancer screening uptake.

By sharing lessons learned from Rwanda and Australia, this policy analysis is meant to provide inspiration for policy makers around the world to consider developing programs to eradicate cervical cancer. Rwanda and Australia demonstrate that cervical cancer eradication is within reach for countries around the world and across the income spectrum. To achieve cervical cancer eradication, high-level and country-specific policy action is needed.

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## CONFLICTS OF INTEREST

The author has no conflicts of interest.

## AUTHOR CONTRIBUTIONS

As the sole author of this paper, JK conceived the idea, carried out the data collection, conducted the analysis, and wrote the manuscript.

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# Opinion: As California reopens, do not forget these three mistakes on COVID-19

**UCSF's Dr. Monica Gandhi and medical student Kyle Hunter reflect on California's handling of the pandemic**

Dr. Monica Gandhi, Kyle Hunter, MPH  
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California officially reopens Tuesday after 15 months of restrictions and lockdowns for the COVID-19 pandemic.

California has done a great job in vaccine distribution and uptake, surpassing President Joe Biden's desired metric of [70% eligible residents receiving](#) their first dose on May 31. However, the general perception that more restrictive measures throughout the pandemic kept Californians safe is not reflected in our [difficult third surge](#), nor the [mental health effects on California's children](#) of prolonged school closures. On this reopening day, it is important to reflect on three mistakes California made in the hopes that more data-driven approaches can be applied to guide us safely out of the pandemic completely.

## School closures

California to this day officially has the [lowest number of children](#) back to full in-person learning of all 50 states. We have not budged from this last-place position despite data from multiple countries and places in our own ([Wisconsin](#), [North Carolina](#), [Utah](#), [Chicago](#), [New York City](#)) demonstrating the safety of in-person learning with mitigation procedures for children and staff. Even in households, children have a [threefold lower chance](#) of catching COVID-19 than adults and, if they do, are about [half as likely to spread it](#). Unfortunately, despite [article](#) after [article](#) by California-based scientists on the safety of in-person learning (in [local](#) and [national periodicals](#)), [almost 80% of our students](#) have not seen the inside of a classroom since March 2020.

The depressing contrast of watching California's private schools reopen safely for nearly the entire year while public schools remained shuttered [underscored the inequities](#) that were deepened by basing decisions off models and metrics that did not reflect the true risk to students and educators. California students with the means to pay tuition or form private learning pods had a school year that approached normal. Those families who did not went without.

The most recent article we wrote from UCSF last week in the [Wall Street Journal](#) about school closures detailed the tragic mental health costs of this mistake California made towards our children. Data from hospitals in the Bay Area showed a 66-75% increase among 10- to 17-year-olds screening positive for active or recent suicidal ideation from last year. California Department of Public Health (CDPH) data showed 134 youth under age 18 in California died by suicide in 2020, up 24% from [108 in 2019, and well above totals from 2017 and 2018](#). Adult suicide rates were down by 11% concomitantly, speaking to additional stressors among children beyond the pandemic from losing support structures in schools. Our data was reflected in [national CDC data released last week](#) showing a 50% increase in emergency department visits for suicide attempts among American adolescents (mainly girls) during the pandemic.

Despite [publishing a blueprint](#) that detailed metrics for normal school openings for the fall in the New York Times — which are [metrics that we have already reached in California](#) — the Los Angeles Unified School District proposed this week [twice weekly testing and masking](#) of children and teachers in the fall. [Asymptomatic testing of children is not recommended in the yellow tier](#) in California, and we exited the tier-based system in our state today. The CDC recommends masking indoors only [in areas of high community transmission](#) and [already indicated a plan to likely discontinue](#) mask requirements for children indoors in the fall if community transmission stays low. California continuing the same mistakes around schools for the fall and signaling “abnormal” to our children may lead to [ongoing mental health effects](#).

## Closing the outdoors

On Dec. 3, during our third surge, California issued [another stay-at-home order](#) which closed large areas of the outside, including outside playgrounds and outdoor dining. However, closing the outdoors, based on how this virus disseminates, is not scientifically based. In fact, SARS-CoV-2 viral particles [disperse effectively in the outside air](#).

[A study in Wuhan, China](#), which utilized careful contact tracing, discovered that just one of 7,324 infection events investigated was linked to outdoor transmission. [An extensive review](#) reported that the risk of outdoors transmission of the coronavirus is about 20 times lower than inside. In [another analysis](#) of over 232,000 infections in Ireland, only one case of COVID-19 in every thousand was traced to outdoor transmission. And [an extensive review from the University of Canterbury](#) last fall concluded that outdoor transmission is rare, citing the opportunity costs of not encouraging the public to congregate outdoors for “the potential impact on physical and mental health and wellbeing.”

Closing events like outdoor dining [may have driven people inside during the holiday season](#), and California had a terrible third surge over the winter holiday. Many places, [like British Columbia](#), kept the outside open as much as possible to allow for congregation and socialization. The [principle of harm reduction is to reduce infections](#) from a contagious pathogen by also acknowledging the real-world conditions that may require essential work to continue or [people to want to see loved ones](#). California took a “lockdownist” approach, rather than [one of harm reduction](#), which may have harmed small business owners and increased social isolation in our state more than others.

## Unmasking and embracing the effectiveness of vaccines

The [revised CDC mask guidance May 13](#) stated that vaccinated people no longer needed to mask, inside or out. Although not messaged well, the backlash to this response and the hesitation by the public to embrace it is partially the fault of California's messaging around vaccines and masks.

Masks, distancing, ventilation, testing and contact tracing are tools for COVID-19 mitigation. Vaccines and increasing population immunity are the solution. California not only has one of the highest rates of vaccination in the country, but, unfortunately, has natural immunity from our terrible third surge. One of the most comprehensive seroprevalence studies performed in the U.S. was performed by the CDPH and showed a [38% seroprevalence rate](#) after our winter surge and before vaccines were being rolled out to the general population. [Natural immunity](#) and vaccinations are contributing to population immunity in our state, which is keeping our case and hospitalization rates low even as we graduate to less restrictive tiers. Low community transmission keeps our unvaccinated children safe, although our summer camp and school guidance has children down to the age of 2 still masking with low cases and hospitalizations for months across our state.

Despite having some of the most amazing immunology-related research coming out of California (at [La Jolla Institute for Immunology](#) and [UCSF](#)) showing the durability of the immune response to COVID-19 and [the effectiveness](#) of the immune response [against variants](#), California continues to message alarm over variants and test asymptomatic individuals after vaccination, despite the CDC recommending following [symptomatic breakthroughs](#). The way through this communication challenge in California around the CDC guidance on May 13 was to message simply and with optimism. Vaccines work. Continuing to message fear undermines trust in the data we have around vaccine effectiveness, [even against variants](#), and prevents people from returning to pursuing normal lives.

The signaling of abnormal will continue to have effects on our schools and personal anxieties and California should step forth [with optimism](#) and confidence on the power of immunity to get us through this pandemic on this day of opening.

*Interested in submitting an op-ed to SFGATE? [Click here.](#)*

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