Equity and Effectiveness during the COVID pandemic

Kirsten Bibbins-Domingo, PhD, MD, MAS
Professor and Chair, Department of Epidemiology & Biostatistics
Lee Goldman, MD Endowed Chair & Professor of Medicine
Vice Dean for Population Health & Health Equity
UCSF School of Medicine

April 22, 2021
Inequities during the pandemic
This Time Must Be Different: Disparities During the COVID-19 Pandemic

Kirsten Bibbins-Domingo, PhD, MD, MAS
How have we done?
Excess deaths in California during early 2020

All phases: 12,918 (9,950 to 15,724) excess deaths

Yea-Hung Chen, Maria Glymour..... Kirsten Bibbins-Domingo
• Black Californians
  • Highest per capita deaths early in the pandemic and high throughout

• Latino Californians
  • Only race/ethnic group that didn’t experience a decline with early shelter in place
  • Sustained raise and account for >50% excess mortality
Two-thirds of the excess deaths in California adults occurred in those with only a high school degree or less.
Foreign born Latinos in California at higher risk

Excess mortality among Latino people in California during the COVID-19 pandemic

Alicia R. Riley, Yen-Hung Chen, Elliott C. Mathay, M. Maria Glymour, Jacqueline M. Torres, Alicia Fernandez, Kirsten Bibbins-Domingo

*Departments of Epidemiology and Biostatistics, University of California, San Francisco, CA, USA
*Institute for Global Health, University of California, San Francisco, CA, USA
*Department of Public Health, University of California, San Francisco, CA, USA

Figure 4. Weekly excess mortality during the COVID-19 pandemic among Latinos in California, by place of birth

Note: Risk ratios (observed/expected) for all-cause mortality, comparing the pandemic period (March 1, 2020 to October 3, 2020) to previous years (January 3, 2016 to February 29, 2020); Source: California Department of Public Health Death Records.
Foreign born, essential work, lower education magnifies risk in Latino Californians
OBSERVED DEATHS AMONG WORKING-AGE FARMWORKERS IN CALIFORNIA DURING THE PANDEMIC 2020

Percent Increase in Death:

- MAR: 29%
- APR: 3%
- MAY: 36%
- JUN: 58%
- JUL: 91%
- AUG: 101%
- SEP: 64%
- OCT: 27%
- NOV: 71%
- DEC: 78%
Education and Experience

- 85% of working-age farmworkers who died of COVID-19 had <high school education, 69% had <9th grade education

- Average working-age farmworker who died of COVID-19 had spent 24 years in the job

Source: Jorge Macias
**Why:** Intersecting Structural Disadvantages

- Low Formal Schooling
- Limited English Proficiency
- Unauthorized Legal Status
- Low-wage, unprotected work
Essential work sectors and excess mortality among adult Californians (age 18-65 years)
### Table 2. Risk ratios for mortality, comparing pandemic time to non-pandemic time, among California residents 18–65 years of age, by occupational sector and race/ethnicity, March through October 2020.

<table>
<thead>
<tr>
<th>All races</th>
<th>Asian</th>
<th>Black</th>
<th>Latino</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>All sectors</td>
<td>1.22 (1.20–1.24)</td>
<td>1.18 (1.14–1.23)</td>
<td>1.28 (1.24–1.33)</td>
<td>1.36 (1.29–1.44)</td>
</tr>
<tr>
<td>Food or agriculture</td>
<td>1.39 (1.32–1.48)</td>
<td>1.18 (1.05–1.33)</td>
<td>1.34 (1.19–1.54)</td>
<td>1.59 (1.47–1.75)</td>
</tr>
<tr>
<td>Transportation or logistics</td>
<td>1.28 (1.24–1.33)</td>
<td>1.26 (1.12–1.44)</td>
<td>1.35 (1.26–1.46)</td>
<td>1.40 (1.31–1.52)</td>
</tr>
<tr>
<td>Facilities</td>
<td>1.27 (1.22–1.32)</td>
<td>1.24 (1.08–1.46)</td>
<td>1.25 (1.17–1.34)</td>
<td>1.38 (1.27–1.51)</td>
</tr>
<tr>
<td>Unemployed or missing</td>
<td>1.23 (1.19–1.27)</td>
<td>1.08 (1.04–1.14)</td>
<td>1.31 (1.22–1.40)</td>
<td>1.31 (1.22–1.41)</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1.23 (1.18–1.28)</td>
<td>1.18 (1.06–1.33)</td>
<td>1.13 (1.01–1.30)</td>
<td>1.44 (1.34–1.57)</td>
</tr>
<tr>
<td>Health or emergency</td>
<td>1.19 (1.17–1.22)</td>
<td>1.40 (1.33–1.49)</td>
<td>1.27 (1.17–1.40)</td>
<td>1.32 (1.18–1.51)</td>
</tr>
<tr>
<td>Retail</td>
<td>1.18 (1.14–1.23)</td>
<td>1.10 (1.00–1.22)</td>
<td>1.36 (1.21–1.55)</td>
<td>1.40 (1.28–1.55)</td>
</tr>
<tr>
<td>Government or community</td>
<td>1.14 (1.11–1.18)</td>
<td>1.22 (1.07–1.41)</td>
<td>1.20 (1.09–1.33)</td>
<td>1.42 (1.32–1.53)</td>
</tr>
<tr>
<td>Not essential</td>
<td>1.11 (1.08–1.14)</td>
<td>1.14 (1.06–1.23)</td>
<td>1.23 (1.15–1.33)</td>
<td>1.29 (1.20–1.41)</td>
</tr>
</tbody>
</table>
Op-Ed: How the pandemic divided California in two

California marked a grim milestone this week, surpassing 31,000 COVID-19 deaths and 600,000 cases. With the coronavirus outbreak still raging in many parts of the state, Gov. Gavin Newsom is toggling between tightening restrictions in some places and rolling them back in others.
“Averages are no consolation to those who have been left behind.”

Sir Angus Deaton - The Great Escape: Health, Wealth, and the Origins of Inequality
Reflection

Throughout the pandemic, we have observed stark disparities that are deeply rooted in deep pre-existing social and structural inequities.

The disproportionate burden of COVID-19 on poor and minoritized communities was predictable, predicted, and could have been planned for.

Failure to focus on *equity* in our pandemic management has limited the overall *effectiveness* of our response.
inequity reduction is not a side quest of pandemic preparedness. It is arguably the central pillar—if not for moral reasons, then for basic epidemiological ones.

Infectious diseases can spread, from the vulnerable to the privileged. “Our inequality makes me vulnerable,” Mary Bassett, who studies health equity at Harvard, told me. “And that’s not a necessary feature of our lives. It can be changed.”
Where are the bright spots?
Partnership: “Unidos en Salud”

Latino COVID-19 Task Force, Sup. Hilary Ronen’s Office
Office of Mayor Breed, SF Dept. of Public Health, SF Parks & Rec, SFUSD School Board
UCSF, Zuckerberg San Francisco General Hospital, Chan-Zuckerberg BioHub, UCSFClinLab

Recruited and trained 450 medical & community volunteers

Led by Drs. Diane Havlir, Carina Marquez, Gabe Chamie

Medical and community volunteers at Flynn Elementary School
Latino COVID-19 Task Force at study headquarters
Setting: Mission District
April 25-28 2020 – 6 weeks into shelter in place

The Mission, San Francisco

This census tract in the Mission is the second most dense in San Francisco of all census districts >5,000 persons (and the highest with a significant Latinx population) and with a wide range of household incomes.

*Census Tract 022901*
4,087 adults (>20 years)
58% Latinx
34% HH Income < $50K

*2018 American Community Survey (U.S. Census Bureau)
Images: https://statisticalatlas.com
Low Barrier “test and respond”

Test

Respond

Latino task Force

Isolation and Quarantine education, Masks, Gloves, Cleaning supplies, Food (hot meals and supplies), Work excuses

April 25-28, 2020
There is high demand for testing in the Community

In 4 days, Unidos en Salud increased SF’s total # of COVID-19 tests (50+ days) by 29%
Testing Results: PCR+ for COVID-19

Tract 022901
PCR+ Prevalence Among tested

<table>
<thead>
<tr>
<th></th>
<th>Residents</th>
<th>Workers</th>
<th>Total (residents/workers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community</td>
<td>70/3,048</td>
<td>27/450</td>
<td>2.3%</td>
</tr>
<tr>
<td>Tract workers</td>
<td>43/2,598</td>
<td></td>
<td>1.7%</td>
</tr>
<tr>
<td>Tract residents</td>
<td></td>
<td></td>
<td>1.7%</td>
</tr>
</tbody>
</table>

Latinx vs Non-Latinx (PCR+ % among tested)

<table>
<thead>
<tr>
<th></th>
<th>Latinx</th>
<th>Non-Latinx</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(residents + workers)</td>
<td>79/1,427</td>
<td>4/2,091</td>
<td>5.5%</td>
</tr>
<tr>
<td>(residents + workers)</td>
<td></td>
<td></td>
<td>0.2%</td>
</tr>
</tbody>
</table>
PCR+ Cases: Can we rely on symptoms for testing yield?

47% of PCR+ cases were symptomatic

- Cough: 33%
- Muscle Aches: 17%
- Fever: 11%

53% of all PCR+ participants reported no symptoms.
### PCR positive vs. negative: Work Impact

<table>
<thead>
<tr>
<th>Can work from home</th>
<th>PCR+ (n=69)</th>
<th>Overall Tested Residents + Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>7%</td>
<td>45%</td>
<td></td>
</tr>
</tbody>
</table>

| Cannot work from home (still working outside of home, furloughed, unemployed) | 93% | 55% |

People who cannot sustain their income while sheltering in place are disproportionately represented in the PCR+ cases.
Viral genomic diversity among polymerase chain reaction (PCR)–positive participants
Summary of Mission Study

• Over 2 percent of persons tested, that live or work in a Mission census tract are PCR+, 6 weeks into shelter in place.

• COVID-19 infections (multiple strains) are distributed unevenly within the community and over half of active infections are asymptomatic.

• Low wage, LatinX community members unable to shelter in place, living in high-density housing are most highly affected.

Chamie, Marquez, Havlir, et al. Community Transmission of Severe Acute Respiratory Syndrome Coronavirus 2 Disproportionately Affects the Latinx Population During Shelter-in-Place in San Francisco. CID August 2020
Impact of Findings

• Need for more low barrier testing in San Francisco
• Symptomatic testing insufficient to detect infection
• Loss of wages is a barrier to testing
• Job loss is a barrier to testing
• Model for other communities

New Mission Test site
New testing criteria
*“Right to Recover” legislation
“SAFER act” proposed
National and international requests for Mission study approach

*Introduced and shepherded by Supervisor Hillary Ronen, partner in Unidos en Salud
Thank you for Supporting Umoja Health

Led by Dr. Kim Rhoads
Why are we doing what we are doing?

Umoja Health Goal:
To increase COVID-19 testing participation in Black/African American communities testing in Oakland
1) Coalition – community led
2) Wrap-around services
3) Data to inform public health
4) Building trust & partnerships for the future
California launches new 'health equity metric' focused on disparities of COVID-19 impact

The first-in-the-nation approach is designed to focus on the disproportionate impact that coronavirus is having on California's most disadvantaged communities.
Four Bay Area counties fall short of new coronavirus equity metrics needed to advance reopening.

Equity Metrics: Toward A More Effective And Inclusive Pandemic Response

Priya B. Shete, Jason Vargo, Alice Hm Chen, Kirsten Ribbins-Domingo

FEBRUARY 3, 2021

10.1377/hblog20210202.251805
The UC Health & CDPH COVID Modeling Consortium unites UC investigators and California public health leaders in a forum to help guide policy decision-making during the COVID-19 pandemic.

The consortium aims to facilitate direct, timely engagement and conversation between policymakers and investigators, with bi-weekly discussions focused on high-priority topics such as vaccinations, health equity, economic impact, challenges of new variants, and epidemiological forecasting and nowcasting.

To learn more or join the conversation, please email us: UC Covid Modeling@ucsf.edu.
### Increase in observed versus expected deaths for selected occupations

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooks</td>
<td></td>
</tr>
<tr>
<td>Packaging/filling machine operators</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous agricultural workers</td>
<td></td>
</tr>
<tr>
<td>Bakers</td>
<td></td>
</tr>
<tr>
<td>Construction laborers</td>
<td></td>
</tr>
<tr>
<td>Production workers</td>
<td></td>
</tr>
<tr>
<td>Sewing machine operators</td>
<td></td>
</tr>
<tr>
<td>Shipping, receiving, and traffic clerks</td>
<td></td>
</tr>
<tr>
<td>Grounds maintenance workers</td>
<td></td>
</tr>
<tr>
<td>Customer service representatives</td>
<td></td>
</tr>
<tr>
<td>Chefs and head cooks</td>
<td></td>
</tr>
<tr>
<td>All workers</td>
<td></td>
</tr>
</tbody>
</table>

### NOW ELIGIBLE

**Food and Agriculture**

- Grocery Store Workers
- Restaurant Workers
- Farmworkers
- Food Supply Chain

#SBCountyTogether

Protecting Our County Through COVID-19
Taking Vaccine to Where the Virus Is—Equity and Effectiveness in Coronavirus Vaccinations

Kirsten Bibbins-Domingo, MD, PhD, MAS¹,²; Maya Petersen, MD, PhD³; Diane Havlir, MD²
Geographically targeted COVID-19 vaccination is more equitable and averts more deaths than age-based thresholds alone

Elizabeth Wrigley-Field1,2, Mathew V. Kiang1,4, Alicia R. Riley3, Magali Barbier1,7, Yea-Hung Chen5, Kate A. Duchowny6, Ellicott C. Matthay2, David Van Riper2, Kirithana Jegathesan1, Kirsten Bibbins-Domingo3, Jonathon P. Leider1

COVID-19 mortality increases markedly with age and is also substantially higher among Black, Indigenous, and People of Color (BIPOC) populations in the United States. These two facts can have conflicting implications because BIPOC populations are younger than white populations. In analyses of California and Minnesota—demographically divergent states—we show that COVID vaccination schedules based solely on age benefit the older white populations at the expense of younger BIPOC populations with higher risk of death from COVID-19. We find that strategies that prioritize high-risk geographic areas for vaccination at all ages better target mortality risk than age-based strategies alone, although they do not always perform as well as direct prioritization of high-risk racial/ethnic groups. Vaccination schemas directly implicate equity of access, both domestically and globally.
Vaccinate more in places hard hit by COVID-19

**Concentrating Vaccines in Neighborhoods with High Covid-19 Burden**

Rachel J. Stern, MD, Henry F. Rafferty, MS, MPA, Anna C. Robert, RN, MSN, DrPH, Cathy Taniguchi, RN, MSN, MPH, Blake Gregory, MD, Elaine C. Khoong, MD, MS, Margaret Handley, PhD, MPH, Lukejohn W. Day, MD, Ellen Chen, MD

DOI: 10.1056/CAT.21.0056

**San Francisco Incident Covid Cases by Zipcode (left) vs Neighborhood Distribution of SFHN COVID Vaccines (right)**

Source: SF Dept Public Health, SFHN electronic health record

NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society
Partner with local community leaders/organizations

- Trusted messengers and community mobilization
- Addresses access & hesitancy
- Unidos en Salud in Mission District SF
  - Vaccinating 400/day
  - "overflow" + van -> direct referral 200/day

Estimated percent of residents that received at least one dose of vaccine, by race/ethnicity:

- American Indian or Alaska Native: 90%
- Asian: 81%
- Black or African American: 70%
- Hispanic or Latino/a, all races: 82%
- Native Hawaiian or Other Pacific Islander: 90%
- White: 68%

All residents vs. Residents 65+
Still more work to do....
What are the elements of an equitable pandemic response?

- Recognition that equity is a moral imperative \textit{and} critical to effectiveness
- Partnerships
  - Community partnerships
  - Multi-sector coalitions
  - Academic- public health
- Data to inform policy
- Metrics and accountability
“....the answer to the question as to how to prevent future outbreaks...is quite simple: education, together with its daughters, freedom and welfare.

However, in practice, it is more difficult to see how this *social* problem is to be solved. For let us be perfectly clear, we are confronting the fundamental problem of attempting to understand those factors which have made us what we are and which will determine our future.

Rudolf Virchow (1849)