California has committed itself to a bold and wise strategy to combat the COVID-19 pandemic: a strategy oriented toward “suppression”, not simply “mitigation”.1 The strategy is based on aggressive social distancing as a means of decreasing R₀ (the basic reproduction ratio of the pandemic -- average number of new infections from each infected person).2

Urgent Need for A Detailed Strategy To Combat COVID-19 in the Farmworker Population

California Governor Gavin Newsom’s Executive Order of March 18, 2020 requiring statewide shelter-in-place had to include provisions for continued work in “essential” industries. Understandably, agriculture is one such industry, as is the health care system and other parts of the food system. At the same time, provisions for families to “shelter in place”, means that non-working farmworker family members, like other Californians, should stay at home, and that coronavirus-infected individuals with only mild symptoms should self-isolate at home, while being as careful as possible not to infect family members.

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1 This distinction – between mitigation and suppression - articulated by Imperial College COVID-19 modelers, shaped Governor Newsom’s COVID-19 policy, as well as influencing national strategy in the U.K. and the U.S. (Ferguson et al 2020) In subsequent testimony to Parliament on March 25, 2020 Ferguson spoke to what could be expected from social distancing. He stated that social distancing policy (now in place based, in part, on his model of pandemic spread) would likely result in a major reduction in estimated fatalities in Great Britain—to “only” 20,000 deaths.

2 The R₀ for SARS-CoV-2 has been estimated as being in the range of 2.2-2.4, but experience in the European context has led to a revised higher estimate of 2.5. Social distancing needs to bring the R₀ below 1 to control the epidemic. Former CDC Director, Thomas Frieden stresses the need to configure social distancing to the distinctive mode of transmission of a disease in a particular cultural context. Well-known examples are the role that funeral practices played in transmission of Ebola in West Africa. (Frieden and Lee 2020) The epidemiology of the HIV pandemic is another case where strategy to reduce transmission required careful attention to social, socioeconomic, and cultural behaviors that determined rate and patterns of transmission.
We’re All In This Together

California cannot succeed in its battle to suppress COVID-19 unless it brings statewide coronavirus transmission down from the currently estimated $R_0$ of 2.2-2.4 to below an $R_0$ of 1 to halt the pandemic’s exponential growth. But in actuality the level of transmission for any jurisdiction is made up of individual transmission rates within diverse communities and populations.

Even if the COVID-19 transmission rate is lowered in suburban and rural areas, but remains high among farmworkers, the counties where labor-intensive agriculture is a major industry will lose part of their workforce and likely would become the “hot spots”, epicenters for ongoing spread of coronavirus.³

Statewide Strategy Now Needs To Be Tailored to California’s Diverse Populations and Local Communities

Meticulous and “customized” steps to suppress transmission of COVID-19 among California farmworkers, their household members, neighbors, extended family members, and others, in communities with concentrations of farmworkers, are particularly crucial because the broad federal program to provide economic support and cover the costs of COVID-19 treatment for “all Americans” provides only a tattered safety net for many farmworker families, and the pressure is on farmworkers to work in order to survive, no matter the conditions or how they feel. Farmworkers take their role in putting food on America’s tables seriously; and also they have to work in order to provide food and shelter for their own families.

In particular households of undocumented immigrants and mixed immigration status households face unmanageable challenges.⁴ If a breadwinner becomes even mildly ill, household economic

³ About 35 of California’s counties are ones where agricultural production is a major industry. California County Agricultural Commissioners’ reports for 2015-2016 show California agricultural production of over $56 billion per year. A major sub-state region of concern is the San Joaquin Valley with 9 counties where agricultural production is worth more than $1 billion/year. Much of this production is labor-intensive. The other leading sub-state agricultural production region is the Central Coast (Santa Cruz, Monterey, San Luis Obispo, Santa Barbara, and Ventura counties). As of March 28, 2020 there were 260 COVID-19 cases in the San Joaquin Valley counties and 300 cases in these Central Coast counties.

⁴ Richard Mines’ 2017 Salinas-Pajaro Valley survey (California Institute of Rural Studies, April, 2018) provides the most recent and detailed data on demographics of California farmworkers (and his sample appears to be representative of the statewide population). His data show that 83% of the farmworker households are ones with families in them, countering the common misconceptions that most farmworkers are solo male migrants. Mines’ household composition data also shows that although most California farmworkers have lived a long time in the state about two-thirds of all households appear to be mixed status. The last opportunity for many to secure legal status—IRCA—was more than 35 years ago. The undocumented person in the farmworker households is usually a working parent while most children are U.S.-born (about 9 out of 10). In many of the seasonally-unemployed farmworker households both spouses work. Loss of income from either is a blow and in these “working poor”
security is threatened; and if a family member’s mild case requires intensive medical care, the family will be saddled with an unbearable burden of debt. This is not too distinct from the conditions of other people living in poverty in the US. But many of the other people are sheltering in place; farmworkers are not, so at the moment they are more at risk. Given the prevailing housing and living conditions farmworkers live in, the likelihood of limiting transmission is low – so if one person in the household contracts the virus, it is unlikely to stop there. The best strategy to protect farmworkers and their families from COVID-19 is to prevent them getting it.

California has to take a crucial next step, then. This step will be to dedicate specific attention to the nature of communities in which those doing essential work live and work as the framework for refining and advancing strategy. The crucial step will be to refine the state’s general approach to COVID-19 suppression, providing resources and strategies that take into account the distinctive characteristics of social and economic interactions for different populations and communities. Epidemiological expert Paul Delamater and his colleagues explain,

*Estimations of the R₀ value are often calculated as a function of 3 primary parameters—the duration of contagiousness after a person becomes infected, the likelihood of infection per contact between a susceptible person and an infectious person or vector, and the contact rate—along with additional parameters that can be added to describe more complex cycles of transmission. Further, the epidemiologic triad (agent, host, and environmental factors) sometimes provides inspiration for adding parameters related to the availability of public health resources, the policy environment, various aspects of the built environment, and other factors that influence transmission dynamics and, thus, are relevant for the estimation of R₀ values.*

**A Focused Strategy to Decrease COVID-19 Among Farmworkers and Their Families**

Carefully considering the dynamics of the COVID-19 pandemic and how to reduce R₀ can yield valuable implications for practical strategies for farmworkers, their supervisors, their families, farm labor contractors and growers:

**Duration of contagiousness** can be reduced by improving farmworkers’, their co-workers, their supervisors, their employers’, and their families’ ability and willingness to rapidly recognize symptoms that potentially indicate COVID-19 infection, and by providing access to and encouraging the seeking of advice/testing and to rapidly secure a diagnosis. Enhanced, widely disseminated, interactive advice—not just bureaucratic posters, pamphlets, and web pages with “basic facts”, is needed.

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families, if a breadwinner requires hospitalization for COVID-19 (typically more than a week) the household cannot possibly pay medical costs themselves.

Likelihood of infection per contact between a susceptible person and infection person can be addressed by rapid provisions to make masks (and/or perhaps other protective gear such as face shields), nearby handwashing facilities, sanitary wipes etc.) readily available to workers, especially those involved in tasks where social distancing is more difficult (e.g. field packing, packing sheds, closely-spaced harvesting, checking-in field workers’ harvested fruit or vegetables). Guidance can seek to encourage employers to give careful attention to the types of interactions between workers determined to be COVID-19 positive and others in the workplace to make decision as to whether self-quarantine is required.6

Contact rate can be reduced by workplace social distancing protocols tailored to the specific interactions in workplace tasks. This will work best if the specific workplace protocols are developed for diverse crop-tasks (e.g. cutting asparagus, picking strawberries, picking cherries, thinning apricots, harvesting apples). Reducing contact rate in the agricultural workplace will also require broad attention to the entire workplace environment: social distancing in transportation to/from work, in-field tasks, on work-breaks, in distributing paychecks.

California’s strategy in its battle against COVID-19—indubitably the correct one—has major implications for California’s 1.5 million farmworkers and family members. Because farmworkers continue to work they face the risk of in-workplace infection. At the same time, farmworker families face the risk of in-home infection if a family member is infected by COVID-19 and required to self-isolate at home. Ignoring the actual real-world environment in which farmworkers work and live or accepting it, because of some interpretation of what ‘essential work’ means, jeopardizes the health and resiliency of these workers, their communities, and the state itself with all the rest of our communities.

Moving From The Status Quo Toward Decreasing Transmission of COVID-19 in Agricultural Work

The basic assumption underlying “shelter in place” as the primary driver for social distancing to reduce COVID-19 transmission is to decrease transmission by reducing opportunities for infection from casual contact. Provisions to minimize within-workplace transmission has, correctly, received much attention vis-à-vis health care workers; and, encouraging news from, public health expert Atul Gawande, is that very detailed workplace procedures have been used by Singapore health-care providers, and reports are that they had no cases of COVID-19 infection among them.

6 At this point, the quality of agricultural industry associations’ guidance to their members varies significantly. A good example of practical guidance meant to encourage good decision-making has been disseminated by United Fresh. In contrast, guidance from the Western Growers’ Association is incomplete and misleading, providing little or no encouragement to proactive and effective policies to minimize exposure. News stories confirm that workplace safety provisions are uneven.
Mitigating the workplace risks faced agricultural workers requires the same attention as that being given to health care workers. As yet, though, strategies for achieving this in other essential industries such as agriculture has been uneven. Resources from employers, local governance and state governance need to be directed here. Surely it may not be possible to totally eliminate risk—but risk can certainly be dramatically reduced. Universal attention to CDC guidelines and adoption of those related to social distancing in the workplace are obviously a crucial first step—but more needs to be done.

**Strategy for Reducing Workplace Transmission Needs To Involve All Stakeholders**

Effectively decreasing COVID-19 in the agricultural workplace will not work if it’s assumed to be the responsibility of any single stakeholder.

Agricultural producers need to be proactive and innovative. Farm labor contractors who supply about one-third of California’s farm labor will need to be proactive and expect their producer-customers to collaborate with them to reduce transmission among workers. Producer and farm labor contractor associations and worker unions will need to overcome their longstanding conflicts and jockeying for advantage to focus on the specific task at hand—defeating COVID-19.

Agricultural workers themselves will need to exert peer pressure to urge co-workers to be vigilant to potential COVID-19 illness, to follow social distancing guidelines, even when inconvenient, awkward.

And local and state governance will need to work closely and collaboratively with these groups to ensure the access to health care, health management and health sustaining resources that only they can free up and make available in geographically remote areas.

Producers, contractors, supervisors, crewleaders will need to be prepared to engage in social distancing even if it involves lower production rates and potential reduction in profits or earnings. Payment for tasks typically paid with a piecerate component might, for example, be adjusted to encourage slower, more careful work.

California’s current requirements for field sanitation are basically sound—but it is not clear whether compliance is even across farms, crop-tasks, or geographic areas—particularly vis-à-vis provision of easily-accessible handwashing facilities that are so necessary to conform to CDC recommendations. There are toilets, for example, but how often are they cleaned; and how many people have to use the same one. Additionally, it is likely there is also a lot of variation in the

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specific arrangements for water, a concern being social distancing at such “high traffic” locations within the workplace (e.g. a common water container where workers might congregate or individual water containers?) There have been reports of sanitizer being made available in some contexts; but sanitizer does not necessarily work with dirt-laden hands. So easy access to soap and water—not just at toilets— is key.

Areas where workers can take work-breaks are also an issue—since social distancing will not be possible if there’s too little shaded area; not enough chairs or tables for lunch, etc. If, as is sometimes the case, checks are distributed from a crewleader’s truck in the parking lot of a corner store, it will be important to keep people from bunching up. Loading lettuce or some other crop on a truck is another place where individuals and crews converge.

Beyond the specific provisions is the question of which employers are required to comply. A serious hole in the “safety net” provided by the Families First Coronavirus Response Act (FFCRA) for farmworkers and their families is that employers with 50 or fewer employees can seek exemption from emergency sick leave/family leave provisions if this would “jeopardize” the viability of the business as a going concern”. Small agricultural employers and contractors should be made to understand that the genuine business risks they face do not justly compromising their workers’ well-being. An important function of the emergency sick leave provisions in FFCRA is to encourage workers not to go to work when they suspect they may be sick – and the same for supervisors and growers/contractors/ride providers

It is important to recognize that the federal legislation, despite its shortcomings, does provide strong incentives to employers to provide their workers with emergency sick leave—via tax credits. It is just as important to note that the business risks in addition to the ethical risks of not engaging in maximum efforts to minimize workplace transmission of COVID-19. If a worker on a crew is infected with COVID-19 it will almost certainly be necessary for all the workers who have had close contact with that worker to be quarantined.

David Brooks pointed out recently in talking about national COVID-19 strategy and the dangers of delays in recognizing and addressing the severity of the pandemic that the historical experience with epidemics is that “over-reaction” is well-justified and that even over-reaction may be too little. Agricultural employers should recognize that “generosity” in helping their workers confront the challenges of COVID-19 is not simply the decent thing to do but that it is a crucial part of pursuing their own self-interest.

**Beyond “Health Information” to Impact Attitudes, Aspirations and Behavior to Decrease COVID-19 Transmission**

In particular, health education—not just basic information but advice to farmworkers trying to understand how to confront the specific risks they face—e.g. what to do if a nearby co-worker

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8 PBS News Hour, 27Mar2020.
seems sick, what to do to avoid exposure in crowded vans or cars while going to/from work—while, at the same time, continuing to work if they want.

Farmworkers, most of them with relatively little formal education, need assistance in interpreting what is known about COVID-19 transmission and risks—in particular about incidence of mild vs. serious disease (81% mild, 19% serious), implications of hospitalization if their condition worsens, risks of transmission from asymptomatic individuals (about half the risk of transmission from symptomatic individuals but still significant).

They need advice, guidance, counseling to translate unanchored information into an action plan that will work given their personal circumstances. To accomplish this it will be necessary to quickly set up and staff phone hotlines—possibly staffed by community health centers—to provide sympathetic, bilingual assistance both in decision-making and in navigating the bureaucratic jungle that must be traversed to secure medical care and financial assistance if they are out of work—due to becoming ill themselves, or due to self-quarantine orders, due to their employer laying off workers or decreasing hours or if they need to care for a family member.

While interactive advice is necessary, it is also important as a practical first step to disseminate easily-understandable material for farmworkers to refer to in seeking to navigate their way forward. A good example is a Spanish-language CRLAF guide about both COVID-19 and provisions of the FFCRA legislation (https://www.crlaf.org/coronavirus). Video materials with basic information about COVID-19 transmission in the most commonly spoken indigenous languages in California farmworker communities began to be disseminated on March 26 (https://mycielo.org/resources/)

It must also be recognized that the agricultural workplace cannot simply be conceptualized as the physical environment where workers do their jobs. The “agricultural workplace” in California differs from mainstream ones in the way workers are recruited, transported to and from work, and supervised and, in some cases, housed (e.g. where a farm labor contractor or employer houses lone male workers together in barracks or other “unconventional” housing), where they do their laundry and eat. Decreasing within-workplace COVID-19 transmission needs to address each of these “micro-domains” that affect social interaction, exposure, hygiene, and, ultimately, the efficacy of self-quarantine and self-isolation. Transportation to and from the fields is a particular concern, because many farmworkers do not drive their own cars to work but, instead, ride in a van with a raitero or carpool with friends or neighbors or other co-workers. These are exactly the kinds of nodes where distinct social networks intersect and where “super-spreader events” are most likely.

The prevalence of farm labor contracting stems in part from the fact that crews can be moved from one establishment and crop-task to another. Crew size may vary from contractor to contractor and from crop to crop. But in every case, there are increased occasions where disparate social networks make contact and where, as a result, transmission risk is heightened.
It is also important to consider the possible implications of labor shortages in agriculture—given the fact that COVID-19 strategy seeks not simply to minimize social contact within social networks, e.g. of friends and neighbors, but also to decrease mixing of diverse social networks (since network theory implies that linkages between multiple social networks increases transmission within the entire constellation). The possible implications of bringing in new workers to a particular production site as the available labor force at that site is eroded by COVID-19 infection is a concern due to the fact that farm labor contractor crews may inadvertently become “super-spreaders” as separate social network intersect.

**Decreasing In-Home Transmission of COVID-19 Among Farmworker Families**

Home isolation ideally entails at least two bedrooms and two bathrooms. Thus, the concept of “shelter in place” is, unfortunately, most effective for affluent families living in single-family homes that allow them ample economic and physical space to establish “isolation zones” for family members with mild COVID-19 infections. CDC recommendations are for a COVID-19 infected person to be housed in a bedroom of their own with a door that can be shut and use a bathroom of their own. Food is to be left at their door and contact with family members and/or caretakers should be very limited.

“Sheltering in Place” presents formidable challenges for farmworkers because of the prevalence of crowded housing. The most recent available data from the National Agricultural Worker Survey shows that 30% of farmworkers in the Western Stream (California, Oregon, Washington) live in crowded housing, that is, housing with more than 1 person per room. While more than half (58%) live in a single-family home—which is usually crowded—another 26% live in an apartment, and 13% live in a trailer. Consequently, housing accommodations are very problematic. There has, justifiably, been concern about the risks of COVID-19 transmission in the living quarters provided to H-2A workers. These concerns are merited but the housing-related risks faced by local workers are just as serious.

It is, also, clear that there are variations in extent of crowded housing from community to community. An in-depth study of farmworker housing in the Salinas and Pajaro Valley areas

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11 Susan Gabbard and Daniel Carroll, “Recent Changes in U.S. Agriculture and Crop Worker Characteristics”, Presentation to 2020 Forum for Migrant and Community Health”, February, 2020
conducted by longtime farm labor researcher Richard Mines provides valuable insights for considering COVID-19 in-home transmission issues in a major agricultural production area.\textsuperscript{12}

There was an average of 2.3 persons \textit{per room} (double the threshold for a dwelling being considered “crowded”).\textsuperscript{13} Overall, 93\% of the farmworkers lived in housing that was—by standard definition—“crowded”. Almost one-third (29\%) lived in housing with more than 2.5 persons per room. During peak harvest season, housing becomes still more crowded as migrants arrive; 15\% of the households had more than their usual residents at some time during the year—sleeping in the living room, garage, hallway, closet, or kitchen.

Bathroom crowding is another issue. The farmworker housing had, on the average, 5.3 persons \textit{per bathroom}. The shortage of bathrooms was most marked in households where families rented out space to others and in households of indigenous farmworkers. Obviously, COVID-19 self-isolation provisions are infeasible in communities with this kind of housing.

A Fall, 2018 survey of Latino immigrants, most of them low-income, many of them farmworkers, showed that in the San Joaquin Valley region, 20\% of the survey respondents lived in “complex” households or compounds, almost all of which are likely to be crowded.\textsuperscript{14}

We feel it worth repeating to say that the strategies for addressing COVID-19, cannot be to just ignore housing and a farmworker’s life outside the fields. COVID-19 will not be stoppable if this is it. A major priority for COVID-19 strategy in farmworker communities, therefore, is to provide safe, clean, housing for farmworkers or family members from crowded households who are forced to self-isolated because they are suffering from COVID-19. Farmworkers, their families, and employers need both guidance and help with this. Here, the general strategy is the same as in urban low-income areas with high rates of infection. An urgent requirement is to find temporary housing for those who are COVID-infected.

Public health officials and clinicians have begun to stress the importance of surveillance for even mild cases of COVID-19 because it appears that mild cases can rapidly become serious and require immediate hospitalization. Motel and hotel space have great advantages because each


\textsuperscript{13} A 2007 report prepared for the Department of Housing and Urban Development, “Measuring Overcrowding In Housing” discusses standard and alternative indicators of crowded housing. The standard definition is >1 person per room but alternative definitions have been used. The report provides an overview of the correlation between crowded housing and infection disease transmission in the home.

\textsuperscript{14} Edward Kissam et al, “Findings from the San Joaquin Valley Census Research Project”, January, 2019. https://www.shfcenter.org/assets/SJVHF/SJVCRP_Survey_Findings_Report_011819_Web.pdf A particular concern in connection with “unconventional” housing—converted garages, backyard trailers, makeshift add-ons to single family homes is that the renters—relatives, paisanos from a hometown village, recently-arrived solo male migrants—often lack access to standard bathroom facilities.
patient can be isolated in their own living quarters. Possibly, if available, mobile homes or RV’s could be used if necessary, ideally in locations where health care personnel could check in on patients regularly.

Challenges arise in confronting limitations of hospital capacity in rural communities—where one part of efforts to increase capacity to provide care requires the fastest viable discharge of recovered patients. If local hospital facilities become overloaded with serious COVID-19 cases, there are practical and innovative possibilities for combining emergency housing and COVID-related health care support. For example, a recent e-mail communication from an emergency room physician in Louisiana reports that their hospital has begun to contract with a private company so that paramedics could check in daily on patients discharged with only portable oxygen. Presumably, specially and rapidly-trained promotor/es could fill this role. However, given the pace of the pandemic, it is necessary to start immediately—to prepare for expected capacity crises that may only be a few weeks or a month away.

However, efforts to minimize in-home transmission of COVID-19 cannot stop at housing. Simply providing housing for farmworkers and/or family members to self-isolate is not enough. There will also be an urgent need for putting in place the case management supported needed to make arrangements for COVID-19 sufferers to move from their regular homes into self-isolation housing. Families, as well as households that include multiple families and/or unrelated migrant workers lodging with them, will need assistance in navigating whatever organizational or bureaucratic mechanisms are set up to move people into self-isolation. Given the fact that indigenous workers and their families may be limited in Spanish as well as English interpreters will be needed. A key need is health care workers, period. Rural communities often do not have medical services in sufficient supply or with sufficient capacity nearby.

The issue of household composition also deserves special attention and would need to be considered in planning to allow self-isolation—either in self-isolation zones within a household or public facilities. Almost two-thirds of the households in the Pajaro-Salinas Valley study were farmworker households with children. Arrangements to make self-isolation work will need to vary depending on whether a child is ill with COVID-19, a mother/caretaker, or a man who is the principal wage-earner in the household.

Although the COVID-19 pandemic is an emergency and extremely rapid response is required, effective strategy to decrease the frequency of contacts between COVID-19 infected individuals and the types of contacts, will require coordination in efforts to provide health education/advice

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15 A gap in the safety net provided by the Family Coronavirus Response Act is that emergency sick leave must be provided for workers who need to care for their own children but it appears that those provisions do not yet extend to workers who are the guardians of children who may be related but not their own biological sons or daughters. This might, for example, affect households where family members who are not parents take care of unaccompanied Central American minors.
and provision of emergency housing accommodations for infected individuals who live in crowded housing.

Conclusion

Governor Newsom’s recognition that California’s battle against COVID-19 cannot be one based entirely on a “one size fits all” strategy is correct and has many implications. It requires all stakeholders—both public sector and public sector entities—to work together and move forward informally in parallel to take the next steps so as to create customized battle plans that articulate distinct strategies for protecting different and diverse populations of Californians, living in communities with diverse housing infrastructure and local resources.

The planning will also need to give very careful attention to provisions to reduce within-workplace transmission for workers in essential industries such as agriculture and integrate them into the broader “shelter in place” and other efforts to reduce COVID-19 transmission. Speed is crucial—but so is thoughtful and innovative planning and action.

With 700,000 or more farmworkers continuing to work in California’s labor-intensive fruit and vegetable production as the pandemic proceeds, enhanced and specialized protocols to decrease workplace-related transmission will be crucial. The stakes are high. Labor-intensive California agriculture generates more than $50 billion per year in farm receipts. Farmworkers’ earnings will be crucial—particularly with non-essential businesses shuttered—to keeping the economy of hundreds of rural communities functioning. At the same time, the well-being of farmworkers’ family members who do not, themselves, work in the fields, processing plants, or as truck drivers, mechanics or other roles in support of agricultural production, is also crucial. The very high prevalence of crowded housing means that the state will need to define guidelines for and promote development of emergency housing to make self-isolation possible for farmworkers and their families.

Assuring that undocumented farmworkers and their families can secure the economic support COVID-19 impacted households need to survive spells of unemployment, under employment, mandated self-quarantine, or mandated self-isolation is a crucial reminder that California needs to adopt a “Health for All” approach to protect households where a family member’s COVID-19 illness requires costly medical care and a “Help for All” approach to economic security for farmworker households. These provisions are needed not only to pursue California’s

16 CRLAF submitted comprehensive recommendations to Governor Gavin Newsom’s office on March 16, 2020 about the pressing need for economic support to farmworkers and farmworker family members irrespective of legal status. They have, since then, been updated and amplified since the pandemic is moving so rapidly and state strategy is moving forward very rapidly. The federal legislation does not do nearly enough to assure the well-being of immigrants without legal status. See also the analysis by the National Immigration Law Center that includes recommendations for key changes needed in followup legislation, “Short Summary of the COVID-19 Stimulus and Supplemental Funding Bill: CARES Act “, March 25, 2020
commitment to advancing economic justice for all Californians—those who are native-born and those who are immigrants, irrespective of income and immigration status— but, very practically speaking, to effectively combat the COVID-19 pandemic in a real-world battlefield.

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