



Combatting COVID-19: Why Community-Based Case Investigation and Contact Tracing is Crucial

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Introduction

Case identification and contact-tracing, coupled with effective support to assist families in effective case isolation/quarantine, are crucial components in efforts to minimize spread of COVID-19 infection and to gradually “open up” different areas of the state after the initial wave of the COVID-19 pandemic has been reduced.

The public health system does not currently have adequate capacity to do this and is now seeking to rapidly build it. But it faces challenges in building the capacity to rapidly and reliably conduct case investigation and contact tracing in low-income minority and immigrant communities as it works to meet Governor Newsom’s ambitious objectives with systematic, evidence-based steps to suppress COVID-19 throughout the state.

Rapid and accurate identification of incipient “hot spots” - nascent networks of COVID-19 resurgence - are essential because there will be subsequent waves in the pandemic. Unless California develops the organizational capacity to rapidly and reliably identify and map networks of COVID-19 transmission in low-income minority and immigrant communities, they will continue to be disproportionately impacted by COVID-19 and slow progress for the entire state.

We explain how a Community-Based Case-Tracing Program component in the state’s case investigation and contract-tracing initiative can contribute to accelerating statewide progress while, at the same time, improving accuracy/reliability of data secured in the process. This paper then continues to explore the challenges to be confronted in recruiting, training, and deploying the case-investigation/contact-tracing workforce needed to function effectively in minority and immigrant communities.

We also explore how a Community-Based Case-Tracing Program could play a valuable and expanded role in efforts to actively combat the pandemic, going beyond the traditional implementation of case investigation, contact-tracing, and standard information-and-referral networks so widely used in public health to rapidly delivery “navigation” help, direct



support/assistance, and health-related advice and rapidly identify specific nodes of COVID-19 transmission across the broad spectrum of California’s diverse populations and communities .¹

Adapting standard case investigation and case-tracing design to assure efforts will go well in minority communities already suffering from disparities in access to health care is a wise investment in both short-term and long-term.

This “working paper” incorporates information from rapidly-evolving epidemiological analysis and incorporate insights from presentations by teams in Massachusetts and San Francisco regarding the challenges they’ve faced in their initial efforts and what’s been learned so far in case investigation and case-tracing, as well as on discussions with advocates, health professionals, social service providers, and community organizers with experience working in low-income immigrant communities. We will continue to closely track developments in epidemiological modeling, clinical research, ongoing refinements in strategy, and update our analysis periodically.

Strategic Context: Case Investigation/Case-Tracing As A Key Element in The Overall Battle to Contain COVID-19

On May 4, California Governor Gavin Newsom announced the overall framework for the state’s ambitious efforts to increase the size of the case investigation/contact-tracing workforce needed to respond to “hotspots” of COVID-19 re-emergence as more businesses resume operations and as “stay at home” restrictions are loosened. The objective in Phase I of this strand in the comprehensive state strategy is to rapidly mobilize 10,000 case-tracers and, possibly, move on subsequently to expand to a workforce of 20,000 in Phase II. The state will support training provided through an on-line Academy with some ‘in-person’ supplementary content. Workers will be recruited from furloughed or volunteer government workers

However, as of May 1, only 22 of California’s county health departments were engaged in active case-investigation/contract-tracing and many of those had backlogs due to limited staffing. Augmenting county public health departments’ current professional staff with large numbers of newly-recruited workers is essential. But diligent management attention will need to be given to the need to develop a new organizational culture—working faster, rapidly brainstorming, testing, and implementing new procedures, etc.

In order to effectively combat COVID-19 resurgence in the neighborhoods and populations most at risk, the implications of health care disparities in the real-world, day-to-day life of communities, have to be considered up front. Communities with concentrations of low-income

¹ Standard information-and-referral systems will not be optimally effective, for example, in rapidly providing case isolation or quarantine options for individuals in low-income overcrowded households where “isolation zones” cannot be viably established (i.e. where multiple individuals share a small bedroom or sleep in common spaces in a housing unit and use the same bathroom)—in part because such space is not currently available. In the current crisis, cross-agency integration will be crucial. Delayed response is not useful. The mean duration from infection to symptoms is 4.6 days and cases are resolved—by recovery or turning serious within 7-14 days.



families of minorities and immigrants are ones that have been recognized to have pervasive disparities in access to health care. These communities also often have housing, employment, and resource shortfalls which mitigate against easy solutions.

Building the capacity to better address these issues into the statewide network of county public health programs COVID-19 surveillance and rapid-response efforts is essential, not just as an immediate investment in May-June, 2020, but in order to “reopen” after the large initial wave is overcome.

We believe a Community-based Case Investigation and Contact Tracing system is required for this to happen; and that it is also necessary *as part of* a sustainable strategy to combat COVID-19 resurgence over the next 2 years.²

The Case for Addressing Health Disparities Up Front, As Part of COVID-19 Strategy

There is growing evidence that there is a very elevated level of COVID-19 infection among racial/ethnic minorities. Analysis also shows a disproportionate share of case fatalities within the working-age minority population. It is clear that special efforts to combat COVID-19 will be needed in communities with concentrations of low-income minorities, and immigrants.³ Without provisions to rapidly discern, map, and control outbreaks of COVID-19 in these communities, there will be dire consequences both for vulnerable families and California’s overall population and economy.

Public sector capacity to rapidly and effectively conduct case investigation and contact tracing in low-income neighborhoods with concentrations of minorities and immigrants is not a small “marginal” problem. The Public Policy Institute of California has estimated that almost four in ten Californians (36.9%) live in poverty or near poverty.

Latinos and immigrants are over-represented in the population living in poverty, in areas where access to COVID-19 testing has been least available, and where those without legal status and mixed-status families are less likely to make regular visits to health care providers, less likely to have health insurance coverage, and who have only very limited access to CARES Act COVID-19 relief.

² There is currently some optimism about rapid development of a COVID-19 vaccine, but experience has shown that actual research and development efforts take longer than hoped for. Improved treatment options will not decrease the urgency of rapid response to “hot spots” of COVID-19 resurgence because ongoing clinical research suggests that COVID-19 has more serious consequences than initially believed. It is becoming clear that bad outcomes are not confined to the elderly and/or those with co-morbidities and can seriously impact the working-age population.

³ Presentation by Sergio Aguilar-Gaxiola, Director, UC Davis Center for Reducing Health Disparities, UCSF Institute for Global Health Sciences Webinar, May 5, 2020. See also <https://www.latimes.com/california/story/2020-04-25/coronavirus-takes-a-larger-toll-on-younger-african-americans-and-latinos-in-california>



At the same time, crowded housing greatly increases the likelihood of within-household transmission among sub-populations of low-wage immigrants employed in essential businesses—e.g. farmworkers.

Many of the “hot spots” of COVID-19 resurgence throughout the rest of 2020 and on at least into 2022 are likely to be in these neighborhoods and communities and at the workplaces where their residents are employed.⁴ As we have seen already in meatpacking plants and as we are beginning to see in crop agriculture, low-wage immigrants in workplaces where social distancing provisions are lax are particularly vulnerable.

Four out of five (79.6%) of California’s low-income minority and immigrant families are working poor—whose overall exposure to COVID-19 has been and will continue to be particularly high because so many are employed in essential businesses.⁵ While “community transmission” may be the primary risk factor for COVID-19 infection faced by most Americans, workplace transmission can be expected to be a major component of overall COVID-19 spread in these communities.

Employment in these communities is often concentrated in low-wage jobs in industries where the nature of work makes social distancing difficult. As an NPR reporter put it, “It’s not possible to pick strawberries on Zoom”. Moreover, “informal” working arrangements are common in many immigrant workplaces. Work is often not structured in a standard way and supervisors have latitude to adopt and refine or, more often, simply not give much attention to social distancing.

Moreover, in these industries, many employers, under intense economic pressure from the pandemic, are reluctant to invest in making the changes necessary to reduce workplace transmission of COVID-19 or are unprepared to make substantial changes in longstanding work practices. The smaller employers, many of them marginally profitable before the pandemic, many having had difficulties in securing loans from the CARES Act small business program, will not be consistently proactive and/or diligent in adopting new approaches to COVID-19-related workplace safety

In order to help reduce current and future COVID-19 transmission in the workplaces where less-educated, limited-English immigrant workers are concentrated, public health departments will need to engage more proactively and creatively than ever before. Worksite posters, translations of simplistic, summary CDC and OSHA guidelines, and facility inspections of facilities, the

⁴ A Harvard team of epidemiologists project recurrent peaks of COVID-19 resurgence possibly continuing through 2024. See Kissler et al, “Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period” Science, April 14, 2020. <https://science.sciencemag.org/content/early/2020/04/24/science.abb5793>

⁵ See Public Policy Institute of California, “Who’s in Poverty in California” <https://www.ppic.org/interactive/whos-in-poverty-in-california/> See, also, Sarah Bohn, Caroline Danielson, and Tess Thorman, “Poverty in California”, July, 2019, <https://www.ppic.org/publication/poverty-in-california/>



standard tools of public health interventions to enhance workplace safety, will not be as effective as they need to be.

Social distancing guidelines are only effective if they are well-formulated and routinely implemented. Similarly, reliance on personal protective equipment, daily screening of workers, and related measures can only have an impact if they are diligently designed and implemented.⁶

Requirements for Rapid Response to Outbreaks of COVID-19 In Low Income, Minority and Culturally Diverse Communities

California is the paradigm case of a state with big pockets of low income, minority and culturally diverse communities. One tool needed for rapid response is more testing (using PCR-based tests in parallel with antibody-based tests to overcome limitations of each). A robust and reliable testing program can guide targeting of rapid-response. However, a still more important tool for actually minimizing transmission and rapidly stamping out “hot spots” is case investigation and contact-tracing linked to delivering help to affected households.

Accurately mapping networks of COVID-19 transmission, identifying nodes in local communities’ transmission networks, and the sub-populations affected, are needed as a basis for tailoring assistance to the distinctive needs of different kinds of individuals and households, and segments of the low-wage workforce, and delivering that help rapidly.⁷

Effective response also requires working toward a deeper understanding of the dynamics of transmission—due to distinctive aspects of workplace organization that affect transmission risk, community social interactions (beach-going in Southern California, for example), and housing infrastructure (household size, crowding, composition in “complex households”, prevalence and type of sub-standard, unconventional hidden housing). There will also need to be more attention to the dynamics of COVID-19 transmission between workplace and home and from home into the workplace—just to the overall panorama of ways in which social distancing and sheltering in place reduce transmission. Interactions between each of these “sub-domains” of social and economic life varies from community to community and better understanding of variations is a critical element in “design thinking” to develop optimal interventions.

Consequently, beyond the general challenge of rapidly building overall state-level organizational capacity to conduct the level of case-investigation and contact-tracing needed to permit systematic opening-up of counties, states, and regions of the U.S., there needs to be focused attention to the demands of case-tracing in these communities with linguistically and culturally

⁶ Atul Gawande stresses this point in his important analysis of quality assurance in hospitals and other health care settings in his influential book, **The Checklist Manifesto** (2009).

⁷ Case investigation and contact-tracing needs to go beyond observed patterns in datasets derived from PCR and/or antibody-based testing to characterize the distinctive circumstances of transmission in specific outbreaks. In the Smithfield outbreak among meatpacking workers, for example, it turned out that one factor in rapid spread was a well-known back door to the plant where workers could avoid pro-forma front-door screening.



diverse populations; where housing conditions might not be ideal for isolation or quarantine; and where healthcare access might be (or has been) constrained for some individuals.⁸

To ignore the special demands placed on efforts to conduct effective case investigation and case-tracing in these communities, proceeding to do it in a standardized way without adaptation to local context, will not be advantageous either to the community itself or to California as a whole.

Thus, it will be crucial to build into the state's case investigation/contact-tracing initiative the following objectives, in order for it to function effectively:

- Recruiting and training a linguistically and culturally diverse workforce of grassroots community service providers and activists who can reach out in each of California's diverse communities to rapidly contact and establish rapport with sub-groups who are already under stress and resistant to communication with "outsiders";
- Developing local consortia that can efficiently integrate case investigation and contact-tracing with practical advice, so as to streamline the challenging process of securing temporary housing for self-isolation or self-quarantine of COVID-19 infected and/or exposed individuals living in low-income overcrowded households;
- Enhancing standard contact-tracing by reliance on the cultural and social capital of community contact-tracers to allow rapid and reliable identification of nodes in diverse social networks and workplaces where COVID-19 is particularly prevalent
- Including mechanisms to mobilize the resources needed for rapid-response where patterns of transmission are identified that warrant special attention – e.g. where case clusters of COVID-19 are observed among farmworkers, day-laborers, hospital support staff, or home health care workers
- Providing opportunities for case investigators, contact-tracers, and navigators recruited from low-income communities to move onward and upward in public health careers.

Public health experts are very conscious of the need to conduct COVID-19 surveillance effectively in socioeconomically disadvantaged neighborhoods and communities but there remain huge challenges in rapidly overcoming the obstacles that must be faced in creating that capacity and achieving those goals.

However, case investigation and contact-tracing is not necessarily easy or straightforward in diverse communities, especially immigrant ones that are particularly distrustful of outsiders--given the current immigration enforcement climate and apprehension regarding potential federal

⁸ The utility of proximity-based contact-tracking technology has been debated at length—but "human intelligence" will be needed even if automated contact-tracking is widely accepted by the public because assessment as to whether proximity constitutes a "contact" generates many "false positives" and inconsistent use of cellphones will generate "false negatives".



mis-use of confidential data.⁹ “Trusted voices” are more important than ever at this point in time as part of efforts to secure, accurate, complete information on sensitive issues.

Community “insiders” often can move forward more rapidly than “outsiders” in conducting interviews to explore the configuration of the diverse networks of social interaction or economic interaction that determine patterns of personal contacts in low-income areas, especially in immigrant communities. They can often elicit more reliable information. Informants reached by contact-tracers immersed in community life may more easily be prompted to accurately recall contacts from some contexts (like personal friends and families) than others (i.e. workplaces).

By relying on their cultural and social capital as an applied research tool, community case-tracers, can more rapidly and adequately understand/interpret the contextual elements of information elicited from informants either in the case investigation phase and the contact-tracing phase of interviews. This, then, allows more rapid and more sophisticated description of potential transmission hotspots and provides a sounder basis for formulating hypotheses regarding COVID-19 transmission in the context of a local socioeconomic set of inter-related networks while, at the same time, crafting more viable intervention strategies.

For example, the central role played by networks of *paisanos* from Mexican sending villages in linking geographically-separated workplaces into a single network within which COVID-19 may be transmitted is not well understood by outsiders and, practically-speaking, details of network configuration are not easily accessible to outsiders.¹⁰

Incorporating a community-based COVID-19 case investigation/contact-tracing program into California’s newly-initiated case-tracing initiative will enhance the strategic effectiveness of these efforts.¹¹ Beginning in the summer of 2020 and onward, beefing up community-based resources can make it possible to rapidly reach and communicate with low-income immigrant

⁹ There is widespread concern, for example, about potential use of DACA applicants’ personal information submitted to USCIS for enforcement purposes. Parallel concerns persist about mis-use of data collected in Census 2020 and use of social service program data in review of eligibility for green cards (although DHS has stated it will not use information on services accessed during the COVID-19 pandemic in its review of family visa applications).

¹⁰ We are currently exploring the role “invisible” social geography may be playing in emergence of a “hot spot” of COVID-19 infection in Marion County, Oregon, a destination for many California-based Mixtec and Triqui migrants going to work in the berry harvest. For details on these inter-state linkages, see Ed Kissam, “21st Century Rural Life at the End of the Oregon Trail: Global Migration and Economic Change In Woodburn, Oregon”, Report of the New Pluralism Project, Aguirre International, 2006. Understand the dynamics of inter-state migration throughout the Pacific Seaboard region will enhance the efficacy of the tri-state regional compact to align California, Oregon, and Washington COVID-19 strategy.

¹¹ Governor Newsom announced the initiative in his May 4, press conference on COVID-19 strategy. Summary descriptions have been published in several news outlets. See, for example, <https://www.politico.com/states/california/story/2020/04/27/how-californias-contact-tracing-army-could-serve-as-model-for-nations-reopening-1280023> More detailed discussion of details of some key elements were provided by the UCSF pilot team in their April 29, 2020 webinar.



and minority households at very high risk of burgeoning COVID-19 infection, due to working in “essential businesses” such as agriculture and health care and living in overcrowded living situations.¹²

How Community-Based Case Investigation and Contact Tracing Enhances COVID-19 Containment Strategy

All COVID-19 epidemiological models imply that “opening up” in order to resume business and social interaction after a jurisdiction has been successful in “squashing the curve”, i.e. achieving a real-time reproduction rate (R_t) that is sustainably below 1, will require a systematic process for refining interventions – a process that includes rapid deployment of case investigation/contact-tracing teams in addition to easier access to PCR-based diagnostic testing, and antibody-based testing to determine actual prevalence.

Each of the epidemiological models is also clear in projecting that there will be secondary waves of COVID-19 resurgence in hard-to-predict “hot spots” Consequently, a crucial objective will be rapid mobilization to initiate case identification, contact-tracing, and intervention so that new cases will rapidly self-isolate and persons who have been in close contact with an infected person will self-quarantine and that those with more infrequent and/or not such close contact will, at the very least, be particularly vigilant for COVID-like symptoms.¹³

The epidemiological modelling also indicates that this organizational capacity will need to be sustained and, hopefully, enriched by lessons learned in the course of implementation, for an extended period of time: 18-24 months. Even after a vaccine is developed it is reasonable to expect, based on long-term experience, that vaccination will proceed slower and more unevenly in the medically-underserved communities so that surveillance, relying on case investigation and contact tracing to achieve maximum precision to control outbreaks will be needed.

Governor Newsom and all public health experts agree that the strategy for “opening up” areas of California so as to resume business activity and community social life needs to be systematic and evidence-based—based on counties being able to meet scientifically-determined criteria for moving forward.¹⁴ Governor Newsom’s strategy requires counties to develop effective plans to meet broadly-accepted criteria for relaxing social distancing requirements.

¹² Nationally, about one-third of farmworker households are crowded. In some areas of California such as Monterey and Santa Cruz counties, 93% of farmworkers live in crowded housing and one-third in extremely crowded housing. See Ed Kissam, “Why Special Help To Farmworker Families In Crowded Housing Is So Important As Part of Overall Strategy to Suppress COVID-19”, WKF Fund Working Paper, April 7, 2020.

¹³ Speed is crucial because one of the components of the basic reproduction rate in an epidemic is the duration during which an infected person is in close contact with others.

¹⁴ The original plan, “National Coronavirus Response: Roadmap for Reopening” was detailed and specific. This original plan articulated by Scott Gottlieb and his colleagues at the American Enterprise Institute has, however, been



One of the criteria for these plans is that they will need to include implementation approaches that assure counties' case investigation and contact-tracing efforts will be able to rapidly respond to outbreaks of COVID-19 wherever they occur – i.e. including in neighborhoods, or entire communities with concentrations of low-income minority households and county sub-regions with distinctive business patterns such as labor-intensive agricultural production.¹⁵

Given the mounting pressure and social and political divisiveness of provisions for “opening up” different geographic areas and different locales in communities, surveillance will be most effective if it goes beyond standard contact-tracing to rapidly garner evidence of “transmission nodes” that result from non-compliance with mandated social-distancing within the social and business dynamics of diverse communities. This will enable not only early intervention with people, but potential modification of practices that will enable businesses or social interaction to continue. Ideally, case-tracing can be the springboard for enhanced epidemiological analysis by providing insights on the dynamics of contact nodes.

Another set of issues it will be crucial to carefully address are the challenges stemming from respondents' negative reactions to being contacted by a government employee. Inner city parents may be apprehensive about contacts with official agencies due to problematic interactions with local police or Social Service agency workers. In rural areas, there may be concerns about contacts from county government in a central location.

We are already hearing concerns in immigrant communities about sharing confidential personal information due to worries that ICE may somehow be involved. These sorts of concerns inevitably arise in the context of contact-tracing. However, distrust of government is now extremely high, undermining the credibility of standard and powerful assurance of confidentiality that previously were adequate—especially in Latino immigrant communities.¹⁶ Familiar “trusted voices” are more necessary than ever before. Contact tracers will have to be

replaced by a subsequent official roadmap (“Opening Up America Again”) which is notable in that the specific criteria originally articulated have been re-framed into vague generalities that will allow relatively arbitrary determinations by governors regarding “opening up”. Even that roadmap is crumbling as the White House announced on May 5 that it plans to disband the national Coronavirus Task Force.

¹⁵ A current harbinger of the challenges that lie ahead in relation to business/workplace patterns of COVID-19 transmission is a current COVID-19 outbreak in Monterey County where agriculture, an essential business has a major presence. Despite the local agricultural industry being more proactive in efforts to address the risks of workplace transmission and to collaborate with county public health officials in efforts to provide field hospital capacity, it was both unfortunate and predictable that there would be problems. Employer guidelines developed by the Strawberry Commission are promising—but still imperfect. And as shown by recent research (California Institute of Rural Studies, 2018) farmworker housing in the Salinas area is extremely crowded.

¹⁶ We conducted extensive research on this question as part of our assessment of Census 2020 response among Latino immigrant communities. Our research and parallel research by the Census Bureau, Pew, and others shows that generalized distrust is very high in minority communities. Even well-supported assurances of confidentiality are heavily discounted. There is also analytic evidence that distrust of anti-immigrant efforts under the 287(g) program affected use of public program by legally resident Hispanics and citizens even though it could not actually impact them.



well versed and skilled and trusted to navigate this razor edge between extensive elicitation of information on an individuals' activities, assurances about commitment to protection of confidentiality. Still more sensitive and potentially volatile discussions will be required in some cases in order to provide the necessary support for families at risk.

Teams will need to be able to successfully move quickly to establish the rapport that is needed to elicit thorough and reliable information on COVID-19+ individuals' interactions throughout the period they have been infectious while, at the same time, securing insights about the social/business context of those interactions. For example, as noted in critiques of efforts to rely only on cellphone-based contact-tracing, the question as to what constitutes a "contact" is not always straightforward (since type and context of interaction matter) and eliciting reliable information is, inevitably, challenging.

Consequently, there is an urgent need to recruit and deploy a contact-tracing workforce that is ethnically and linguistically diverse and feels at home in the community they work in—*because contact-tracing will not be effective unless contact-tracers can rapidly establish rapport with infected individuals, reliably elicit thorough details about their contacts during the period in which they were presumed to be contagious (both the pre-symptomatic period of about 5 days and the period during which they were symptomatic).*¹⁷

Ideally, the workforce recruited for a California Community-Based COVID-19 Case Investigation and Contact-Tracing Program would be diverse not simply in terms of language and cultural competency but, also, include workers drawn from diverse sociological sub-groups within each ethnic population. These might, for example, include: community activists who can gain the trust of their peers and communicate effectively with them, middle-aged locally well-known community activists, Chicanos/Chicanas and, also, Mexican and Central American immigrants from indigenous communities (e.g. Mixteco/as, Zapoteco/as, Kanjobal, Mam), African-American church leaders, and youth program counselors/leaders, Hmong elders, DACA recipients, and other immigrant community members under-employed or unemployed due to COVID-19 disruption.

Technical training to assure the integrity and reliability of case identification, contact-tracing, data collection, reporting and adherence to protocols to safeguard privacy is, of course, crucial. But this technical competency can be developed rapidly. The UCSF pilot model, for example, consists of rapid online training followed by practicum. *However, the optimal strategy is not to attempt to train "mainstream" health professionals to communicate effectively with communities they are not part of but, instead, to give priority to training community members to become "barefoot public health researchers".*

¹⁷ Recent papers suggest that SARS-CoV-2 infected individuals may have peak infectivity immediately before and soon after they become symptomatic, with infectiousness actually decreasing during the course of their illness.



Building on Traditional Case-Tracing Approach To Create a More Comprehensive Initiative to Contain COVID-19 Spread

Traditional public health contact-tracing efforts can and should be enhanced and expanded. A Duke University expert report very practically summarizes the optimal strategy as including the following strand of linked activities:¹⁸

1. Rapid Response: Capacity for Isolation, Contact Tracing, and Quarantine

- a) *The capacity to isolate new cases and trace, test, and quarantine contacts rapidly*
- b) *The capacity to treat new COVID-19 cases effectively, at home or in a hospital*

The approach recommended by these experts recognizes that contact-tracing is not an isolated endeavor but that it must be linked to organizational capacity to intervene so as to rapidly isolate new cases, in addition to tracing, arranging for testing, and quarantining their close contacts as needed.

Self-isolation or quarantine is challenging in low-income communities of immigrants and native-born individuals working in low-wage essential businesses. The widely-reported difficulties faced by hospital personnel exposed to infection who responsibly decide to isolate themselves from their families are serious—but these challenges are still more serious for low-wage workers who lack savings. Many heavily-exposed medical personnel, for example, have moved to live in hotel accommodations.

Low-income crowded households where a household member is infected will need help so that the individual ill with COVID-19 can rapidly find safe living accommodations where their condition can be monitored in case it worsens.¹⁹ Resolving multiple problems related to self-isolation or self-quarantine is not easy for families that lack the financial resources to secure quarters for effective quarantine or isolation and lack the experience and/or English-language skills to navigate the bureaucratic maze for getting into temporary lodging.

A high proportion of COVID-19 cases are unobserved. Some unobserved cases are genuinely asymptomatic but others are individuals who were symptomatic and ignored minimal symptoms as well as those who experienced more evident, but relatively mild, illness, but could not get

¹⁸ Mark McClellan et al, “A National COVID-19 Surveillance System: Achieving Containment”, Duke University Margolis Center for Health Policy, April 7, 2020.

¹⁹ Recent research indicates that COVID-19 infectiousness may be highest immediately before and immediately after symptoms appear. Therefore, minimizing delay in actually self-isolating can make a significant contribution to decreasing in-home transmission in crowded households. For example, assuming a peak period of infectiousness of 1 week, accelerating isolation/quarantine by 2 days can be expected to reduce within-household transmission by more than 30% since transmission is a function of duration of close contacts, as well as frequency and type of contact.



access to PCR testing. There is reason to believe that this is a particular problem in farmworker and other immigrant households who have been unable to access testing.²⁰ Diligent, culturally-attuned case-tracers can quite probably increase identification and isolation of both the marginally-symptomatic and the presumed but unconfirmed cases.

Case Management and Navigation Assistance as an Integral Component of Contact-Tracing

California’s case-investigation and contact-tracing efforts should include case management workers whose roles are visualized as working in the team to address immediate priorities—most obviously, to rapidly assist isolate newly-infected individuals in finding temporary lodging for self-isolation and to rapidly quarantine their contacts as well.

However, as clinical experience in treating COVID-19 evolves and provides additional insights, the case management responsibilities of community-based case investigators and contract-tracers and case managers might usefully be expanded to include roles in providing supportive advice, health care and coaching as part of very practical strategies to minimize COVID-19 transmission.

In these communities which have, typically, had constrained access to medical advice and treatment, case managers or “community navigators” may be called upon and will need to be prepared to initiate discussions with exposed but infected family members about minimizing exposure in the future and, in other cases, be prepared to discuss accessing followup care. There is both a need and an opportunity to provide the initial cadre of case investigators and contact-tracers recruited from minority communities with career pathways that allow them to stay on board and develop their health-related knowledge and skills via in-service learning programs.

CDC guidelines and pamphlets about “zone isolation” for infected individuals need to be supplemented with practical workarounds in crowded, “complex households” (i.e. multiple family/economic groups or individuals living under one roof). Counseling will be needed for families confronting both economic stress and health care for family members suffering from COVID-19. What resources are available to get healthy food or avoid eviction? What can be done to manage children who may not have access to online learning or who are not accustomed to it? When should a COVID-19-infected mother self-isolate or quarantine herself even if it places difficult burdens on her spouse or other children? These questions and many others will surely arise.

This sort of expansion from the immediate rapid-strike crisis response of building core teams of case investigators and contact-tracers to evolve into a more comprehensive strategic

²⁰ Virtually all California farmworkers are immigrants (95%) and about two out of three (70%) lack legal status. Aside from the economic challenges they face, getting access to COVID-19 testing has, in many areas, required referral by a physician. However, a high proportion of farmworkers (30%), for example, have not visited a primary health care provider during the 2 years before they were interviewed by National Agricultural Worker Survey interviewers. Many will encounter difficulties in securing a provisional COVID-19 diagnosis and access to testing in areas where testing is limited. In other cases, PCR testing may be available but not nearby, making access difficult for those without transportation.



interventions could and should also include enhanced COVID-19 health education and recruitment of outreach workers to assure a representative population sample for assessing COVID-19 prevalence since refusals can lead to sample bias that undermines the reliability of surveillance findings. As the multi-decade experience with community health clinic teams of *promotore/as* shows, these roles can be filled by individuals with a foundation of sound communication and self-management skills and enhanced as time goes along with in-service learning opportunities.

It will also be useful to draw on case-tracers' communication with infected individuals and their contacts to gain crucial insights about contexts in their workplaces, day-to-day social interactions, and home life where social distancing is particularly likely to fail and where the risk of SARS-CoV-2 transmission is particularly high. Examples might include, the small local grocery store which lets in people without masks, congregations of workers waiting to receive their weekly check from a farm labor contractor, or lunch break areas with little shade, or converted garages where a large crew of workers share an undivided living/cooking/sleeping space without separate bathroom facilities.

The community-based case investigator or contact-tracer may well be the only person who finds out about these distinctive contexts where the likelihood of close contacts can be ameliorated. By being able to incorporate their understanding of the dynamics of community life into their case-tracing work, locally-knowledgeable case-tracers will be able to more rapidly elicit a finely-textured map of an infected individual's contacts, including information on type, closeness, frequency of contacts.

In addition to providing insights about COVID-19 transmission in the broad context of day to day real-world life in communities with concentrations of minorities and immigrants, case investigators and contact-tracers drawn from the local community will also be needed to build on the insights from what they learn in investigations and to actively collaborate with and coach employers to take meaningful steps that will reduce workplace transmission of COVID-19.

Piggybacking Enhanced COVID-19 Health Education and Problem-Solving Advice Onto A Community-Based Contact-Tracing Program

California's contact-tracing initiative will need not only to rapidly and definitively identify the contacts of confirmed COVID-19 cases but, also, engage in outreach to identify the contacts of unconfirmed but potential/presumed COVID-19 cases. This outreach provides an opportunity for flexible, highly-effective health education delivery in the course of the case-tracing outreach.

An important reason why such health education is necessary is that the standard "generic" core messaging of CDC messaging cannot effectively mitigate transmission in crowded households. For example, the standard guidance regarding in-home self-isolation is infeasible for crowded households so health education outreach will only be effective if it goes beyond the formal, official information provided in fact sheets, pamphlets, or online web pages to assist low-income families in actually coming up with effective "self-isolation" or "self-quarantine" plans.



The experience in community organizing efforts, including for example, voter registration and promotion of census participation, as well as in field research as part of survey and/or ethnographic research in immigrant and farmworker communities, is that the greatest portion of costs stem from the efforts needed to establish contact with hard-to-reach individuals. Once contact is established, engaging in additional communication is relatively cheap and can actually reduce the perceived “burden” of standard survey response.

It is optimal for case-tracers to be prepared to answer some of the questions from the persons they contact and refer them to knowledgeable professionals for answering others. In either case, conversations will need to go beyond simply delivering information onward to provide problem-solving support, advice, and encouragement to worried, demoralized, and stressed individuals and families.

By preparing contact-tracers to engage in conversations with family members in immigrant and other low-income minority households with little access to online information resources and limited experience in assessing personal health risk can, it is possible, as part of epidemiological surveillance, to also contribute practically to impacting beliefs and aspirations, thereby enhancing behaviors that contribute to reduced transmission.

Community-based Case Investigators and Contact-Tracers Can Help Improve Sample Representativeness in Population Screening to Determine COVID-19 Prevalence

Population screening to determine prevalence and patterns of infection is one of the essential tools in strategic efforts to combat the COVID-19 pandemic. Although there is currently a great deal of concern about the reliability of antibody-based testing due to recent reports of problems with both test specificity and test sensitivity, a still more critical and neglected requirement for eventual reliance on serological testing as a key element in opening up areas of the country is that it is essential to assure a representative sample for population surveillance. Quite probably, the optimal population screening strategy will include efforts to over-sample some relatively small sub-populations in order to permit adequate analysis of patterns of COVID-19 infection among such sub-populations where prevalence may be higher than others. The case investigation and community-tracing workforce can play an important role in these efforts.

Standard “cookie-cutter” online or phone survey approaches are suspect when used as the basis for recruiting volunteers for testing from immigrant and other low-income minority households.²¹ The ideal sampling approach to assure representativeness is, as was the case in

²¹ Research on differential undercount in the decennial census (Kissam 2017; Kissam, Quezada, and Intili 2018, Kissam 2019) shows, for example, that reliance on administrative records as a sampling frame would generate a sample that seriously under-represented immigrants and Native Americans. Online surveys are especially problematic because so few low-income households have in-home online access. In an environment where undocumented immigrants are constantly concerned about “the gaze of surveillance”, extraordinary steps to build trust with interviewers is crucial to minimize refusals and to assure sample representativeness. See anthropologist Lynn Stephen (Transborder Lives) for a brilliant explanation of this aspect of the context of indigenous Mexican immigrants’ lives in the contemporary era. An earlier analysis by anthropologist Phillipe Bourgeois (1990) describes similar dynamics in the “underground economy” in urban New York City.



Vo', Italy, to work hard to secure close to a 100% sample (in Vo' about three-quarters of the town's population received initial PCR testing and subsequent re-testing).²²

But that is not feasible in many cases. Iceland recently reported success in a survey of a relatively small random sample as part of national population screening effort to determine prevalence of COVID-19 (despite the problems inherent in relying on PCR-based testing for that purpose).²³ It is possible that their sample was, in fact, representative given the homogeneity and small size of Iceland's population. However, in the case of California where there is a very high level of population diversity, there is a pressing need for effective support in implementing surveillance so as to avoid sample bias.

There is already good evidence, for example, that local prevalence may be much higher in some sorts of communities and neighborhoods than others.²⁴ The findings from the UCSF pilot of a PCR-testing efforts in the San Francisco Mission District show a very high incidence of COVID-19 infection (1.4% or 1,400/100K population). The reliability of the finding is bolstered by the team having been very successful in testing a high proportion of the total population in the study area (57%)—by forging a partnership that included extensive use of community volunteers.²⁵

There is some evidence that the prevalence of COVID-19 is quite similar in rural areas. For example, as of May 5, the County of Monterey's COVID-19 update showed that 80% of confirmed COVID-19 cases in the county had been from Salinas Valley communities with concentrations of farmworkers. Moreover, 86% of the confirmed COVID-19 cases were among persons under 65 years of age and that more than one-third (37%) were in the 18-34 age range. The extent to which COVID-19 infection stemmed respectively from workplace, community, or in-home transmission is unknown, but the overall conditions are clearly conducive to rapid and widespread spread.²⁶

Riverside County's May 7 update shows 71 confirmed COVID-19 cases in the Eastern Coachella Valley communities of Mecca, Thermal, Oasis, and North Shore—a confirmed case/population

²² Cristani et. al, "Suppression of COVID-19 Outbreak in the Municipality of Vo, Italy", April 18, 2020
<https://www.medrxiv.org/content/10.1101/2020.04.17.20053157v1>

²³ "Spread of SARS-CoV-2 in the Icelandic Population", NEJM, April 14, 2020
<https://www.nejm.org/doi/full/10.1056/NEJMoa2006100>

²⁴ The constraints on the reliability of tabulations of PCR-based testing in conditions when access to testing is not universally available EW well-understood. However, even given these distortions in estimates of the prevalence of COVID-19 in different communities throughout California.

²⁵ Elizabeth Fernandez, "Initial Results of Mission District COVID-19 Testing Announced: Initial Results of Mission District COVID-19 Testing Announced: Latinx Community, Men and Economically Vulnerable Are At Highest Risk"
<https://www.ucsf.edu/news/2020/05/417356/initial-results-mission-district-covid-19-testing-announced>

²⁶ <https://www.co.monterey.ca.us/government/departments-a-h/health/diseases/2019-novel-coronavirus-2019-ncov/2019-novel-coronavirus-2019-ncov-local-data>



ratio for that sub-county farmworker community area of more than 500 confirmed case/100K more than double the county-wide one.²⁷

Culturally-sensitive case-tracing will be needed to detect these variations and rapidly suppress “hot spots” of re-emergence in community contexts with higher-than-average levels of undetected/unreported infection.

California’s population screening will need to minimize refusals by distrustful individuals who are part of the random sample—especially those in mixed-status households. Arguably, a California COVID-19 Community Corps workforce can, in addition to case-tracing in low-income minority communities also serve as a cadre supporting surveillance by successfully convincing survey respondents in the population sample to participate (which will, presumably, involve some significant level of engagement to actually get a blood sample drawn for an antibody test).

Conclusion: Incorporating A Community-Based Case-Tracing Program Into of California’s COVID-19 Rapid-Response and Suppression Strategy

Case investigation and contact-tracing is labor-intensive. But, at the same time, moving ultra-rapidly is crucial. It can be assumed that each infected person infects about 3 additional people during the period they are infectious.²⁸

It is extremely good news that California is moving forward very rapidly to launch the statewide case investigation/contact-tracing component of its overall strategy. However, it will be challenging to build system-wide capacity to rapidly respond to COVID-19 outbreaks in communities with concentrations of low-income minority and immigrant families.

Building consortia based at community/migrant health centers (FQHC’s) is an attractive way to rapidly build the organizational capacity and labor force of culturally/linguistically competent community-outreach activist needed. California already has an extensive network of

²⁷ <https://www.pe.com/2020/05/07/riverside-county-coronavirus-cases-up-to-4756-deaths-now-at-192/>

²⁸ There is a wide range of estimates of R_0 for SARS-CoV-2 because of inherent data problems (e.g. proportion of unobserved cases, variations in criteria for reporting cases). There is, also, consensus that the real-time reproduction rate in the COVID-19 pandemic (R_T varies from one national/social/community context to another and from one stage in an outbreak to another and effectiveness of social distancing protocols. We assume that the COVID-19 reproduction rate in low-income communities where crowded housing is prevalent and where high proportions of adults are working in “essential businesses”, e.g. farmworker communities, is higher than elsewhere in California. At the same time, California’s aggressive efforts in social distancing appear to have decreased the component of R_t stemming from infection in the course of random social contacts. A serious and systematic problem in estimating prevalence COVID-19 and, then, estimating R_T in farmworker communities is that currently PCR testing is not uniformly accessible, serological testing is not available, and issues in estimating prevalence based on observed incidence are inescapable.



experienced community-based health care outreach workers among the community/migrant health centers, the FQHC's. They can provide an initial platform for launching community-based case-tracing. *Promotora/es* at the community clinics can be quickly and reliably trained to take on the additional responsibilities of COVID-19 contact tracing, case identification health education, and case management in moving infected or exposed individuals into isolation or quarantine.

The Johns Hopkins Center for Health Security report, the Massachusetts Partners in Health initiative, and the UCSF pilot case investigation and contact-tracing effort all agree that, although medically-trained and other college-educated professional personnel are now being relied on for contact tracing, lay people can also be successfully and rapidly trained to fulfill these roles. A person with a high-school education, if well-trained, diligent in eliciting and recording information, good in communicating, and computer/database literate, could fill this sort of role well.

It deserves note in passing that California has already invested very heavily in community-based outreach networks to promote Census 2020 participation. The plan was for these networks to do outreach that included both phone banking and door-to-door canvassing. The door-to-door canvassing activities were seriously constrained by the March 18, shelter-in-place mandate but the phone banking efforts are still underway. These provide a supplemental organizational resource for recruiting potential case-tracers. Other social, educational, and community-organizing programs can also be tapped as sources for rapidly recruiting workers who come with already well-developed skills in communicating with "hard to reach" households.

In the San Joaquin Valley, for example, the Sierra Health Foundation has drawn on these networks to serve as intermediaries in getting philanthropy-funded assistance to low-income immigrant and non-immigrant households affected by the pandemic. These organizational networks—that are already in place—are another platform for jumpstarting efforts to build into the overall initiative being implemented by county public-health agencies, a solid program of community-based case investigation and contact-tracing.

There are still other potential organizational and institutional resources for California to draw on in recruiting case-tracers who have the language and cultural competency to rapidly and effectively conduct case-tracing in minority and immigrant communities in California. For example, in agricultural regions of the state Migrant Education staff (including both professional counselors and paraprofessionals) and Migrant Headstart staff represent a workforce of experienced individuals communicating routinely with families who are not easily reached by outsiders.



Staffing Level for A California Community-Based COVID-19 Case Investigation and Contact-Tracing Program

California currently plans to recruit, train, and mobilize a workforce of 10,000-20,000 case investigation and contact-tracing workers. Clearly, the ultimate staffing requirements will depend the extent to which current efforts to maintain social distancing are successful.

Diminished political and public support for the state’s current stay-at-home and other social distancing measures is worrisome—because most models of the COVID-19 trajectory show clearly that reduction is very sensitive to both the duration and the specific provisions for social distancing.²⁹ Most models indicate that if compliance even with relaxed social-distancing and other provisions designed to reduce COVID-19 transmission are not complied with there will be widespread resurgence. This suggests that the eventual case investigation/contact-tracing workforce may need to be closer to the higher end of the range (20,000) than the lower.

If, as the current patterns of COVID-19 incidence observed in urban areas (San Francisco and Los Angeles) and rural areas (Monterey County/Salinas Valley and Riverside County/Coachella Valley) indicate, California’s case investigation/contact-tracing ends up requiring frequent and extensive rapid-response to “hot spots” of resurgence in low-income minority communities, community-based case-investigation and contact-tracing in those communities will need to be a major part of the overall statewide effort.³⁰

UCSF and Massachusetts planners concur in expecting that, after “opening up” the average number of contacts per case will increase; however, they also agree there is still a lot of uncertainty to what extent.

Nonetheless, it is reasonable to expect that the average number of contacts among low-income working poor households will be higher than the average for the general population. Often, couples both work to earn enough income to support themselves. And the types of jobs available to less-educated workers often involve a relatively high amount of close contact. In some cases, as for example, in farm labor contractor crews and day-labor workers employment, a good deal

²⁹ The Reich Lab at the University of Massachusetts provides very good summary documentation of the assumptions underlying a range of COVID-19 models. It should be noted that the projections of the IHME model have been recently revised in part to account for relaxed shelter-in-place provisions and in part to move toward a “hybrid” formulation incorporating SEIR into the earlier curve-fitting analytic approach and that the national and California state projections were dramatically revised upward (to a national projection of 134,445 cumulative deaths and 4,666 deaths in California) <http://www.healthdata.org/covid/updates>

³⁰ The extent to which tabulations of confirmed cases in the population undercount actual cases is unknown and surely varies from one community to another but it is inevitable that such tabulations result in differential undercount of low-income households with bread-winners working in an essential business since so many do not have a regular health provider to refer them and face additional economic and transportation barriers to accessing PCR testing.



of mingling of diverse social networks—making it likely that tracing the intersections of these networks will be very time-consuming.

If California goes forward to implement a “comprehensive” community-based case investigation and case-tracing program as recommended here, that includes case management support to actually move infected individuals in crowded households into case isolation rapidly, health education discussion in the course of contact-tracing, and additional assignments in recruiting participants for surveillance via serologic testing, taking this well-justified and important step forward would imply the need for an even higher contact-tracer/population ratio.

The case investigation/contact-tracing efforts in both Massachusetts and in the UCSF/San Francisco pilot indicate that a case investigator/contact-tracer ratio of about 1:5 seems to work well. Contact-tracing training is being rapidly refined to work well in preparing non-medical personnel to work as case-tracers. Both in Massachusetts and in San Francisco, the project teams are incorporating lessons learned so far (in the 1st month of their efforts!) into ongoing effort toward continuous quality improvement. This is very promising. However, further work will need to be done in order to accelerate case isolation/quarantine in these very low-income communities where most housing is crowded.

Timeline

Reducing the real-time COVID-19 reproduction rate in California to 1 simply achieves the goal of “flattening the curve”. Achieving this objective does not do anything to move the state toward “opening up” since it only implies a steady state of cases. Even if R_T is greatly reduced, it will take months to get to the point where there are few enough current COVID-19 cases that full-fledged “opening up” is consistently viable.³¹

With the current pressure for phased “opening up” and uneven ability to assure that even relaxed social-distancing guidelines are followed, it is likely that summer and fall, 2020 will necessitate a number of rapid-response missions. Community-based contact tracing can accelerate that timeline by facilitating rapid response in “hot spots” in low-income communities with concentrations of immigrant and racial/ethnic minorities.³²

³¹ One team of modelers estimate that in some states social distancing has not reduced R_0 very far below 1. One state estimate, for example is 0.8. In large, diverse, states such as California, given the variations in observed incidence, i.e. confirmed case/100K, it is likely that R_0 is still above 1 in some areas of the state and that, in others, it will be very sensitive to specific local provisions vis-à-vis re-opening, as well as extent of compliance.

³² Because R_0 is context-sensitive, many analysts make reference to R_t —“real time reproductive rate”. They have studied how its value varies over time as different social distancing measures are adopted or abandoned. A good discussion can be found in Mary Hui, “ R_t : The number that can guide how societies ease coronavirus lockdowns”, Quartz, April 8, 2020. A closely-related concept, R_{eff} , refers specifically to modulation of R_0 due to herd immunity and is not currently very relevant—except perhaps in New York City and other areas with very high prevalence.



There is virtually no likelihood that the state, or any state, will reach the point of herd immunity before a vaccine is developed. Therefore, it is likely that a California community-based case investigation and contact-tracing program will need to be in place for at least 18-24 months, although the workforce size could be allowed to decrease based on monitoring of COVID-19 prevalence once serological testing has become reliably and widely available since that is a key factor in preparing for rapid response to “hot spots”.

Consequently, efforts to share lessons learned in the course of deploying the sort of enhanced contact-tracing and case isolation used to effectively reach low-income minority and immigrant communities will provide valuable input to ongoing work to refine the initial approaches being used. If California moves forward to implement its overall “opening up” strategy as part of a Pacific Seaboard regional effort, together with Oregon and Washington, provisions for inter-state exchange of insights, problem-solving, and peer technical assistance might also be helpful.

Inter-Agency Coordination to Integrate Community-based Case Investigation and Contact-Tracing Into State-County Partnerships For COVID-19 Response

Governor Newsom’s over-arching approach to suppressing the COVID-19 pandemic in California via state-local partnerships will inform implementation of the case-investigation and contact-tracing component of the state’s strategy. The “platform” for statewide implementation will be local county public health departments while UCLA and UCSF will collaborate in providing technical training to newly-recruited workers—presumably drawn from local areas wherever possible.

This suggests that inter-agency collaboration can be easily facilitated if county public health departments to reach out to a range of potential local partners in different local jurisdictions to recruit and train the necessary workforce. The first step can be reaching out to a range of potential partners with particularly solid track records and close relationships with different constituencies/service populations within their jurisdiction. It should be clearly recognized that the most critical organization and individual competencies are not health-specific knowledge but, rather, experience and efficacy in reach and communicating well with hard-to-reach households.

In visualizing sub-populations to reach, “community” should not be defined exclusively in racial/ethnic terms but, rather, include attention to the configuration of the diverse array of social networks in each area and throughout the state.

A community-based initiative will work best if it is recognized that partners can and should include, in addition to the community health centers, other social service and education providers who have developed special relationships with sub-groups in a local community; as well as employer or industry groups. It is in everybody’s interest, if a pattern of transmission erupts in a particular type of industry or under specific social contexts, for the state to work with stakeholders to limit future hotspots.



About 4.6 million Californians live in “mixed status” households.³³ Special attention should be given to inclusion of immigrant-serving organizations since these households are likely to be particularly distrustful of strangers.

Additional consideration should be given to integrating organizations that have a special relationship with a linguistically/culturally defined community throughout the state or a region of the state.³⁴

By drawing on their knowledge base of “cultural capital” and “social capital” derived from being participant-observers engaged in day-to-day in the social and economic networks that prevail in local community life, they can very rapidly interpret/analyze the implications of information drawn from individuals interviewed in each case/contact investigation.

Configuring case investigation/contact-tracing efforts to take advantage of these insights that community-based workers can generate as part of mapping transmission in the distinctive domains of local workplaces, housing, and community social life has the promise of making it possible to dramatically accelerate design of effective interventions to reduce community transmission of COVID-19.

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