

2013

California Department of Public Health Interim Guidance:

Prioritizing Populations for Pandemic Influenza Vaccine in California



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I. INTRODUCTION

Background

Pandemic influenza threatens to cause widespread illness and death in California as well as significant economic and social disruption. Immunization is a key prevention and outbreak control measure for decreasing the public health impacts of a pandemic; however, supply is anticipated to be limited initially.

Since one of the characteristics of a pandemic influenza virus is widespread susceptibility in the population, it can be expected that most of the California population will seek vaccination. Two doses of vaccine may be required to ensure adequate protection against the pandemic viral strain. Moreover, it may take between 4 to 6 months after the pandemic strain is identified before any amount of vaccine will be available. Once vaccine becomes available, current federal plans indicate that the US Federal Government will distribute vaccine to states. State and local agencies will then distribute and dispense the vaccine to their residents as quickly as possible.

The California Department of Public Health (CDPH) developed a prioritization strategy to determine how best to allocate this resource as it becomes available. The goal was to develop a consistent statewide pandemic influenza vaccine prioritization policy and practice for California to maximize the acceptance and effectiveness of the vaccine intervention. Refer to Supplement 1 for a list of the CDPH vaccination program goals and objectives.

Guidance Overview

This document provides guidance on pandemic influenza vaccine prioritization to local health departments and tribal entities that is consistent with the US Federal Government's vaccine prioritization recommendations, while accounting for California's pandemic influenza response goals and objectives. This guidance must be flexible as the epidemiology and impact will not be known until the next pandemic occurs. The prioritization recommendations in this document will be updated during a pandemic to reflect developments in vaccine production, the characteristics of pandemic illness, and the health risks that prioritized target groups will face.

This report presents the CDPH vaccine prioritization process, the framework for prioritization, the tiered prioritization lists, the rationale for adapting the prioritization lists based on the severity of the pandemic, and additional guidance for local public health pandemic planners. Refer to the Supplemental Documents 1-4 for detailed information on the CDPH prioritization process.

Vaccine in Context of Other Response Measures

Vaccination represents only one in a series of response measures that will be implemented during an influenza pandemic to minimize the health, social, and economic impacts. Other measures include using antiviral medications; promoting good

respiratory hygiene (washing hands, covering sneezes and coughs); using facemasks and other personal protective equipment in appropriate settings; isolating ill persons and quarantining potentially infected persons; and implementing community containment strategies, such as restricting large public gatherings and cancelling school classes. Because influenza can be spread among people before they show signs or symptoms of illness, vaccination will be the most effective pandemic response measure. However, vaccine will likely not be available until after the first wave of the pandemic. Therefore, it is important to consider the effectiveness of vaccination in the context of these other public health response efforts.¹

¹ Additional information about pandemic planning and response measures is provided at <http://www.flu.gov/#>

II. VACCINE DISTRIBUTION AND VACCINE PRIORITIZATION PLANNING ASSUMPTIONS

Vaccine Distribution

- The federal government will distribute limited supplies of vaccine to states in proportion to states' populations. California can expect to receive approximately 10-12 percent of the U.S. weekly vaccine production.
- CDPH will allocate and distribute vaccine to local health departments in proportion to the local health jurisdictions' populations. Local health officers will have some flexibility in implementing the prioritization guidance to best fit their local situations.
- Within the parameters of the guidance, a small portion of California's vaccine supply may be maintained at the state level for allocation to local health jurisdictions based on specific needs.

Vaccine Prioritization

- The CDPH Vaccine Prioritization Policy will be flexible and responsive to the severity of the pandemic, the characteristics of the virus², the vaccine supply, the effectiveness of the vaccine, and the response needs of the state. Epidemiologic investigations early in the pandemic will help to determine the groups at highest risk for adverse health outcomes.
- Target groups' prioritization rankings will differ by pandemic severity as the need to target vaccine to maintain health care, security, and essential community services differs depending on the severity of the pandemic.
- Occupationally-defined target groups include only those individuals who provide critical services that are essential to maintain during a pandemic, not the entire workforce. These critical workers include personnel performing these duties as part of their normal work functions, those reassigned to perform the function during a pandemic, and those performing the function as a volunteer.
- Identification of critical workers within a target group is the responsibility of the industry sector or organization providing the critical service.
- Family members of frontline emergency responders are not included in the frontline worker target groups. Family members will receive vaccine with the target group they belong to that has the highest priority designation.
- The CDPH vaccine prioritization guidance will be in accordance with, but may not be identical to, the US federal government vaccination program recommendations. The CDPH prioritization process closely resembles the federal process. However, the CDPH guidance includes a greater number of target groups designated for vaccine as well as recommended sub-prioritization within the "federally defined" vaccination tiers.
- CDPH will review and update the prioritization guidance based on changes made to the federal prioritization guidance.

² The characteristics of the virus include the following epidemiologic indicators: transmissibility, virulence, initial geographic distribution, age-specific attack rates, and complication rates.

- CDPH will periodically reassess the guidance to consider potential impacts of scientific advances in vaccine development, improvements in vaccine production capacity, and advances in other medical and public health pandemic influenza counter measures.

III. CDPH VACCINE PRIORITIZATION PROCESS

This section outlines the CDPH vaccine prioritization process that was developed within the context of the US Federal Government prioritization recommendations.

US Federal Government Prioritization Recommendations

In November 2005, the US Federal Government released broad-based national vaccine prioritization recommendations as part of the National Pandemic Influenza Response Plan (Appendix D). These recommendations did not clearly and consistently identify vaccination goals, determine vaccination criteria, and define target groups to be prioritized. As a result, in 2006, the federal government convened an interagency working group with representatives from all sectors of the government to reconsider this issue and in 2008 this working group drafted the US Federal Government Guidance on Targeting and Allocating Pandemic Influenza Vaccine.

The new federal guidance instructs states to follow the federal recommendations, yet it allows for states to *“have some flexibility in defining the target groups and implementing the guidance to best fit their local situations.”* Furthermore, it indicates that *“a small proportion of each State’s vaccine supply will be maintained at the State levels for distribution based on the needs of the jurisdiction”*. It is essential that states develop highly specific prioritization plans that identify occupational categories and sub-categories within each broad priority designation, as well as to select implementation strategies to distribute and administer vaccine to these prioritized groups. Therefore, CDPH developed its own prioritization process to determine which target groups in California will be designated for initial vaccination.

CDPH Prioritization Process-Collaborators

CDPH engaged in a systematic and rigorous process to develop its vaccine prioritization recommendations. The CDPH Immunization Branch (IZB) organized a Joint Advisory Committee on Pandemic Influenza Vaccine and Antiviral Prioritization to assist in identifying the goals and objectives of the vaccine prioritization process.³ In addition, the CDPH IZB in collaboration with the University of California at Berkeley Center for Infectious Diseases and Emergency Readiness (CIDER) developed a formal decision analysis tool to determine which target groups in California should be designated for vaccination.

Decision Analysis Scoring Tool (DAST)

CDPH and CIDER developed the Decision Analysis Scoring Tool (DAST) to simultaneously prioritize multiple target groups for vaccination. The DAST is centered on a self-administered survey instrument, which enables pandemic planners to assess the relative importance of multiple vaccination criteria and evaluate the degree to which

³ This is subgroup of the State Joint Advisory Committee (JAC) comprised of public health and medical care professionals, emergency planners, hospital administrators, physicians, academics, infectious disease experts, and a bioethicist.

the target groups meet these criteria. The DAST survey was administered to 426 statewide pandemic preparedness and response planners in 2006. The DAST survey results served as the basis for the CDPH prioritization lists.

Refer to Supplement 2 for a detailed discussion of the CDPH pandemic influenza prioritization process. Refer to Supplement 3 for a summary of the DAST survey results and conclusions.

Aligning CDPH and Federal Prioritization Recommendations

In 2008, the US Department of Health and Human Services (HHS) and the Department of Homeland Security (DHS) drafted the revised federal strategy for allocating vaccine. In response, the CDPH Immunization Branch aligned the CDPH prioritization recommendations with the federal recommendations to develop the California guidance. The CDPH prioritization process closely resembled the federal process; however, minor adaptations were made to ensure compliance with the revised federal guidance. Refer to Appendix A for a side-by-side comparison of the CDPH and US Federal Government categorized prioritization lists. Refer to Supplement 4 for a detailed discussion of how the CDPH prioritization process was aligned with the US Federal Government recommendations.

IV. FRAMEWORK FOR PANDEMIC INFLUENZA VACCINE PRIORITIZATION

This section outlines the framework of the vaccine prioritization lists, which is based on the US Federal Guidance on Allocating and Targeting Pandemic Influenza Vaccine.

Prioritization Framework Summary

Target Group: Persons targeted for pandemic influenza vaccine based on their age, health status, risk level, and/or occupational role. Every California resident is included in at least one of these target groups.

Category: California target groups are divided into four broad categories (health-vulnerable and general population, health care and social services, critical infrastructure, and homeland and national security) corresponding to the US federal government's pandemic vaccination program objectives.

Tier: Target groups are organized into vaccination tiers, which cut across the four categories. Vaccine will be allocated and administered to target groups according to tiers. Target groups within tiers vary depending on pandemic severity.

Target Groups

Target groups are defined as persons targeted for pandemic influenza vaccine based on their age, health status, risk level, and/or occupational role. The CDPH prioritization list includes 33 distinct target groups. *Every California resident is included in at least one of these target groups.* For individuals who belong to multiple target groups based on their occupational roles and their health status and age, they will be able to receive vaccine with the target group that has the highest priority designation.⁴ Refer to Appendix B for target group descriptions and sample occupations, rationales for target group prioritization rankings, and estimated sizes of the target groups.

Occupationally defined target groups include only persons who are critical for providing essential services during a pandemic, not the entire workforce. The federal prioritization guidance defines “critical workers” by the functions individuals are anticipated to perform over an extended period of time during the pandemic period. Critical workers include personnel performing these duties as part of their normal work functions, those reassigned to perform the function during a pandemic, and those performing the function as a volunteer. Identification of critical workers is the responsibility of the industry sector or organization providing the critical service.⁵ Furthermore, family members of critical workers providing frontline emergency response services are not

⁴ For example, a 40 year old general practitioner with a child <6 months would belong to two target groups; (1) Outpatient Health Care Providers with Direct Patient Care and (2) Household Contacts of Children <6 months. This person will receive vaccine with whichever target group receives the highest priority.

⁵ Refer to the U.S. Department of Homeland Security's National Infrastructure Advisory Council (NIAC) for a [national analysis of industry sectors and workforces that provide critical services during a pandemic final report \(January 2007\)](#).

included in these critical worker target groups and will receive vaccine with the target group they belong to that has the highest priority designation.

Categories

Target groups are organized into four categories corresponding to the US federal government's pandemic vaccination program objectives which are to protect and maintain: 1) Homeland and National Security, 2) Health Care and Community Support Services, 3) Critical Infrastructure, and 4) Health-vulnerable Groups and the General Population. Each of these categories is comprised of multiple target groups. Refer to Appendix A for recommended CDPH and US Federal Government sub-prioritization of target groups within these categories.

The Health-vulnerable and General Public Category includes persons who are at increased risk of developing influenza complications as well as those who have a high risk of transmitting the virus to persons not recommended for vaccine. Healthy persons not included within the occupationally defined role-based groups are also included in this category.

The Health Care and Community Support Services and Critical Infrastructure Categories include individuals who provide essential health care, community support, and critical infrastructure services during a pandemic. The primary objective of vaccinating persons in these three categories based on their occupational roles or functions is to protect workers with specialized skills, expertise, or licensure status whose absence would lead to a collapse of critical services, and to protect workers who are at high risk of occupational infection and transmission of influenza.

The Homeland and National Security (HNS) category includes personnel who are critical to maintaining national and homeland security. The majority of persons in this category are classified as federal assets and federal employees. It will be determined when the need arises whether HNS Personnel working and residing in California will receive vaccine from federal or state and local distribution and administration channels. California National Guard personnel activated in the state will receive vaccine through state distribution and administration channels along with all other critical (state and local) government workers.

Tiers – Vaccine Prioritization Across Categories

Finally, target groups are organized into vaccination tiers which cut across the four categories. All target groups designated for vaccination within a tier have equal priority for vaccine, unless sub-prioritization of target groups within a tier is recommended. For example, hospital-based inpatient health care providers are separated into “front-line providers” who are designated to receive vaccine first in Tier 1 and “other inpatient health care providers” who would receive vaccine later in Tier 1. In general, vaccine allocation within a tier will be proportional based on the estimated size of the target groups. However, this allocation scheme may change at the time of the pandemic to

reflect the severity of the pandemic, the projected vaccine supply, the burden of illness and/or the emergency response needs at that time.

V. CDPH VACCINE PRIORITIZATION RECOMMENDATIONS

This section provides the rationale for developing prioritization recommendations that differ based on pandemic severity and presents the CDPH prioritization lists.

Rationale for Prioritizing Vaccine by Pandemic Severity

The federal prioritization guidance defines vaccination tiers by pandemic severity to reflect the differences in the threats that more or less severe pandemics pose to society and individuals. CDPH adopted the federal government's tiered vaccination framework with separate prioritization recommendations for severe, moderate, and less severe pandemics based on the US HHS Pandemic Severity Index (PSI)⁶. Severe pandemics with high rates of death are more likely to strain the health care delivery system; disrupt the provision of essential services; increase workplace absenteeism (due to illness, caring for family members, or to decrease the risk of exposure); threaten public order and homeland security; and disrupt international and domestic supply chains compared to less severe pandemics. Therefore, developing different prioritization recommendations based on pandemic severity will best achieve both the national and California's pandemic influenza response goals.

CDPH Prioritization Lists

Table 1 presents the vaccine prioritization list tiered by pandemic severity. Figures 1-3 show how the vaccination tiers integrate target groups across the four categories balancing vaccine allocation to role-based target groups, health-vulnerable target groups and the general public. Figure 1 presents the vaccination tier estimates and target groups for a severe pandemic. Figure 2 presents the vaccination tier estimates and target groups for a moderate pandemic. Figure 3 presents the vaccination tier estimates and target groups for a less severe pandemic.

⁶ The PSI outlines five categories of pandemic severity based on the rates of hospitalization and death from influenza complications.

VI. ADDITIONAL GUIDANCE FOR PUBLIC HEALTH PANDEMIC PLANNERS

This section provides additional guidance for local public health pandemic emergency planners to assist them in developing their vaccine prioritization and implementation recommendations.

Vaccine Prioritization

Public health pandemic planners should use the prioritization lists presented in Table 1 and Figures 1-3 as a framework for developing prioritization recommendations for their local jurisdictions. CDPH recommends that pandemic planners develop tables for inclusion in local pandemic plans with the following information:

- List of target groups in CDPH prioritization Tiers 1-5
- List of local population estimates for each target group
- List of organizations that provide critical services and comprise the occupationally-defined target groups (for target groups in Tiers 1 and 2 only)

Table 2 presents an example of a tiered vaccine prioritization list for a local public health jurisdiction for the Health Care and Community Support Services Category.

Vaccine Implementation

Epidemiologic investigations early in a pandemic will guide CDPH decision making for updating vaccine implementation guidance documents for local planners. CDPH recommends planners identify target groups, prior to a pandemic, as the first step toward planning and implementing an effective pandemic vaccination program. The next step for local pandemic planners is to develop vaccine implementation strategies to identify persons in each target group and to verify their target group membership at the time of vaccination. After implementation strategies have been developed, local pandemic planners will need to test their plans for allocating and distributing vaccine, administering vaccine at vaccine point of dispensing sites (VPODs), and tracking doses of vaccine administered and adverse events. Finally, risk communication materials need to be developed for both employers and the general public to clearly communicate the vaccine prioritization strategy and to support its implementation.

Table 1. CDPH Vaccine Prioritization List Tiered by Pandemic Severity (Severe, Moderate, Less Severe) as Defined by the Pandemic Severity Index (PSI)

Category	Target Group ⁱ	Target Group Estimate ⁱⁱ	Severe ⁱⁱⁱ	Moderate ^{iv}	Less Severe ^v
Homeland and National Security^{vi}	Deployed and Mission Critical Personnel	56,000 ^{vii}	Tier 1	Tier 1	Tier 1
	Essential Support and Sustainment Personnel	52,000 ^{vii}	Tier 2	Tier 2	Tier 2
	Intelligence Services	12,000 ^{vii}			
	Border Protection Personnel	8,000 ^{vii}			
	California National Guard Personnel ^{viii}	60,000			
	Other Domestic National Security Personnel	4,000 ^{vii}			
Other Active Duty and Essential Support Personnel	120,000 ^{vii}	Tier 3	Tier 3	Not Targeted^{ix}	
Health Care and Community Support Services	Public Health Personnel	36,000	Tier 1	Tier 1	Tier 1
	Hospital-based Inpatient Health Care Providers	530,000			
	Outpatient and Home Care Providers	380,000			
	Health Care Providers in Other Inpatient and Long-Term Care Facilities (LTFC)	192,000			
	Community Support Service and Emergency Management Personnel	72,000	Tier 2	Tier 2	Not Targeted
	Pharmacists	36,000			
	Mortuary Service Personnel	6,000			
	Laboratory Technicians and Other Licensed Health Care Personnel	17,000	Tier 3	Tier 3	

ⁱ Refer to Core Document: Appendix B for target group descriptions and sample occupations, rationales for target group prioritization rankings, and estimated sizes of the target groups.

ⁱⁱ Target group estimates are estimates for California and are derived from the following sources: California Department of Labor, HHS Guidance on Allocating Pandemic Vaccine and DHS National Infrastructure Advisory Council based on 2007 data. These estimates are approximations of target group sizes.

ⁱⁱⁱ Severe Pandemic: PSI Category 4-5, Case Fatality Rate (CFR) 2.0%, (~108,000-216,000 deaths in California)

^{iv} Moderate Pandemic: PSI Category 3, CFR 0.5-1.0%, (~54,000-108,000 deaths in California)

^v Less Severe Pandemic: PSI Category 1-2, CFR ~0.2%, (~10,800-54,000 deaths in California)

^{vi} It is currently being determined whether Homeland and National Security (HNS) Personnel working and residing in California will receive vaccine from federal or state and local distribution and administration channels. For this reason, HNS personnel (except for California National Guard) and are not included within CDPH target group estimates.

^{vii} HNS target groups population estimates are based on 8% of the federal population estimate. (Source: US Federal Guidance on Allocating and Targeting Pandemic Influenza Vaccine.) It will be determined when the need arises whether HNS Personnel working and residing in California will receive vaccine from federal or state and local distribution and administration channels.

^{viii} California National Guard personnel will receive vaccine through state distribution and administration channels along with all other critical state and local government workers.

^{ix} Persons in role-based target groups not targeted for vaccine in moderate and less severe pandemics will be vaccinated according to their age and health status in the general population.

Category	Target Group	Target Group Estimate	Severe	Moderate	Less Severe
Critical Infrastructure	Emergency Services Sector Personnel (EMS, law enforcement, fire, corrections)	270,000	Tier 1	Tier 1	Tier 1
	Manufacturers of Pandemic Vaccine, Antiviral Drugs, and Other Key Pandemic Response Materials	6,000			
	Key Government Leaders and Critical Government Personnel	48,000	Tier 2	Tier 2	Not Targeted
	Energy Sector Personnel (electricity, nuclear, oil and gas)	30,000			
	Communications Sector Personnel (telephone and IT)	86,000			
	Water Sector Personnel (potable and waste water)	73,000			
	Financial Clearing and Settlement Personnel	50,000			
	Other Important Government Personnel	48,000	Tier 3	Not Targeted	Not Targeted
	Transportation Sector Personnel	24,000			
	Other Banking and Finance Sector Personnel	140,000			
	Pharmaceutical Sector Personnel	24,000			
	Food and Agriculture Sector Personnel	90,000			
	Chemical Sector Personnel	40,000			
	Postal, Shipping, and Warehousing Sector Personnel	56,000			
	Educational Services Personnel	15,000			
Broadcasting and Publishing Personnel	73,000				
Solid Waste Management Personnel	17,000				
Health-vulnerable Groups and General Population	Pregnant Women, all ages	560,000	Tier 1	Tier 1	Tier 1
	Infants and Toddlers, 6-35 months	1,370,000	Tier 1	Tier 1	Tier 1
	Household Contacts of Infants Less than 6 Months, all ages	570,000	Tier 2	Tier 2	Tier 2
	Children 3-18 years with High Risk Medical Conditions	950,000	Tier 2	Tier 2	Tier 2
	Children 3-18 years without High Risk Medical Conditions	7,800,000	Tier 3	Tier 2	Tier 2^x
	High Risk Persons, 19-64 years	4,800,000	Tier 4	Tier 3	Tier 2
	High Risk Persons, 65 years and older (includes all persons 65+)	4,200,000	Tier 4	Tier 3	Tier 2
	Healthy Adults, 19-64 years not included in other categories	15,100,000	Tier 5	Tier 4	Tier 3

^x The [Advisory Committee on Immunization Practice \(2010\)](#) recommends all children under 18 years receive annual seasonal influenza vaccine. Based on these recommendations, CDPH prioritized children 3-18 years without high risk medical conditions in Tier 2 in a less severe pandemic. The Federal Government prioritized these children in Tier 3 for a less severe pandemic.

Figure 1. Vaccination Tiers and Target Groups for a Severe Pandemic

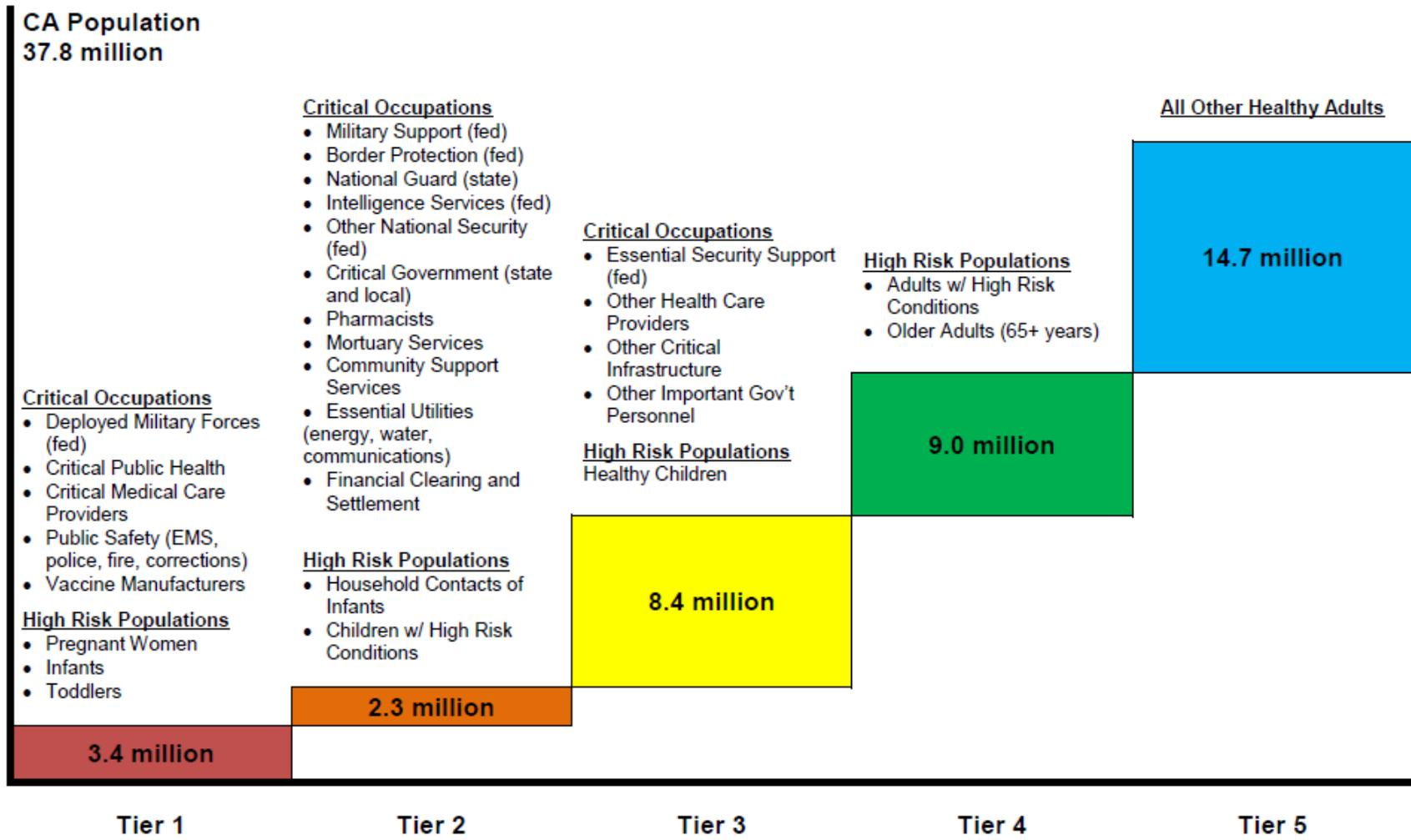


Figure 2. Vaccination Tiers and Target Groups for a Moderate Pandemic

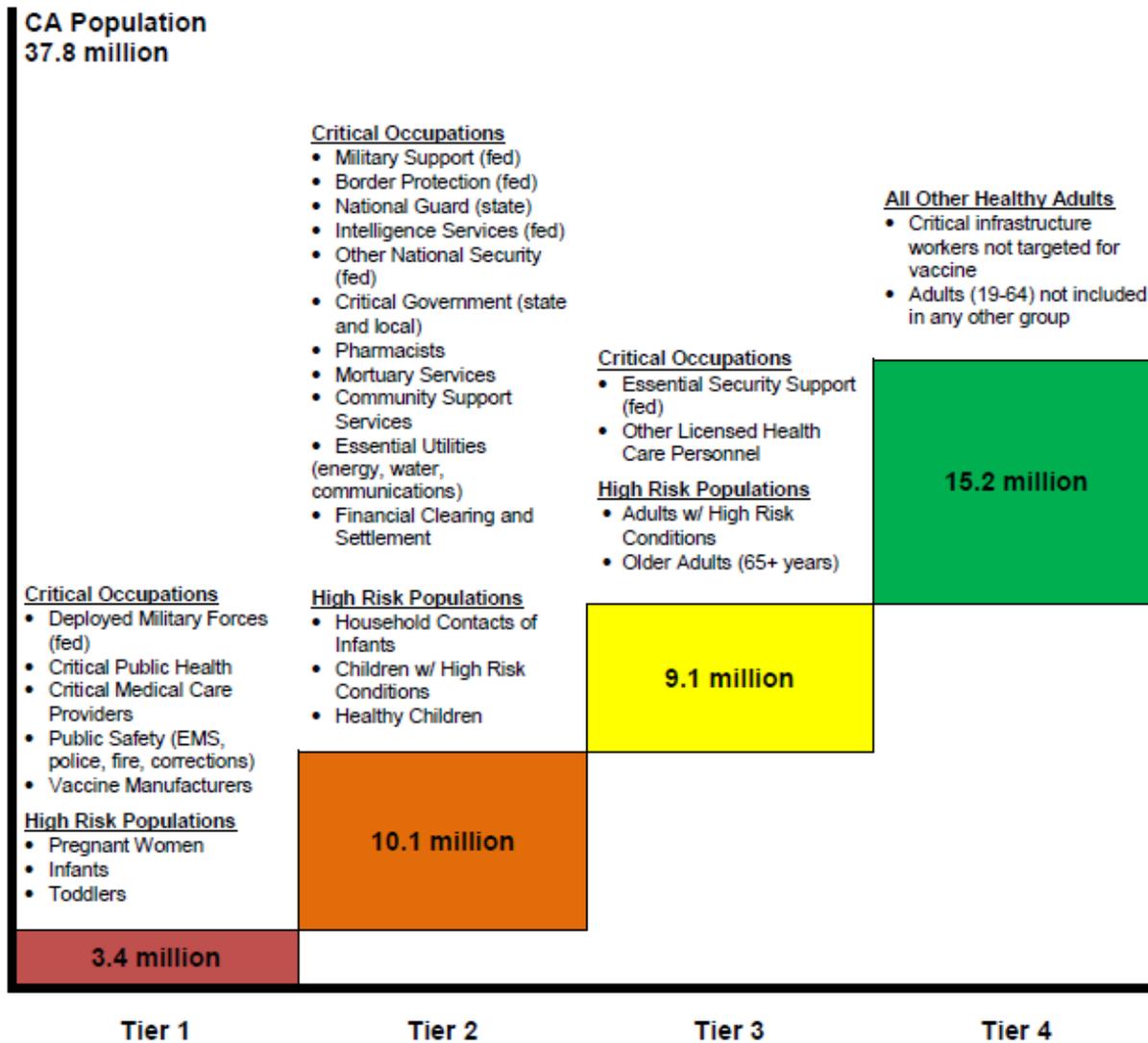


Figure 3. Vaccination Tiers and Target Groups for a Less Severe Pandemic

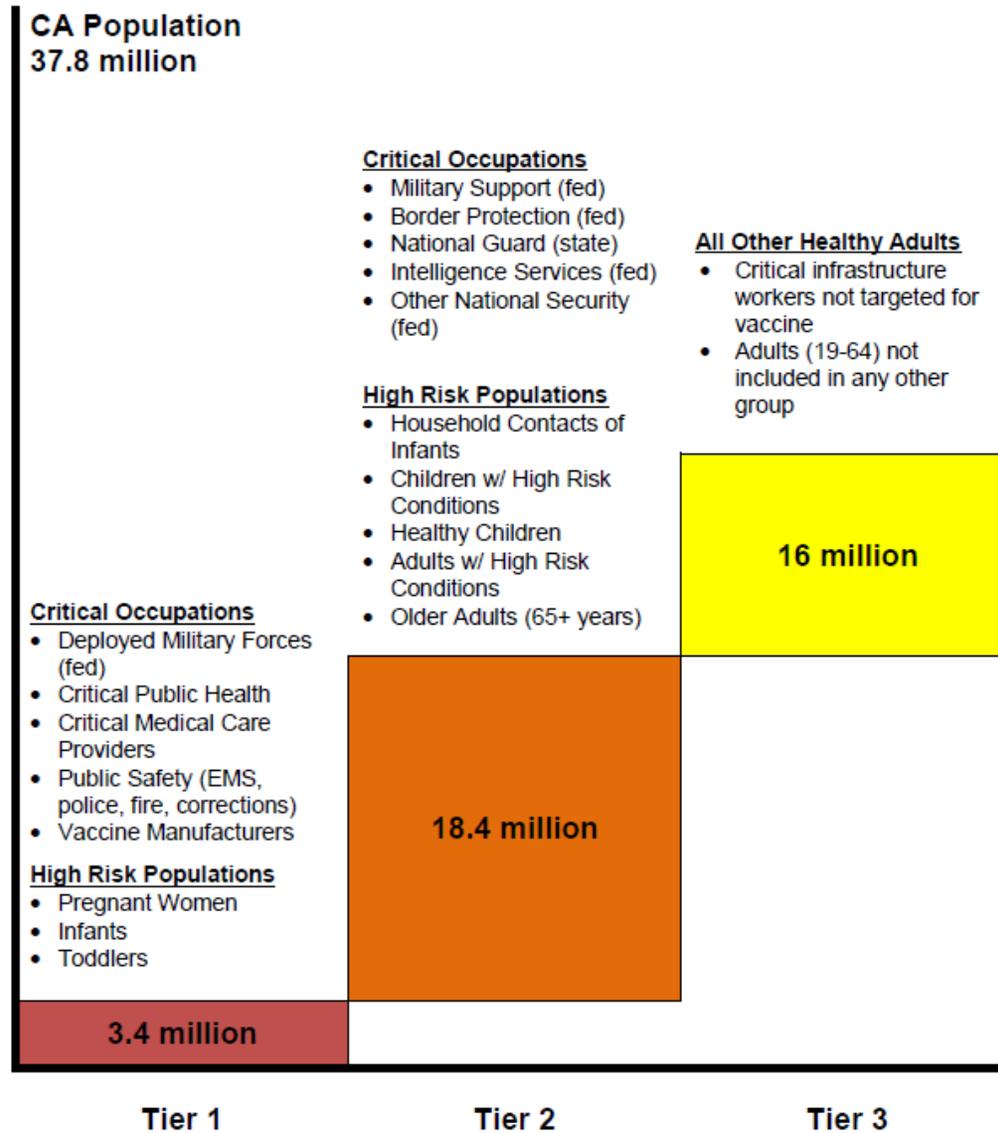


Table 2. Example of Local Public Health Jurisdiction Vaccine Prioritization List

Tier	Target Group	CA Target Group Est. ⁱⁱ	Approximate Local Target Group Est. ⁱ	Actual Local Target Group Est. ⁱⁱ
1	Public Health Personnel	36,000	3,600	4,500
	Hospital-based Inpatient Care Providers	530,000	53,000	50,000
	<i>Local Inpatient Hospital 1</i>		10,000	
	<i>Local Inpatient Hospital 2</i>		20,000	
	<i>Local Inpatient Hospital 3</i>		20,000	
	Outpatient and Home Care Providers	380,000	38,000	40,000
	Health Care Providers in Other Inpatient and Long-Term Care Facilities (LTFC)	192,000	19,200	20,000
2	Community Support Service and Emergency Management Personnel	72,000	7,200	6,000
	Emergency Relief and Response Organizations	Est. needed		1,000
	<i>Local Red Cross Chapter 1</i>		500	
	<i>Local Red Cross Chapter 2</i>		500	
	Religious Organizations	Est. needed		1,000
	Pharmacists	36,000	3,600	2,500
	Mortuary Service Personnel	6,000	600	600
3	Laboratory Technicians and Other Important Health Care Response Personnel	17,000	1,700	3,000
	Private Medical and Diagnostic Laboratory Personnel (non-hospital based labs)	17,000	1,700	1,500
	Other Licensed Health Care Response Personnel (dentists, opticians, veterinarians, medical care volunteers)	Est. Needed		1,500

ⁱ Approximate local target group estimates are calculated by multiplying CDPH target group estimates (column 2) with the local jurisdictions population percentage of California (10% of CA population).

ⁱⁱ Actual local target group estimates will need to be derived from additional data sources such as the [California Department of Labor](#) as well as local data resources. For several target groups no estimates could be found.

VII. RATIONALE FOR VACCINE PRIORITIZATION

The majority of the discussion on the rationale for prioritizing vaccine has been taken directly from the Federal Government Guidance on Targeting and Allocating Pandemic Influenza Vaccine.

Rationale for Vaccinating Tier I First Across All Pandemic Severities

Tier 1 includes the highest priority groups (identified in each of the four prioritization categories (Table 1). Unlike the other tiers (2-5) which differ depending on the severity of the pandemic, Tier 1 is the same across all pandemic severities. This is because the occupationally defined target groups in this tier provide the most critical pandemic emergency response services, are the most difficult to replace, and face the greatest risks of occupational infection through contact with ill persons regardless of pandemic severity.

Targeting vaccinations in Tier 1 to groups that perform critical emergency response functions is balanced by including in this tier pregnant women and infants who are at high risk of dying due to complications from influenza. Protecting pregnant women and infants reflects the federal government's priorities and is an efficient and effective use of vaccine because a pregnant woman will pass on protection from the vaccine to her newborn.

Rationale for Sub-prioritization of Tier 1

Vaccine supply may be very limited through the first wave of a pandemic and even longer. In a severe pandemic, it may be necessary to sub-prioritize groups included in Tier 1 by stratifying *within and between* target groups (Table 3). For example, hospital-based inpatient health care providers are separated into "front-line providers" who are essential for maintaining emergency departments and intensive care units and "other inpatient health care providers" who would receive vaccine later in Tier 1. This proposed ranking of target groups within Tier 1 balances allocation to achieve multiple pandemic response goals and protects persons who face the greatest occupational risk of becoming infected with the influenza virus. Table 3 presents the proposed sub-prioritization of target groups in Tier 1.

Table 3. CDPH Proposed Sub-prioritization of Tier 1 (Based on Severe Pandemic with Limited Vaccine Supply)

Priority Rank	Target Group	Rationale	Target Group Estimate
1	Hospital-based Inpatient Care Providers: Front-line Workers	<p>Frontline workers</p> <ul style="list-style-type: none"> • Provide essential medical services (including administering vaccine and other medical countermeasures) during a pandemic • Face very high risk of occupational exposure and infection • Face high risk of transmitting influenza to ill patients 	350,000
2	National Security: Deployed and mission-critical personnel	<p>National Security Personnel</p> <ul style="list-style-type: none"> • Provide critical services to maintain national security • Face high risk of exposure and infection due to living conditions and possibly geographic location 	700,000* (US est)
3	Emergency Medical Services: Frontline personnel	<p>Frontline personnel</p> <ul style="list-style-type: none"> • Provide critical emergency medical care services • Perform medical procedures (intubation) that increase risk of aerosol exposure and occupational infection 	100,000
4	Outpatient and Home Health Care Providers: Frontline Workers	<p>Frontline workers</p> <ul style="list-style-type: none"> • Maintaining outpatient and home health care delivery systems is critical to reducing demand for inpatient care services • Face high risk of occupational exposure and infection 	250,000
	Public Health Personnel: Pre-designated Emergency Responders	<p>Public Health Personnel</p> <ul style="list-style-type: none"> • Provide pandemic response services to ensure implementation of medical and non-medical countermeasures and community mitigation strategies • Some workers face high risk of occupational exposure and infection • Some workers may face risk of occupational transmission to ill persons 	Estimate needed
5	Public Safety Personnel: Front-line law enforcement and fire personnel	<p>Frontline personnel</p> <ul style="list-style-type: none"> • Provide services to maintain public safety and order and to ensure that pandemic response measures are implemented • Workers face some risk of occupational exposure and infection (though exposure is less substantial than front-line medical care providers) 	170,000

*US estimate – Estimate for number stationed in California not available.

Priority Rank	Target Group	Rationale	Target Group Estimate
6	Pregnant Women	<ul style="list-style-type: none"> Vaccine is highly effective in preventing severe illness in pregnant women Vaccinating pregnant women will also protect newborn infants (children less than 6 months of age) through passive transfer of maternal antibodies 	560,000
	Infants 6-11 months	<ul style="list-style-type: none"> Infants face high risk of influenza complications (severe illness and death) Antiviral drugs are not FDA approved for children <1 year old 	830,000
7	All Other Tier 1 Target Groups	<p>Includes:</p> <ul style="list-style-type: none"> Non-frontline Medical Care Providers in inpatient, outpatient and home health, and long term care facilities Public Health Surge Emergency Responders Pandemic Materiel Manufacturers (vaccine, pharmaceutical and ancillary medical supplies) Non-frontline EMS Personnel Non-frontline Public Safety Personnel Corrections Key Government Leaders Toddlers 12-35 months old <p>Rationale:</p> <ul style="list-style-type: none"> Role-based groups provide critical pandemic emergency response services Role-based groups face less occupational risk of exposure and infection than frontline medical care and public safety workers Toddlers have less risk of severe illness and death than infants and anti-viral drugs are FDA approved for this age group 	1,054,000

Rationale for Vaccinating Tiers 2 Through 5 Differently by Pandemic Severity

CDPH concurs with the federal prioritization guidance whereby target groups included in Tiers 2 through 5 will differ depending on pandemic severity (Table 1). When vaccination has been completed for all five tiers for a pandemic of any severity, everyone in California will have had the option to receive vaccine.

Rationale for Severe Pandemics (PSI 4 or 5)

Tier 2 includes the target groups within the Homeland and National Security category that are critical to maintaining national safety. Critical community support service personnel are included in this tier because they will provide essential services during a pandemic to meet the basic needs of California residents. These personnel will also provide pandemic response services to health vulnerable populations (the elderly, persons living alone, persons with physical impairments, the homeless, immigrants, and families complying with voluntary quarantine when a family member is ill) as is

recommended in the federal government’s community mitigation strategy. Pharmacists and mortuary services personnel are also included in this tier because they provide critical health care services and are at risk of occupational infection because of potential exposure to ill persons. Critical infrastructure sectors targeted in Tier 2 include those that provide “just in time services” (i.e., products like electricity, water and natural gas that cannot be stored); are relied on by all other infrastructure sectors for their essential operations; and contribute to public health and safety. Critical government personnel who perform regulatory or operational roles that are required to maintain government continuity are included in Tier 2.⁷ Finally, this tier includes health vulnerable children (those under 19 years of age who have underlying medical conditions that increase their risk of complications from influenza infections and household contacts of those not recommended for vaccine (household contacts of infants under 6 months)).

Tier 3 includes the remainder of target groups that protect homeland and national security, provide health care services, and maintain critical infrastructure. Critical infrastructure sectors targeted in Tier 3 are those that provide essential products and services where there generally is greater “redundancy” in infrastructure (e.g., there are many bakeries, dairies, gas stations); or personnel (e.g., there are many truck drivers); or where the demand for these services is likely to decrease in a pandemic (e.g., less demand for mass transit, postal, and shipping). Many businesses in these sectors can take other measures to protect employees, such as using alternate work schedules, telecommuting, and reducing in-person meetings and other contacts in the workplace. Healthy children (those without high risk medical conditions) are also included in Tier 3. This reflects the federal government’s vaccination priorities expressed by the general public and federal stakeholder groups of highly prioritizing children among groups defined by age and health status.

Tiers 4 and 5 are focused on health vulnerable and general public target groups that have not yet been designated for vaccine. Whereas persons aged 19 to 64 years who have underlying medical conditions and elderly persons 65 years old or older are targeted in Tier 4, in situations of limited vaccine supply, the 19 to 64 year old group should be targeted first. The rationale for targeting younger persons is that the effectiveness of seasonal and candidate pandemic influenza vaccines is less among elderly persons because of age-related decreases in immune function. Thus, when vaccine supply is limited, targeting high risk adults before the elderly represents the most efficient use of the vaccine supply that is available. Other pandemic response measures such as community containment measures and treatment with antiviral medications may be employed to protect the elderly. Healthy adults will be targeted in Tier 5.

Rationale for Moderate Pandemics (PSI 3)

Moderate pandemics also pose threats to maintaining effective security, health care, community support services, and critical infrastructure. While target groups in Tier 1 are

⁷ Critical government personnel may also include critical workers employed in state and local public health, transportation, financial, food and agriculture, and social services agencies as well as the California National Guard.

the same as for severe pandemics, in later tiers, health vulnerable and general public target groups receive greater priority than some occupationally defined groups.

Target groups in Tier 2 for homeland and national security, health care and community support services, and critical infrastructure are the same as for a severe pandemic. However, for moderate pandemics this tier also includes all children 3 to 18 years old and household contacts of young infants.

Tier 3 includes the remainder of the target groups that protect homeland and national security as well as the remaining target groups that provide health services. Vaccine is not targeted to critical infrastructure personnel in the remaining sectors because of the lower risk to maintenance of important functions, redundancy of infrastructures and personnel, and the ability to protect workforces using other pandemic response measures. In a moderate pandemic, the remaining target groups in the Critical Infrastructure Category will be vaccinated in their applicable age and health status group along with the general population. Tier 3 also includes persons aged 19 to 64 years who are at higher risk of severe illness due to medical conditions and persons 65 years and older. As for severe pandemics, if vaccine supply is limited the high risk adults should be targeted before the elderly because of greater levels of vaccine effectiveness in the former group. Healthy adults are included in Tier 4.

Rationale for Less Severe Pandemics (PSI 1 or 2)

Less severe pandemics pose less threat to the delivery of health care, community support, and other essential goods and services. While target groups in Tier 1 are the same as for severe pandemics, in later vaccination tiers health vulnerable and general public target groups assume greater priority. Historical analyses of the 1957 and 1968 pandemics in the United States indicate that critical health care and essential community services were effectively maintained. Because of this, after Tier 1 target groups in the health care and community support services and critical infrastructure categories are not specifically prioritized and workers in these groups would be vaccinated based on their age and health status as part of the general population.

Tier 2 includes target groups that protect homeland and national security given the importance of protecting our country's safety. In contrast with more severe pandemics where children are vaccinated before other general population groups, in less severe pandemics, guidance for priority vaccination follows recommendations for annual influenza vaccination as defined by the Advisory Committee for Immunization Practices. This is because a PSI category 1 pandemic may be little different than a severe annual influenza outbreak. Thus, Tier 2 includes all children 3 to 18 years old, household contacts of infants less than 6 months old, adults with medical conditions that increase their risk for influenza complications, and persons aged 65 years and older. Tier 3 includes healthy adults, who comprise the remainder of the population.

VIII. CONCLUSION

The CDPH Guidance on Prioritizing Populations for Pandemic Influenza Vaccine presents the first step toward implementing a large-scale pandemic influenza vaccination program in California. This document is intended to be flexible and will be updated during a pandemic to reflect the burden of disease and the situation on the ground in terms of response resources and personnel.

IX. REFERENCES

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APPENDIX A. CATEGORIZED PRIORITIZATION LISTS: CDPH VS. US FEDERAL GOVERNMENT

This appendix presents a side-by-side comparison of the US Federal Government and CDPH categorized prioritization lists as well as CDPH recommended sub-prioritization for specific target groups. The sub-prioritization rankings are subject to change and may be updated during a pandemic. Homeland and National Security Personnel (Category 1) are not included in this appendix.

Category 2. Health Care and Community Support Services

Both the Federal Government and CDPH recommend sub-prioritizing health care and community support sector target groups based on occupational roles and risks. The CDPH guidance includes “Other Licensed Health Care Personnel” in Tier 3 because this group may provide surge emergency medical services during a severe or moderate pandemic. Further sub-prioritization and identification of critical workers within a target group is the responsibility of the industry sector or organization providing the critical service. See Table A1 on next page.

Table A1. Health Care and Community Support Services

Tier	Target Group	CDPH Prioritization	Fed Gov't Prioritization
1	Public Health Personnelⁱ	✓	✓
	<i>Public Health Pre-designated Emergency Responders</i>	✓	
	<i>Public Health Surge and Support Emergency Responders</i>	✓	
	<i>Non-emergency Public Health Personnel</i>	✓	
	Hospital-based Inpatient Care Providers	✓	✓
	<i>Inpatient Care Providers with direct patient exposure (Frontline workers)</i>	✓	✓
	<i>Inpatient Care Providers without direct patient exposure (Non-frontline workers)</i>	✓	✓
	Outpatient and Home Care Providers	✓	✓
	<i>Outpatient and Home Health Care Providers with direct patient exposure (Frontline workers)</i>	✓	✓
	<i>Outpatient and Home Health Care Providers without direct patient exposure (Non-frontline workers)</i>	✓	✓
1	Health Care Providers in Other Inpatient and Long-Term Care Facilities (LTFC)ⁱⁱ	✓	✓
	<i>Other Inpatient and LTFC Providers with direct patient exposure</i>	✓	✓
	<i>Other Inpatient and LTFC Providers without direct patient exposure</i>	✓	✓
2	Community Support Service and Emergency Management Personnel	✓	✓
	<i>Emergency Relief and Response Organizations</i>	✓	✓
	<i>Religious Organizations</i>	✓	✓
	<i>Non-emergency Community Support Services</i>	✓	✓
	Pharmacists	✓	✓
	Mortuary Service Personnel	✓	✓
3	Laboratory Technicians and Other Important Health Care Response Personnel	✓	✓
	<i>Private Medical and Diagnostic Laboratory Personnel (non-hospital based labs)</i>	✓	✓
	<i>Other Licensed Health Care Response Personnel (Dentists, Opticians, Veterinarians, Medical Care Volunteers)</i>	✓	

ⁱ CDPH and the Federal Government sub-prioritized Public Health Personnel slightly differently. CDPH includes both those providing direct patient care services and pre-designated public health responders in the first subgroup. The second subgroup includes public health responders that will be pulled in during a pandemic. The final subgroup includes personnel that provide essential public health services outside of a pandemic. Non-emergency public health personnel are not directly involved with the pandemic response and will be prioritized with “Critical Government Personnel” in Tier 2.

ⁱⁱ CDPH includes health care providers in inpatient mental health and substance abuse facilities as well as providers in other long term and residential care facilities in this target groups. The federal guidance does not prioritize health care providers in other inpatient care facilities.

Category 3. Critical Infrastructure (Essential Community Services)

Both the Federal Government and CDPH recommend defining target groups in critical infrastructure sectors based on workers occupational roles and risks. CDPH recommends sub-prioritizing several large critical infrastructure sectors based on different services provided by the sector. The CDPH guidance includes “solid waste management personnel”, “educational services personnel”, and “broadcasting and publishing personnel” as separate target groups because these groups may provide essential community services during a pandemic and therefore are part of California’s critical infrastructure. Further sub-prioritization and identification of critical workers within a target group is the responsibility of the industry sector or organization providing the critical service. See Table A2 on next page.

Table A2. Critical Infrastructure (Essential Community Services)

Tier	Target Group	CDPH Prioritization	Fed Gov't Prioritization
1	Emergency Services Sector Personnel	✓	✓
	<i>Emergency Medical Services Personnel (EMS)</i>	✓	✓
	<i>Police Protection/ Law Enforcement</i>	✓	✓
	<i>Fire Services Personnel</i>	✓	✓
	<i>Corrections Personnel</i>	✓	✓
	Manufacturers of Pandemic Vaccine, Antiviral Drugs, and Other Key Pandemic Response Materials	✓	✓
2	Key Government Leaders and Critical Government Personnelⁱ	✓	✓
	Energy Sector Personnel (electricity, nuclear, oil, and gas)	✓	✓
	Communications Sector Personnel (Telephone and IT)	✓	✓
	Water Sector Personnel (potable and waste water)	✓	✓
	Financial Clearing and Settlement Personnelⁱⁱ	✓	✓
3	Other Important Government Personnel	✓	✓
	Transportation sector personnelⁱⁱⁱ	✓	✓
	<i>Passenger transportation</i>	✓	
	<i>Non-passenger Cargo Transportation</i>	✓	
	Banking and Finance Sector Personnelⁱⁱ	✓	✓
	Pharmaceutical Sector Personnel	✓	✓
	Food and Agriculture Sector Personnel^{iv}	✓	✓
	<i>Food Manufacturing</i>	✓	
	<i>Food Retail</i>	✓	
	<i>Agriculture and Animal Production</i>		
	Chemical Sector Personnel	✓	✓
	Postal, Shipping and Warehousing Sector Personnel	✓	✓
	Solid Waste Management Personnel	✓	
	Educational Services Personnel	✓	
Broadcasting and Publishing Personnel	✓		

ⁱ This target group includes elected officials, critical state and local government workers, and the California National Guard.

ⁱⁱ Financial Clearing and Settlement Personnel include persons who provide services that ensure the flow of money to banks and other to key financial markets. Banking and Finance Personnel include all other persons who provide critical services to maintain the finance and banking industry.

ⁱⁱⁱ CDPH divides the transportation sector into two subgroups (1) passenger transportation and (2) non-passenger cargo transportation. The federal guidance does not sub-prioritize the transportation sector.

^{iv} CDPH includes a number of subgroups that can be classified within the food and agriculture sector. These include: food manufacturing, food retail, and agriculture and animal production. The federal guidance does not sub-prioritize the food and agriculture sector.

Category 4. Health-vulnerable Groups and General Population

Both the CDPH and federal government initially sub-prioritized “Infants and Toddlers” into two subgroups, recommending vaccinating infants first because antivirals were not recommended for infants. In 2009, antivirals were recommended for infants, so the two groups are now combined. CDPH does recommend sub-prioritizing “Children without High Risk Medical Conditions, 3-18 years” into two subgroups. If vaccine supply is limited CDPH recommends vaccinating younger children 3-5 years prior to vaccinating older children 6-18 years because younger children face higher risks of developing influenza complications. The federal prioritization guidance does not include these two subgroups. See Table A3.

Table A3. Health-vulnerable Groups and General Population

Tier	Target Groups	CDPH Prioritization	Federal Gov't Prioritization
1	Pregnant Women, all ages	✓	✓
	Infants and Toddlers, 6-35 months	✓	✓
2	Household Contacts of Infants Less than 6 Months, all ages	✓	✓
	Children 3-18 years with High Risk Medical Conditions	✓	✓
3	Children 3-18 years without High Risk Medical Conditions	✓	✓
	<i>Children 3-5 years without High Risk Medical Conditions</i>	✓	
	<i>Children 6-18 years without High Risk Medical Conditions</i>	✓	
4	High Risk Persons, 19-64 years	✓	✓
	High Risk Persons, 65 years and older (includes all persons 65+)	✓	✓
5	Healthy Adults, 19-64 years not included in other categories	✓	✓

APPENDIX B. TARGET GROUP DESCRIPTIONS, POPULATION ESTIMATES AND PRIORITIZATION RATIONALE

This appendix includes target group descriptions and sample occupations, target group population estimates and the rationales for determining prioritization designations. The target group list and population estimates are subject to change and will be updated during a pandemic based on the severity of the pandemic, the burden of disease, the supply of vaccine, the feasibility of vaccinating these target groups, and the pandemic response needs of the State. Refer to the US Federal Government Guidance on Allocating and Targeting Vaccine for target group descriptions for Homeland and National Security Personnel. See Table B1 for Health Care and Community Support Services, Table B2 for Critical Infrastructure (Essential Community) Services and Table B3 for Health-vulnerable Groups and General Population. **Note: Data sources could not be found to estimate some of the target group numbers.**

Table B1. Category 2 - Health Care and Community Support Servicesⁱ

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimates ⁱⁱⁱ	Rationale
1	Public Health Personnel	Includes public health workers employed in state, local, or tribal health departments.	See public health personnel subgroups	36,000	<ul style="list-style-type: none"> See rationale for public health personnel subgroups.
	Subgroup 1: Public Health Pre-designated Emergency Responders	Includes public health personnel who have a role within the incident command system (ICS) for infectious disease emergencies and this role has been designated PRIOR TO THE EVENT occurring.	Medical officers, public information officers, bioterrorism coordinators, public health laboratory technicians	Est. needed	<ul style="list-style-type: none"> Provide essential public health emergency response services during an influenza pandemic. Are involved in the implementation of medical and non-medical response measures and community mitigation strategies during a pandemic. Provide services that require a high level of expertise (have critical skills, and licensure status) and are therefore difficult to replace (where peak absence would result in the loss of this sector) during a pandemic. Some pre-designated emergency responders are at high risk of becoming infected with influenza through contact with ill persons. Some pre-designated emergency responders are also at risk of transmitting influenza to health-vulnerable persons while performing their work duties.

ⁱ Refer to the US Department of Homeland Security National Infrastructure Advisory Council (DHS-NIAC) report [“The Prioritization of Critical Infrastructure for a Pandemic Outbreak in the United States Work Group Final Report and Recommendations by the Council” \(January 2007\)](#) for definitions and national estimates of critical workers for target groups in the health care services and critical infrastructure sectors.

ⁱⁱ Sample occupations include examples of occupations that perform critical roles within the target group. These occupations are not meant to be exhaustive. There are numerous occupations that can be classified within these target groups which are not listed.

ⁱⁱⁱ Actual local target group estimates will need to be derived from additional data sources such as the [California Department of Labor](#) as well as local data resources. For several target groups no estimates could be found.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimates ⁱⁱⁱ	Rationale
1	Subgroup 2: Public Health Surge Emergency Responders	Includes public health personnel who have a role within the incident command system (ICS) for infectious disease emergencies and this role has been designated DURING THE EVENT .	Environmental/ occupational health inspectors, coroners and emergency logistics finance, administrative, and ITS support staff	Est. needed	<ul style="list-style-type: none"> • Provide essential public health emergency response services during an influenza pandemic. • Are involved in the implementation of medical and non-medical response measures and community mitigation strategies during a pandemic. • Provide services that require a high level of expertise and are therefore difficult to replace during a pandemic. • Some surge emergency responders are at high risk of becoming infected with influenza through contact with ill persons. • Some surge emergency responders are also at risk of transmitting influenza to health-vulnerable persons while performing their work duties.
2	Subgroup 3: Non-emergency Public Health Personnel	Includes public health personnel who provide essential non-emergency public health services as well as those that support the daily operations of the health department.	Health educators, non-communicable disease researchers and epidemiologists, IT technicians, and security guards	Est. needed	<ul style="list-style-type: none"> • Do not provide emergency response services (direct or support) during an influenza pandemic and therefore should receive lower priority for vaccine than public health emergency responders. • Provides essential (non-emergency) public health services. • Because non-emergency public health personnel are not involved with the pandemic response they do not have high risks of infection and transmission while performing their work duties and therefore should be prioritized for vaccine along with other "Critical Government Personnel" in Tier 2.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimates ⁱⁱⁱ	Rationale
1	Hospital-based Inpatient Care Providers	Includes those providing medical, diagnostic and treatment services to inpatients at acute care hospitals.	See Hospital-based Inpatient Care Providers Subgroups	530,000	<ul style="list-style-type: none"> Maintaining a high quality in-patient medical care delivery system is critical to reducing illness and death from influenza complications as well as other diseases that occur concurrently during an influenza pandemic.
1	Subgroup 1: Inpatient Care Providers with Direct Patient Exposure (Frontline workers)	Includes medical care practitioners, medical care technicians and aids, and other medical staff at acute care hospitals who provide care through direct patient exposure.	General Practitioners, Surgeons, Registered Nurses, Physician Assistants, Medical Aides and Technicians	350,000	<ul style="list-style-type: none"> Provide direct patient care and essential medical services (including administering vaccine and antiviral medications) during a pandemic. Provide essential medical services outside of the pandemic response. Provide services that require a high level of expertise (have critical skills and licensure status) and are therefore difficult to replace (where peak absence would result in the loss of this sector) during a pandemic. Face very high risk of becoming infected with influenza through contact with ill persons. Are at risk of transmitting influenza to health-vulnerable persons who are hospitalized for non-influenza like illness.
1	Subgroup 2: Inpatient Care Providers without Direct Patient Exposure (non-frontline hospital based workers)	Includes professionals who provide medical care services without direct patient care as well as those who provide essential services to maintain the hospital infrastructure during a pandemic.	Medical Scientists and Laboratory Technicians, Social Service Providers, Health Care Administrators, Hospital Support Staff	180,000	<ul style="list-style-type: none"> Provide essential services to maintain the hospital infrastructure during an influenza pandemic. Assist those who provide direct patient care and essential medical services during a pandemic. Also assist those who provide direct medical services outside of the pandemic response. Face some risk of becoming infected with influenza through exposure to persons in the hospital facility. However, this group experiences much less risk than frontline hospital based workers.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimates ⁱⁱⁱ	Rationale
1	Outpatient and Home Health Care Providers	Includes those that provide direct patient care services to ambulatory patients in practitioner's offices, outpatient care clinics, home health care settings, and ambulatory care service centers.	See Outpatient and Home Health Care Providers Subgroups	380,000	<ul style="list-style-type: none"> • Maintaining a high quality ambulatory and home health care delivery system is critical to reducing the demand for inpatient care services during an influenza pandemic. • Maintaining outpatient and home health care services also reduces health consequences (illness, death) from influenza complications as well as other diseases that occur concurrently during an influenza pandemic.
1	Subgroup 1: Outpatient and Home Health Care Providers with Direct Patient Exposure (Frontline workers)	Includes medical care practitioners, medical care technicians and aids and other medical staff in outpatient and home health care settings who provide care through direct patient exposure.	General Practitioners, Physician Specialists, Registered Nurses, Physician Assistants, Medical Aides and Technicians	250,000	<ul style="list-style-type: none"> • Provide direct patient care and essential medical services (including administering vaccine and antiviral medications) during a pandemic. • Also provide essential medical services outside of the pandemic response. • Face high risk of occupational infection. • Face high risk of transmitting influenza to health-vulnerable persons who seek medical care in their facilities for non-influenza like illness. • Provide services that require a high level of expertise and are therefore difficult to replace during a pandemic.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimates ⁱⁱⁱ	Rationale
1	Subgroup 2: Outpatient and Home Health Care Providers without Direct Patient Exposure (Non-frontline workers)	Includes professionals who provide medical care services without direct patient care as well as those who provide support services essential to maintaining outpatient facilities and home health care services during a pandemic.	Social Service Providers, Health Care Administrators, Outpatient Clinic and Home Health Support Staff	130,000	<ul style="list-style-type: none"> • Provide essential services to maintain outpatient and home health care delivery systems during an influenza pandemic. • Assist those who provide direct patient care and essential medical services during a pandemic. • Also assist those who provide direct patient care services outside of the pandemic response. • Face some risk of becoming infected with influenza through exposure to persons in outpatient facilities. However, this group experiences much less risk than frontline outpatient and home health personnel.
1	Health Care Providers in Other Inpatient Care and Long-Term Care Facilities (LTFC)	Includes those that provide medical services to inpatients who suffer mental illness or substance abuse disorders as well as those who provide either nursing, supervisory or other types of care in residential care facilities.	See Health Care Providers in Other Inpatient and Long Term Care Facilities Subgroups	192,000	<ul style="list-style-type: none"> • Maintaining psychiatric and nursing care is critical in reducing the demand for inpatient and outpatient medical care services during a pandemic. • Persons residing in these facilities are at high risk of developing complications from influenza leading to severe illness and death. • Both health care providers and patients are at risk of transmitting the virus to others in the facility. • Vaccinating health care staff and limiting visitors at these facilities will protect both the health care personnel and the patients.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimates ⁱⁱⁱ	Rationale
1	Subgroup 1: Health Care Providers in Other Inpatient Care and Long-term Care Facilities with Direct Patient Exposure (Frontline workers)	Includes medical care practitioners, medical care technicians and aids and other medical staff in other inpatient care and long-term care settings who provide care through direct patient exposure.	General Practitioners, Physician Specialists, Registered Nurses, Physician Assistants, Medical Aides and Technicians	128,000	<ul style="list-style-type: none"> • Provide direct patient care and essential medical services (including administering vaccine and antivirals) during a pandemic. • Provide essential medical services outside of the pandemic response. • Face some risk of becoming infected with influenza through contact with ill persons. • Are at risk of transmitting influenza to health-vulnerable persons residing in their facilities. However, this group experiences much less risk than frontline inpatient and outpatient health care providers.
1	Subgroup 2: Health Care Providers in Other Inpatient Care and Long-term Care Facilities without Direct Patient Exposure (Non-frontline workers)	Includes professionals who provide medical care services without direct patient care as well as those who provide support services essential to maintaining other inpatient and long-term care facilities during a pandemic.	Social Service Providers, Health Care Administrators, In-patient and Long Term Care Facilities Health Support Staff	64,000	<ul style="list-style-type: none"> • Provide support response services that are essential to maintaining these facilities. • Assist those who provide direct patient care and essential medical services outside of the pandemic response. • Face some risk of transmitting influenza to health-vulnerable persons residing in their facilities. However, this group experiences much less risk than frontline health providers at these facilities.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimates ⁱⁱⁱ	Rationale
2	Community Support Service and Emergency Management Personnel	Includes those who work in community organizations that provide emergency relief services to persons affected during community pandemic outbreaks and emergency management personnel who coordinate pandemic response and community support activities.	See Community Support Service and Emergency Management Personnel Subgroups	72,000	<ul style="list-style-type: none"> • Provide essential goods and services during a pandemic (e.g. food, medications, shelter, clothing, mental health support services). • Assist in implementing community mitigation strategies by providing services to ill persons complying with household quarantine recommendations. • Provide essential services outside of a pandemic to vulnerable populations (homeless, immigrants, elderly). • Face some risk of becoming infected with influenza through exposure to ill persons. However, this group experiences much less risk than health care workers. • Are at risk of transmitting influenza to health-vulnerable persons.
2	Subgroup 1: Emergency Relief and Response Organizations	Includes organizations that provide food, shelter, clothing, medical relief, resettlement, and counseling to victims of domestic or international disasters or conflicts (ex. Red Cross, CERTs, MRCs, VIPS).	Nurses, family social workers, community volunteers, mental health counselors, administrative staff	Est. needed	<ul style="list-style-type: none"> • See rationale for Community Support Service and Emergency Management Personnel.
2	Subgroup 2: Religious Organizations	Includes religious organizations such as churches, religious temples, and monasteries that provide faith-based community services.	Clergy, religious counselors, volunteers, administrative staff	Est. needed	<ul style="list-style-type: none"> • Provide essential goods and services during a pandemic (e.g. food, shelter, clothing, mental health support services). • Also assist ensuring proper burial of the deceased both as a result of influenza and non-influenza illnesses. • See rationale for Community Support Service and Emergency Management Personnel.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimates ⁱⁱⁱ	Rationale
2	Subgroup 3: Non-emergency Community Support Services	Includes organizations providing myriad social assistance services.	Social workers, rehabilitation counselors, vocational assistants working in shelters, community centers	Est. needed	<ul style="list-style-type: none"> Provide essential goods and services outside of the pandemic response (food, shelter, clothing, daycare, rehabilitation services, vocational training). See rationale for Community Support Service and Emergency Management Personnel.
2	Pharmacists	Includes pharmacists dispensing medications at retail locations (Pharmacists in hospitals or outpatient care facilities are included in these target groups).	Pharmacists, pharmacy aides	36,000	<ul style="list-style-type: none"> Provide medications for both pandemic and non-pandemic related illnesses. May have some risk of becoming infected with influenza through contact with ill persons. However, this risk is much lower than health care providers in inpatient, outpatient, and long term care facilities.
2	Mortuary Services Personnel	Includes businesses engaged in preparing the dead for burial or internment and conducting funerals.	Funeral services directors, morticians, embalmers	6,000	<ul style="list-style-type: none"> Ensure the preparation and internment of the deceased both as a result of influenza and non-influenza illnesses. Faces some risk of infection and transmission from prolonged contact with ill family members of deceased persons.
3	Laboratory Technicians and Other Licensed Health Care Response Personnel	Includes laboratory personnel working in private or commercial laboratory settings as well as other licensed medical care practitioners that may provide surge emergency medical services during a pandemic.	See Laboratory Technicians and Other Licensed Health Care Personnel Subgroups	17,000	<ul style="list-style-type: none"> See rationale for Private Medical and Diagnostic Laboratory Personnel. See rationale for Other Licensed Health Care Response Personnel.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimates ⁱⁱⁱ	Rationale
3	Subgroup 1: Private Medical and Diagnostic Laboratory Personnel (non-hospital based labs)	Includes laboratory personnel that provide diagnostic services in private or commercial laboratories. (Laboratory technicians in hospitals or outpatient care facilities are included in these target groups).	Clinical lab technicians, microbiologists,	17,000	<ul style="list-style-type: none"> Private laboratory technicians assist those who provide direct patient care and essential medical services during a pandemic by testing samples for pandemic influenza and non-influenza related illnesses. Faces a much lower risk of infection and transmission because they are not in contact with persons likely to be infected with influenza.
3	Subgroup 2: Other Licensed Health Care Response Personnel	Includes other licensed medical care practitioners that may provide surge emergency medical services during a pandemic.	Dentists, Opticians, Veterinarians, Medical Students, Medical Volunteers	Est. needed	<ul style="list-style-type: none"> Other licensed medical care practitioners may provide essential surge emergency medical response services during a pandemic. Are at some risk of becoming infected with influenza through contact with ill. However, this risk is much lower than health care providers in inpatient, outpatient, and long term care facilities.

Table B2. Category 3 - Critical Infrastructure (Essential Community) Servicesⁱ

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimate ⁱⁱⁱ	Rationale
1	Emergency Services Sector Personnel	Includes groups that provide emergency medical and public safety services.	See Emergency Services Sector Personnel Subgroups	270,000	<ul style="list-style-type: none"> • Provide emergency medical and public safety services to maintain public order and ensure that pandemic response measures are implemented. • Face occupational risks of infection due to contact with ill persons and transmission to health vulnerable persons. • Provide services that require a high level of expertise (have critical skills, and licensure status) and are therefore difficult to replace during a pandemic.
1	Subgroup 1: Emergency Medical Services Personnel (EMS)	Personnel who provide emergency medical care and ambulance services (includes those who are fire department-based, hospital-based, and privately affiliated).	Paramedics, EMTs, ambulance drivers, dispatchers	Est. needed	<ul style="list-style-type: none"> • Provide emergency medical services during a pandemic. • Perform medical procedures (intubation) that place these persons at high occupational risk of aerosol exposures and occupational infection. • Are also at risk of transmitting influenza to health-vulnerable persons while performing their work duties. • See rationale for Emergency Services Sector Personnel.

ⁱ Refer to the US Department of Homeland Security National Infrastructure Advisory Council (DHS-NIAC) report [“The Prioritization of Critical Infrastructure for a Pandemic Outbreak in the United States Work Group Final Report and Recommendations by the Council” \(January 2007\)](#) for definitions and national estimates of critical workers for target groups in the health care services and critical infrastructure sectors.

ⁱⁱ Sample occupations include examples of occupations that perform critical roles within the target group. These occupations are not meant to be exhaustive. There are numerous occupations that can be classified within these target groups which are not listed.

ⁱⁱⁱ Actual local target group estimates will need to be derived from additional data sources such as the [California Department of Labor](#) as well as local data resources. For several target groups no estimates could be found.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimate ⁱⁱⁱ	Rationale
1	Subgroup 2: Police Protection/ Law Enforcement	Includes officers engaged in activities related to the enforcement of the law and preservation of order.	Detectives and criminal investigators, police and sheriff patrol officers, police dispatchers	Est. needed	<ul style="list-style-type: none"> • Provide services to maintain public safety and order and to ensure that pandemic response measures are implemented. • See rationale for Emergency Services Sector Personnel.
1	Subgroup 3: Fire Services Personnel	Includes personnel engaged in fire fighting rescue, other related fire protection activities.	Fire fighters, fire dispatchers	Est. needed	<ul style="list-style-type: none"> • .Provide services to maintain public safety and order and to ensure that pandemic response measures are implemented. • See rationale for Emergency Services Sector Personnel.
1	Subgroup 4: Corrections Personnel	Includes personnel engaged in managing and operating correctional institutions.	Correctional officers and jailers, administrative and personal care service staff of correctional institutions	Est. needed	<ul style="list-style-type: none"> • Ensuring California's correctional institutions is critical to preserving public safety and welfare during a pandemic. • Persons residing in these facilities may be at are at high risk of developing severe illness from complications to pandemic influenza. • Both correctional officers and inmates are at risk of transmitting the virus to others in the facility. • Therefore, vaccinating correctional staff and limiting visitors at these facilities will protect both the staff and those who are incarcerated. • See rationale for Emergency Services Sector Personnel.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimate ⁱⁱⁱ	Rationale
1	Manufacturers of Pandemic Vaccine, Antiviral Drugs, and Other Key Pandemic Response Materials	Includes essential workers required for the production of vaccine, antiviral medications, and medical equipment and supplies that are needed to implement medical response measures.	Scientists, biological technicians, machine operators	6,000	<ul style="list-style-type: none"> Produce vaccine, pharmaceutical, and medical materiel that is essential for implementing pandemic emergency medical response and containment measures. Face a much lower risk of occupational infection and transmission than frontline health care providers because they are not in contact with ill persons while performing their work duties. Vaccinating manufacturers will decrease health impacts by ensuring the production of medicines and ancillary medical supplies during an influenza pandemic.
2	Key Government Leaders and Critical Government Personnel	Includes elected officials and government employees (state, local, and tribal) who perform critical regulatory or operational functions required to implement a pandemic response and/or to ensure government continuity.	Governor, mayors, state and local representatives, critical personnel employed in state, local or tribal public health, transportation, financial, food and agriculture, and social services agencies	48,000	<ul style="list-style-type: none"> Provide leadership and make critical decisions in implementing pandemic response measures. Inform the public of government response efforts and encourage social acceptance and adherence to community response efforts (isolation, quarantine, mass vaccine, etc.). Provide regulatory and operational functions essential to maintaining government continuity and preserving public health, safety and welfare. Provide services that require a high level of expertise and are difficult to replace during a pandemic.
2	Energy Sector Personnel	Includes personnel engaged in generating, transmitting and or distributing electric, coal, oil, natural gas, nuclear, alternative energy, and operating energy facilities.	Power plant operators, civil engineers, nuclear engineers	30,000	<ul style="list-style-type: none"> Provide a basic resource (energy power/electricity) that is required by all other critical infrastructure sectors to function. Maintaining the energy supply is essential to implementing pandemic response and community mitigation strategies (isolation, quarantine, mass vaccination, telecommuting). Energy is a “just-in-time” resource that cannot be stored.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimate ⁱⁱⁱ	Rationale
2	Communication Sector Personnel (Telephone and IT)	Includes personnel that provide telephone, internet and web search data services.	Computer engineers, telecommunications installers and repairers	86,000	<ul style="list-style-type: none"> • Provide a basic resource (communication via telephone, radio, television, internet) that is required by all other critical infrastructure sectors to function. • Maintaining lines of communication is essential to implementing pandemic response and community mitigation strategies. • Telecommunications is a “just-in-time” resource that cannot be stored.
2	Water Sector Personnel (potable and waste water)	Includes personnel engaged in operating water treatment plants and/or operating sewer systems or sewage treatment facilities that collect, treat and dispose of waste.	Water control and valve installers	73,000	<ul style="list-style-type: none"> • Provide a basic resource (potable water, wastewater) that is required by all other critical infrastructure sectors to function. • Ensuring clean water and waste water is essential to implementing pandemic response and community mitigation strategies • Water is a “just-in-time” resource that cannot be stored.
2	Financial Clearing and Settlement Personnel	Industry personnel engaged in facilitating financial transactions (e.g. transactions involving the creation, liquidation, or change in ownership of financial assets).	Bankers, tellers, insurance underwriters, and financial analysts	50,000	<ul style="list-style-type: none"> • Provide a basic resource (access to money and financial transactions) that is required by all other critical infrastructure sectors to function. • Maintaining access to money and to financial transactions is essential to maintaining economic continuity.
2	California National Guard	National Guard personnel are likely to be activated to maintain public order during a pandemic or to support pandemic response services or maintain critical infrastructure.		60,000	<ul style="list-style-type: none"> • Provide support pandemic responses services such as maintaining public order and safety and ensuring that pandemic response measures are implemented. • Face some risk of becoming infected through contact with ill persons. • Are also at risk of transmitting the virus to health-vulnerable persons while performing their missions.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimate ⁱⁱⁱ	Rationale
	Other Important Government Personnel	Includes government employees and contractors who perform important government functions included in agency continuity of operations plans who were not prioritized in Tier 2.	Personnel employed in state, local or tribal public health, transportation, financial, food and agriculture, and social services agencies	48,000	<ul style="list-style-type: none"> • Provide regulatory and operational functions essential to maintaining government continuity and preserving public health, safety and welfare. • Face low risk of becoming infected with influenza through contact with ill persons while performing their work duties.
3	Transportation Sector Personnel	Includes select industries providing transportation of passengers and cargo.		24,000	<ul style="list-style-type: none"> • Provide a basic resource (transportation of people and goods) that is required by most other critical infrastructure sectors to function. • Most transportation personnel and resources are transferable and therefore the sector can implement strategies to accommodate higher levels of worker absenteeism (peak absence may not result in the loss of the sector) during a pandemic.
3	Subgroup 1: Passenger Transportation	Includes personnel engaged in transportation of passengers via air, rail, water, and ground routes.	Aircraft pilots, truck drivers, sailors, railway engineers	Est. needed	<ul style="list-style-type: none"> • Provides a basic resource (transportation of people) that is required by most other critical infrastructure sectors to function. • Maintaining the ability to transport people is essential to implementing pandemic response strategies (transporting those who provide front line pandemic response services to their jobs, transporting people to dispensing sites to receive medical countermeasures). • Face some risk of becoming infected with influenza through contact with ill persons while performing their work duties. However, this group experiences less risk than front line responders. • See rationale for Transportation Sector Personnel.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimate ⁱⁱⁱ	Rationale
3	Subgroup 2: Non-passenger Cargo Transportation	Industry is engaged in shipment of cargo via air, rail, water, pipeline and ground routes.	Aircraft pilots, freight workers, laborers	Est. needed	<ul style="list-style-type: none"> Provides a basic resource (transportation of goods) that is required by most/all other critical infrastructure sectors to function. Maintaining the ability to transport goods is essential to implementing pandemic response and community mitigation strategies. Face a very low risk of becoming infected with influenza through contact with ill persons while performing their work duties. See rationale for Transportation Sector Personnel.
3	Banking and Finance Sector Personnel	Includes all other persons who provide critical services to maintain the banking and finance sector (not including financial clearing and settlement personnel).		140,000	<ul style="list-style-type: none"> Provide a basic resource (financial transactions) that is required by most/all other critical infrastructure sectors to function. Maintaining banking and financial services is essential to maintaining economic continuity. Face very low risks of becoming infected with influenza through contact with ill persons while performing their work duties. Most banking and financial personnel and resources are fungible and therefore the sector can implement strategies to accommodate higher levels of worker absenteeism during a pandemic.
3	Pharmaceutical Sector Personnel	Includes personnel engaged in the manufacturing and processing of biological, botanical, medicinal and herbal products.	Scientists, biological technicians, machine operators	24,000	<ul style="list-style-type: none"> Produce essential medical goods (pharmaceuticals) that assist in saving and preserving the lives of health-vulnerable persons. Face very low risk of becoming infected with influenza through contact with ill persons while performing their work duties. Most pharmaceutical sector personnel and resources are fungible and therefore the sector can implement strategies to accommodate higher levels of worker absenteeism during a pandemic.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimate ⁱⁱⁱ	Rationale
3	Food and Agriculture Sector Personnel	Includes personnel engaged in growing crops, raising animals, harvesting timber, and harvesting fish and other animals as well as manufacturing and selling food and agricultural products.	See Food and Agriculture Sector Personnel Subgroups	90,000	<ul style="list-style-type: none"> • Provide a basic resource (food) that is required by all other critical infrastructure sectors to function. • Food is a “just-in-time” resource that cannot be stored for long periods of time. • Maintaining the food supply essential to implementing pandemic response and community mitigation strategies. • Face very low risk of becoming infected with influenza through contact with ill persons while performing their work duties. • Most agricultural personnel and resources are fungible and therefore the sector can implement strategies to accommodate higher levels of worker absenteeism during a pandemic.
3	Subgroup 1: Food Manufacturing Personnel	Includes personnel who transform livestock and agricultural products into products for intermediate or final consumption.	Butchers, bakers, and food batchmakers	Est. needed	<ul style="list-style-type: none"> • See rationale for Food and Agriculture Sector Personnel.
3	Subgroup 2: Food Retail Personnel	Includes personnel who engage in the retail of food and beverages merchandise.	Cashiers, packers, food preparation workers	Est. needed	<ul style="list-style-type: none"> • See rationale for Food and Agriculture Sector Personnel.
3	Subgroup 3: Agriculture and Animal Production Personnel	Includes personnel who engage in growing crops, raising animals, and harvesting fish and other animals.	Farmers, animal breeders, farm workers, ranchers, fishermen.	Est. needed	<ul style="list-style-type: none"> • See rationale for Food and Agriculture Sector Personnel.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimate ⁱⁱⁱ	Rationale
3	Chemical Sector Personnel	Includes personnel who produce and manufacture chemicals using basic processes.	Scientists, engineers, machine operators	40,000	<ul style="list-style-type: none"> • Provide a basic resource (basic chemicals, chemical components for manufactured goods) that is required by many other critical infrastructure sectors to function. • Manufacturing chemicals is essential for producing goods required to implement pandemic response strategies (disinfectants, plastics, latex, bandages, etc.). • Face very low risk of becoming infected with influenza through contact with ill persons while performing their work duties. • Most chemical sector and resources are fungible and therefore the sector can implement strategies to accommodate higher levels of worker absenteeism during a pandemic.
3	Postal, Shipping and Warehousing Sector Personnel	Includes personnel who operate the National Postal Service, private postal carriers (FedEx, UPS) as well as those who operate warehousing and storage facilities for general merchandise, refrigerated goods, and warehousing products.	Postal service clerks, mail carriers, machine operators, laborers, packers and packagers, sales managers	56,000	<ul style="list-style-type: none"> • Provide a basic service (warehousing and shipping) that is required by most other critical infrastructure sectors to function. • Storing and shipping basic goods is essential to implementing community mitigation strategies (isolation, quarantine, mass vaccination, anti-viral distribution). • Face very low risk of becoming infected with influenza through contact with ill persons while performing their work duties. • Most postal, shipping and warehousing personnel and resources are fungible and therefore the sector can implement strategies to accommodate higher levels of worker absenteeism during a pandemic.

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimate ⁱⁱⁱ	Rationale
3	Educational Services Personnel	Includes personnel who provide instruction and training in schools, colleges, universities, and training centers. These establishments may also offer food and accommodation services to their students.	Teachers, professors, educational administrators, food service workers, school psychologists, and security guards	15,000	<ul style="list-style-type: none"> • Provide essential community services (education, food, shelter). • Maintaining educational institutions is essential to preserving social continuity • In the absence of school closures, education sector employees (teachers) are at high risk of becoming infected with influenza through prolonged contact with ill persons. However, this group experiences less risk than front line responders. • Most education services personnel and resources are fungible and therefore the sector can implement strategies (school closures) to reduce the risks of infection and transmission to employees.
3	Broadcasting and Publishing Personnel	Includes personnel who engage in traditional broadcasting and broadcasting over the Internet as well as software, paper and internet publishing.	Radio and television broadcasters, newspaper and internet publishers	73,000	<ul style="list-style-type: none"> • Provides an essential community service (mass media communication) that is required by pandemic responders to disseminate information to the general public. • Face low risk of becoming infected with influenza through contact with ill persons while performing their work duties. • Most broadcasting and publishing personnel and resources are fungible and therefore the sector can implement strategies to accommodate higher levels of worker absenteeism (during a pandemic).

Tier	Target Group	Description	Sample Occupations ⁱⁱ	Target Group Estimate ⁱⁱⁱ	Rationale
3	Refuse Collection (Solid Waste Sanitation Services) Personnel	Includes personnel who engage in collecting, treating and disposing of solid waste and refuse.	Sanitation collectors, engineers, machine operators	17,000	<ul style="list-style-type: none"> • Provide a basic service (solid waste and sanitation collection) that is required by all other critical infrastructure sectors to function. • Maintaining sanitation services is essential to implementing pandemic response and community mitigation strategies as well as reducing disease and illness in the community. • Refuse collection is a “just-in-time” service. • Face a low risk of becoming infected with influenza through contact with ill persons while performing their work duties. • Most sanitation service personnel and resources are fungible and therefore the sector can implement strategies to accommodate higher levels of worker absenteeism during a pandemic.

Table B3. Category 4 - Health-vulnerable Groups and General Populationⁱ

Tier	Target Group	Description	Target Group Estimate ⁱⁱ	Rationale
1	Pregnant Women, all ages	Includes women who will become pregnant at any time during the influenza season.	560,000	<ul style="list-style-type: none"> • Pregnant women in second and third trimesters have a high risk of developing severe illness leading to hospitalization from complications to pandemic influenza. • Vaccine is likely to be highly effective in preventing severe illness. • Vaccinating pregnant women will also protect newborn infants (children less than 6 months of age) through passive transfer of maternal antibodies.
1	Infants and Toddlers, ages 6-35 months	Includes children who turn age 6-35 months during the influenza season.	1,370,000	<ul style="list-style-type: none"> • Face very high risk of developing severe illness and/or dying from complications to pandemic influenza. • Are also at high risk of transmitting the influenza virus to susceptible persons (including health-vulnerable persons). • It is assumed that infants and toddlers will require ½ the dose of vaccine used to protect older children and adults. • Protecting children was identified as a key objective of the national vaccination program.
1	Subgroup 1: Infants, ages 6-11 months	Includes children who turn age 6-11 months during the influenza season.	830,000	<ul style="list-style-type: none"> • Face very high risk of developing severe illness and/or dying from complications to pandemic influenza. • Anti-viral drug treatment is not FDA approved for children <1 year of age, therefore vaccine may be the only medical countermeasure available for this group. • See rationale for Infants and Toddlers, ages 6-35 months.
1	Subgroup 2: Toddlers, ages 12-35 months	Includes children who turn age 12-35 months during the influenza season.	540,000	<ul style="list-style-type: none"> • Face high risk of developing severe illness and/or dying from complications to pandemic influenza; however their risk is lower than that of infants. • Anti-viral drug treatment is approved for children in this age group. • See rationale for Infants and Toddlers, ages 6-35 months.

ⁱ Refer to the US Department of Homeland Security National Infrastructure Advisory Council (DHS-NIAC) report [“The Prioritization of Critical Infrastructure for a Pandemic Outbreak in the United States Work Group Final Report and Recommendations by the Council” \(January 2007\)](#) for definitions and national estimates of critical workers for target groups in the health care services and critical infrastructure sectors.

ⁱⁱ Actual local target group estimates will need to be derived from additional data sources such as the [California Department of Labor](#) as well as local data resources. For several target groups no estimates could be found.

Tier	Target Group	Description	Target Group Estimate ⁱⁱ	Rationale
2	Household Contacts of Infants under 6 months old, all ages	Includes all persons residing at home with a child age under 6 months of age.	570,000	<ul style="list-style-type: none"> Influenza vaccine and antivirals are not recommended for children under six months of age because they are not likely to be effective in preventing influenza complications. Therefore, vaccinating household contacts represents the best option for protecting these children. Protecting children (directly and indirectly) was identified as a key objective of the national vaccination program.
2	Children 3-18 years with high risk medical conditionsⁱⁱⁱ	Includes all children between the ages of 3 to 18 years who have the following chronic medical conditions that place them at high risk of developing influenza complications if infected.	950,000	<ul style="list-style-type: none"> Face high risk of developing severe illness from complications to pandemic influenza. Are also at high risk of transmitting the influenza virus to susceptible persons (including health-vulnerable persons) in their households and in the community. Protecting children was identified as a key objective of the national vaccination program.
3	Children 3-18 years without high risk medical conditions	Includes all children ages 3 through 18 years with NO underlying health characteristics that puts them at high risk of influenza complications.	7,800,000	<ul style="list-style-type: none"> Are at increased risk of transmitting the influenza virus to susceptible persons (including health-vulnerable persons) within their households and in the community. Vaccine is likely to be highly effective for these children. Protecting children was identified as a key objective for the national vaccination program.
3	Subgroup 1: Children 3-5 years without high risk medical conditions	Includes children 3-5 years with NO underlying health characteristics that put them at high risk of influenza complications.	1,460,000	<ul style="list-style-type: none"> Younger children have an elevated risk of developing severe illness leading to hospitalization from complications to pandemic influenza. Face a higher risk than older children of transmitting the influenza virus to susceptible persons within their households and in the community. See rationale for Children 3-18 years without high risk medical conditions.

ⁱⁱⁱ Refer to [Recommendations from the Advisory Committee on Immunization Practices \(2010\)](#) for a list of medical conditions that place persons at high risk of developing influenza complications.

Tier	Target Group	Description	Target Group Estimate ⁱⁱ	Rationale
3	Subgroup 2: Children 6-18 years without high risk medical conditions	Includes children 6-18 years with NO underlying health characteristics that put them at high risk of influenza complications.	6,340,000	<ul style="list-style-type: none"> Older children may be less likely to develop severe illness leading to hospitalization from complications to pandemic influenza than younger children. However, these children are also at risk of transmitting the influenza virus to susceptible persons within the household and in the community. See rationale for Children 3-18 years without high risk medical conditions.
4	High Risk Persons, 19-64 years old³	Includes adults between the ages of 19 to 64 years who have chronic medical conditions that place them at high risk of developing influenza complications if infected.	4,800,000	<ul style="list-style-type: none"> Face high risk of developing severe illness from complications to pandemic influenza. Are at risk of transmitting the virus to other health-vulnerable persons within their household and in the community. Vaccine is likely to be effective for these adults.
4	All Persons, 65 years and older	Includes adults ages 65 years and older who are healthy as well as those have the following chronic medical conditions that place them at high risk of developing influenza complications if infected.	4,200,000	<ul style="list-style-type: none"> Many older adults, who are 65+ years have underlying medical conditions that place them at high risk of developing severe illness and/or dying from complications to pandemic influenza. Are also at risk of transmitting the virus to other health-vulnerable persons within their households and in the community. Vaccine is likely to be less effective for this group than for healthy children and adults.

Tier	Target Group	Description	Target Group Estimate ⁱⁱ	Rationale
5	Healthy Adults, 19-64 years not included in other categories	Includes adults 65 years and older with NO underlying health characteristics that puts them at high risk of influenza complications and are NOT EMPLOYED in any occupational group in categories 2 and 3.	15,100,000	<ul style="list-style-type: none"> • Persons in this group do not exhibit any health-related risks and are not employed in an occupational target group that would give them priority for influenza vaccine. • Therefore, persons in this group would receive the vaccine when the supply is large enough for mass distribution and administration.

SUPPLEMENTAL DOCUMENT 1. CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH) VACCINATION PROGRAM GOALS AND OBJECTIVES

Vaccination Program Goals and Objectives

CDPH identified three primary goals for the pandemic influenza vaccination program:

- Minimize health consequences. The ability of the intervention to reduce the number of severe illnesses and deaths caused by complications to pandemic influenza.
- Minimize social disruption. The ability of the intervention to reduce disruption in essential community services and minimize social chaos and distress caused by pandemic influenza.
- Minimize economic loss. The ability of the intervention to reduce economic losses caused by reductions in production and consumption of goods and services because of pandemic influenza.

Seven vaccination objectives (e.g. criteria) were identified and included in the prioritization process. These criteria were based on target groups' occupational roles as well as their health risks. The three most important criteria identified by CDPH are as follows:

- Direct Pandemic Response Role. To protect persons who directly provide services that are essential to the pandemic response.
- Support Pandemic Response Role. To protect persons who provide support services that are essential to the pandemic response.
- Critical Infrastructure Role. To protect persons who provide essential critical infrastructure services.

The remaining four criteria were also considered important to guiding pandemic influenza vaccine allocation.

- Risk of Transmission. To protect persons who are at high risk of transmitting the virus to health vulnerable populations.
- Vaccine Effectiveness. To protect persons among whom the vaccine is likely to be effective.
- Risk of Infection. To protect persons at high risk of infection (on the job and in the community).
- Risk of Complications. To protect persons who are at high risk of developing complications (severe illness and/or death) as a result of becoming infected with influenza.

SUPPLEMENTAL DOCUMENT 2. DISCUSSION OF CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH) PANDEMIC INFLUENZA VACCINE PRIORITIZATION PROCESS

This document presents the timelines for the federal government and CDPH pandemic vaccine prioritization processes. In addition, this document presents an overview of the CDPH formal decision analysis process that informed the development of the CDPH prioritization recommendations. Table S2-1 presents the US Federal Government vaccine prioritization project timeline. Table S2-2 presents the CDPH vaccine prioritization project timeline and highlights the key project activities of the project.

Table S2-1. Federal Government Vaccine Prioritization Project Timeline

Date	Activity	Description
November 2005	HHS Released National Pandemic Influenza Vaccine Response Plan ⁱ	<ul style="list-style-type: none"> HHS plan included broad-based national vaccination priority recommendations.
October 2006 – February 2007	US Federal Government (HHS and DHS) convened an interagency workgroup to update federal vaccine prioritization recommendations	<ul style="list-style-type: none"> HHS, in collaboration with CDPH, adapted the Decision Analysis Scoring Tool (DAST) methodology for federal vaccination project goals and objectives. DAST prioritization survey was administered to federal working group. Results were used to assist working group in developing the revised federal vaccine prioritization guidance.
January 2008	CDC released draft Influenza Pandemic Operational Plan (OPLAN) ⁱⁱ	<ul style="list-style-type: none"> OPLAN contains recommendations for allocating, distributing, and administering pandemic influenza vaccine to target groups.
July 2008	US Federal Government released Guidance on Allocation and Targeting Pandemic Influenza Vaccine ⁱⁱⁱ	<p>Guidance advises state and local health departments to develop more specific prioritization plans that:</p> <ul style="list-style-type: none"> Specifically define target groups. Identify occupational categories and sub-categories within each broad target group. Select implementation strategies to distribute and administer vaccine to target group members.
Spring 2008	US Federal Government (HHS and DHS) convened a second workgroup to update CDC Operational Plan.	<ul style="list-style-type: none"> Workgroup developed draft guidance documents for implementing vaccine but the documents were never published. CDPH, as part of the workgroup, had access to the documents.

ⁱ US Department of Health and Human Services. HHS Pandemic Influenza Plan, November 2005. Available at: <http://www.hhs.gov/pandemicflu/plan/pdf/AppD.pdf>.

ⁱⁱ Centers for Disease Control. CDC Pandemic Influenza Operational Plan (OPLAN): Annex F Community Interventions, January 11, 2008. (No longer available on the website.)

ⁱⁱⁱ US Department of Health and Human Services. [Guidance on Allocating and Targeting Pandemic Influenza Vaccine](http://www.flu.gov/images/reports/pi_vaccine_allocation_guidance.pdf), July 2008.

(Available at: http://www.flu.gov/images/reports/pi_vaccine_allocation_guidance.pdf)

Table S2-2. CDPH Vaccine Prioritization Project Timeline

Date	Activity	Description
January 2005	CDPH Immunization Branch contracted UC Berkeley Center for Infectious Disease and Emergency Readiness (CIDER)	<ul style="list-style-type: none"> • CIDER developed comprehensive prioritization process to determine which target groups in California will be designated for initial vaccination.
March 2005	CDPH organized a Joint Advisory Committee on Pandemic Influenza Vaccine and Antiviral Prioritization	<ul style="list-style-type: none"> • Committee provided guidance in developing prioritization process inputs (goals, objectives, strategies, criteria, target groups).
March 2005 – May 2006	CDPH and CIDER developed Decision Analysis Scoring Tool (DAST)	<ul style="list-style-type: none"> • DAST was based on a survey instrument that produces a rank-ordered prioritization list.
June 2006-October 2006	CDPH conducted statewide vaccine prioritization surveys	<ul style="list-style-type: none"> • DAST prioritization survey was administered to 385 pandemic preparedness and response planners from across the state.
March 2007-September 2007	CDPH drafted preliminary prioritization recommendations	<ul style="list-style-type: none"> • CDPH analyzed results from California prioritization survey and drafted preliminary prioritization recommendations.
October 2007-December 2008	CDPH drafted the Interim Guidance: Prioritizing Populations for Pandemic Influenza Vaccine in California	<ul style="list-style-type: none"> • CDPH aligned CDPH recommendation with federal vaccine prioritization recommendations and drafted the CDPH Guidance.
April 2008-August 2009	CDPH convened Pandemic Influenza Vaccine and Antiviral (PIVA) Advisory Group	<ul style="list-style-type: none"> • CDPH organized the PIVA workgroup to advise and recommend implementation strategies for administering vaccine and dispensing antivirals.
January 2009-August 2009	CDPH drafted the CDPH Interim Guidance: Implementing a Pandemic Influenza Vaccine Immunization Program in California	<ul style="list-style-type: none"> • CDPH aligned CDPH recommendations with federal and PIVA workgroup and drafted implementation guidance on how to allocate, distribute, and administer vaccine to prioritized target groups in local jurisdictions.
June 2013	CDPH updated the CDPH Interim Guidance: Prioritizing Populations for Pandemic Influenza Vaccine in California	<ul style="list-style-type: none"> • CDPH documents remain aligned with current federal recommendations. When federal recommendations change, CDPH will update the document to reflect any changes.
July 2013	CDPH updating The CDPH Interim Guidance: Implementing a Pandemic Influenza Vaccine Immunization Program in California	<ul style="list-style-type: none"> • CDPH documents remain aligned with current federal recommendations. When federal recommendations change, CDPH will update the document to reflect any changes.
Anticipate August 2013	Both documents approved by CDPH for distribution to local public health pandemic emergency planners	<ul style="list-style-type: none"> • Documents made available by CDPH to local public health pandemic emergency planners to guide them in developing their vaccine prioritization and implementation plans.

CDPH Formal Decision Analysis Process

The CDPH Immunization Branch (CDPH IZB) in collaboration with the University of California Berkeley Center for Infectious Diseases and Emergency Readiness (CIDER) developed a formal decision analysis process to determine which target groups in California will be designated for initial vaccination. The results from this decision analysis process served as the basis for the CDPH prioritization recommendations.

CDPH IZB and CIDER researchers developed a formal decision analysis scoring tool to simultaneously analyze multiple goals, criteria, and alternatives to develop an optimal prioritization strategy.¹ The Decision Analysis Scoring Tool (DAST) was centered on a self-administered survey instrument, which enabled experts to assess the relative importance of the vaccination criteria and evaluate the degree to which the target groups met these criteria. At the end of this process, the Scoring Tool produced a rank-ordered list of target groups prioritized for pandemic influenza vaccination. The Scoring Tool results served as the basis for the CDPH prioritization lists.²

CIDER researchers reviewed current scientific data on inter-pandemic influenza (seasonal flu) as well as historical research on previous influenza pandemics to identify and define the DAST inputs (goals, objectives, criteria, target groups). In addition, the researchers identified the industry sectors and occupational roles that are essential to carrying out a pandemic emergency response and to maintaining critical infrastructure. Finally, they evaluated the ethical, legal, political feasibility and implementation implications of planning a phased approach to pandemic vaccination.

In the Summer of 2006, a Statewide vaccine prioritization survey was conducted. CDPH IZB and CIDER researchers administered the decision analysis survey to 426 statewide pandemic preparedness and response experts, of which 385 completed surveys were included in the final results (response rate= 90%). In addition to the medical care service and public health sectors, the sampling frame included representatives from myriad public health, public administration, public safety and justice, commercial business and critical infrastructure sectors.

A supplemental survey was administered to 23 members of the California Joint Advisory Committee on Emergency Preparedness (JAC) to determine the levels of criticality and degree of expertise for occupationally defined (role-based) target groups. The JAC was also asked to rate the vaccination criteria for moderate and less severe pandemics.

Results from these two surveys were incorporated into the final analysis to produce the rank-ordered prioritization list. This list was then divided into three prioritization sub-categories: (1) health care and community support services, (2) critical infrastructure, and (3) health vulnerable and general population. The results were then stratified to compare differences in target groups' priority rankings by pandemic severity.

¹ The Scoring Tool is based on an Analytic Hierarchy Process, which is a "choice-based" modeling technique that helps decision-makers allocate resources across competing alternatives to develop an optimal prioritization scheme.

² Refer to the CIDER [Pandemic Influenza Project](#) webpage for a complete discussion of the decision analysis scoring tool methodology.

Occupationally defined target groups with the highest overall scores regardless of pandemic severity included front-line emergency medical services workers and health care providers, public health emergency responders, and law enforcement and fire services personnel. Among the health vulnerable and general population target groups, infants and toddlers and household contacts of infants under 6 months of age ranked highest.

Supplemental Document 3 presents a summary report of the DAST survey results including the rank-ordered prioritization lists along with the stratified analysis of survey results by pandemic severity. These survey results were compared to the national prioritization list in order to align the California process with the federal guidance.

SUPPLEMENTAL DOCUMENT 3. DECISION ANALYSIS SCORING TOOL (DAST) SURVEY RESULTS REPORT: EXECUTIVE SUMMARY

This document presents summary results from the two pandemic influenza prioritization surveys as well as the results from an additional analysis of the survey data stratified by the participants' occupational roles. Overview of The DAST survey results by section.

Criteria Weights

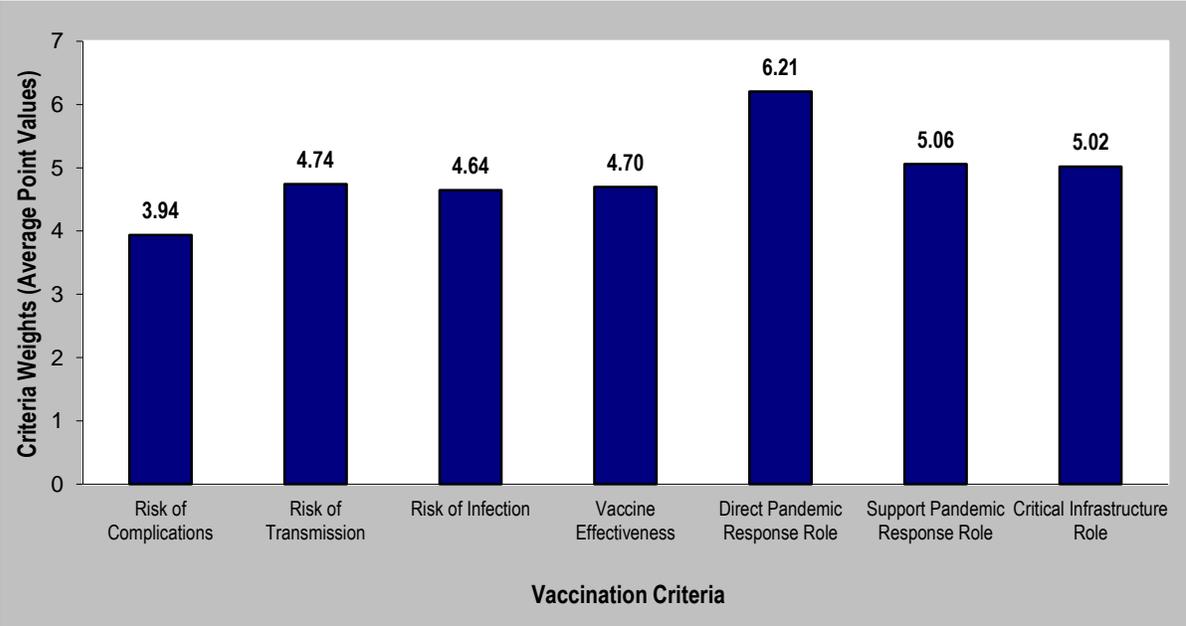
Description

The survey instrument asked respondents to rate the importance of the vaccination criteria on a seven-point scale (1=least important and 7=most important), which was used to determine which target groups should be prioritized for initial vaccination.

Results

Figure S3-1 presents the seven prioritization criteria and their average point values from the statewide survey (n=385). All 7 criteria were considered at least somewhat important (>4 points on the scale of 1-7). Role-based criteria were considered more important than health and age related purposes. "Performing a direct pandemic emergency response role" was considered to be the most important criterion in determining who should be prioritized for vaccine. "Risk of complications" was considered to be the least important criterion.

Figure S3-1. Vaccination Criteria by Weight (Statewide Sample)



Rank-ordered Prioritization List

Description

The rank-ordered prioritization list was based on responses from the statewide prioritization survey and the supplemental survey given to the Joint Advisory Committee on Pandemic Influenza Vaccine and Antiviral Prioritization. Survey results were ranked from highest to lowest based on the target groups' final prioritization scores. The rank-ordered prioritization list includes 73 distinct target groups. All California residents are included in at least one of these target groups.

Results

The top third of the list includes medical care, public health, public safety and emergency response professionals. The middle third of the list includes the remaining medical care and public health professions as well as select public administration, critical infrastructure, education, community services and commercial business sectors. The bottom third of the list includes the remaining government decision makers; remaining critical infrastructure sectors as well as persons at high risk of developing influenza complications and healthy populations.

Categorized Prioritization Lists

Description

The prioritized target groups were divided into three categories corresponding to the national pandemic vaccination objectives.¹ These categories include: (1) Health-vulnerable and General Population; (2) Health Care and Social Services; and (3) Critical Infrastructure.

Target Groups within each category were clustered into priority tiers or “levels” based on their final prioritization scores. These levels identified the groups that should receive the highest, moderate, and lowest priority for vaccine within the three prioritization categories. All of the target groups included in the same level within a category would receive equal priority for vaccine.

Target groups within the Health-vulnerable category include those groups that are at increased risk of developing influenza complications (illness and death) as well as those groups that have a high risk of transmitting the virus to persons not recommended for vaccine. Healthy persons not included within the occupational role-based groups are also in this category.

The Health Care and Social Services and the Critical Infrastructure categories include only those individuals who provide critical services that are essential to maintain during a pandemic. The primary objective of vaccinating persons based on their occupational roles is to protect workers with specialized skills, expertise, or licensure status whose absence would lead to a collapse of critical services, and to

¹The organization of the prioritization list into categories and levels is based on the federal [Guidance on Allocating and Targeting Pandemic Influenza Vaccine](#)

protect workers who are at high risk of occupational infection and/or transmission of influenza.

Results

Category 1. Health-vulnerable Groups and General Population

Table S3-1 presents the prioritization list for the Health-vulnerable Groups and General Population Category. Infants and young children as well as healthy household contacts ages 65+ of vulnerable populations dominate the top of the prioritization list. The groups at high risk of influenza complications (those with chronic medical conditions and pregnant women) comprise the middle of the list. Healthy older children (ages 6-17) and healthy adults along with the remaining household contacts of vulnerable populations (ages 2-64) comprise the bottom of the prioritization list for this category.

Table S3-1. Health-vulnerable Groups and General Population*

Level	Rank	Target Group	Final Prioritization Score
Highest (A)	1	Household Contacts of Severely Immunocompromised Persons, Ages 65+	12.96
	2	Household Contacts of Children <6 Months, Ages 65+	12.85
	3	Healthy Young Children, Ages 2-5	12.67
	4	Infants and Toddlers, Ages 6-23 months	12.07
Moderate (B)	5	People with Chronic Medical Conditions, Ages 2-17	11.35
	6	People with Chronic Medical Conditions, Ages 65+	11.26
	7	Pregnant Women (all ages) [†]	11.18
	8	People with Chronic Medical Conditions, Ages 18-64	11.14
Lower (C)	9	Household Contacts of Children <6 Months, Ages 2-17 [†]	9.52
	10	Healthy Children, Ages 6-17	9.52
	11	Healthy Adults, Ages 18-64	9.26
	12	Household Contacts of Children <6 Months, Ages 18-64 [†]	9.10
	13	Household Contacts of Severely Immunocompromised Persons, Ages 2-17 [†]	8.75
	14	Household Contacts of Severely Immunocompromised Persons, Ages 18-64 [†]	8.64

* Several age categories are slightly different than recommended in the federal guidance because the DAST survey was administered before the federal guidance was issued.

[†] Both pregnant women and healthy household contacts of vulnerable populations (indicated by asterisks) have frequent, close, and prolonged contact with vulnerable persons who are unable to receive vaccine. As a result, they should be reconsidered for higher vaccination priority within category one.

Category 2. Health Care and Social Services

Table S3-2 presents the prioritization list for the Health Care and Social Services Category. Public health emergency responders and medical care practitioners dominate the top of the prioritization list. Other public health and health care professionals (technicians and aides, pharmacists, public health responders), emergency relief organizations and those working in inpatient, outpatient, and residential health care settings comprise the middle of the list. The rest of the public health and health care professionals, medical care settings, death care services, social services, and religious organizations comprise the bottom of the prioritization list for category two.

Table S3-2. Health Care and Social Services

Level	Rank	Target Group	Final Prioritization Score
Highest (A)	1	Medical Care Practitioners - all	24.30
	2	Public Health Emergency Responders	24.22
Moderate (B)	3	Medical Care Technicians and Aides -all	21.94
	4	Pharmacy Personnel	21.58
	5	Public Health Surge Emergency Responders	21.25
	6	General Medical and Surgical Hospital Services	20.27
	7	Nursing and Residential Care Facility Personnel	19.81
	8	Emergency Relief Organizations Personnel	19.60
	9	Ambulatory Care Facility Personnel	19.47
Lowest (C)	10	Mental Health and Social Service Providers –all	18.05
	11	Psychiatric and Substance Abuse Hospital Personnel	18.01
	12	Death Care Services	16.85
	13	Medical Scientists and Laboratory Technicians -all	16.02
	14	Health Care System Support and General Support Services – all	15.49
	15	Other Health and Personal Care Store Personnel	15.23
	16	Religious Organizations	14.37
	17	Non-emergency Public Health Professionals	14.01
	18	Non-emergency Social Assistance Services	13.25

Category 3. Critical Infrastructure

Table S3-3 presents the prioritization list for the Critical Infrastructure Category. Frontline responders (EMS, police, fire) comprise the top of the prioritization list. Corrections, emergency management, medical manufacturing and laboratories, and some essential community services (passenger transportation, utilities, education, food retail) comprise the middle of the list. The remaining community services as well as public administrators and elected officials and the remaining community services (postal services, information sector, banking, agriculture, manufacturing, warehousing, shipping) comprise the third level of the prioritization list. Finally, the

mining sector (oil and natural gas extraction) is ranked last on the prioritization list for category three.

Table S3-3. Critical Infrastructure

Level	Rank	Target Group	Final Prioritization Score
Highest (A)	1	Emergency Medical Services (EMS)	24.13
	2	Fire Protection/EMT	23.70
	3	Police Protection/ Law Enforcement	23.57
Moderate (B)	4	Corrections Services	18.73
	5	Food, Beverage and Grocery Stores	18.17
	6	Emergency and Disaster Management Services	17.56
	7	Medical and Diagnostic Laboratories	17.45
	8	Passenger Transportation Services	17.31
	9	Medical and Pharmaceutical Manufacturing Services	17.16
	10	Utilities Services	16.58
Lowest (C)	11	Educational Services	15.83
	12	Waste Management and Remediation Services	15.06
	13	Postal Services	14.96
	14	Food Manufacturing Services	14.87
	15	Telecommunications Services	14.55
	16	Judicial and Legal Services	14.39
	17	Executive Offices	14.30
	18	Public Finance Services	14.07
	19	Gasoline Stations	14.02
	20	Broadcasting and Publishing Personnel	13.52
	21	Poultry and Egg Production Services	13.15
	22	Departments of Food and Agriculture Personnel	12.67
	23	Financial and Insurance Services	12.66
	24	Tribal Governments	12.52
	25	Non-passenger Cargo Transportation Services	12.42
	26	Legislative Bodies and Offices	12.13
	27	Warehousing and Storage Services	11.50
28	All Other Manufacturing	10.83	
29	Departments of Fish and Game Personnel	10.69	
30	All Other Agriculture, Forestry, Fishing, and Hunting Personnel	10.58	
Last (D)	31	Mining	7.40

Categorized Prioritization Lists by Pandemic Severity

Description

The seven prioritization criteria for three possible pandemic scenarios (severe, moderate, mild) are based on the US Department of Health and Human Services Pandemic Severity Index (PSI)². The assumptions are as follows:

- Severe- Category 4-5 Pandemic: Attack Rate 30%, Case Fatality Rate 2%
- Moderate - Category 3 Pandemic: Attack Rate 30%, Case Fatality Rate 0.5-1%
- Mild - Category 1-2 Pandemic: Attack Rate 30%, Case Fatality Rate 0.2%

Researchers developed categorized prioritization lists based on these pandemic scenarios and compared these to the list from the statewide survey sample (baseline data). These lists were analyzed to determine if the positions of the target groups (movement between levels) changed between the pandemic scenarios.

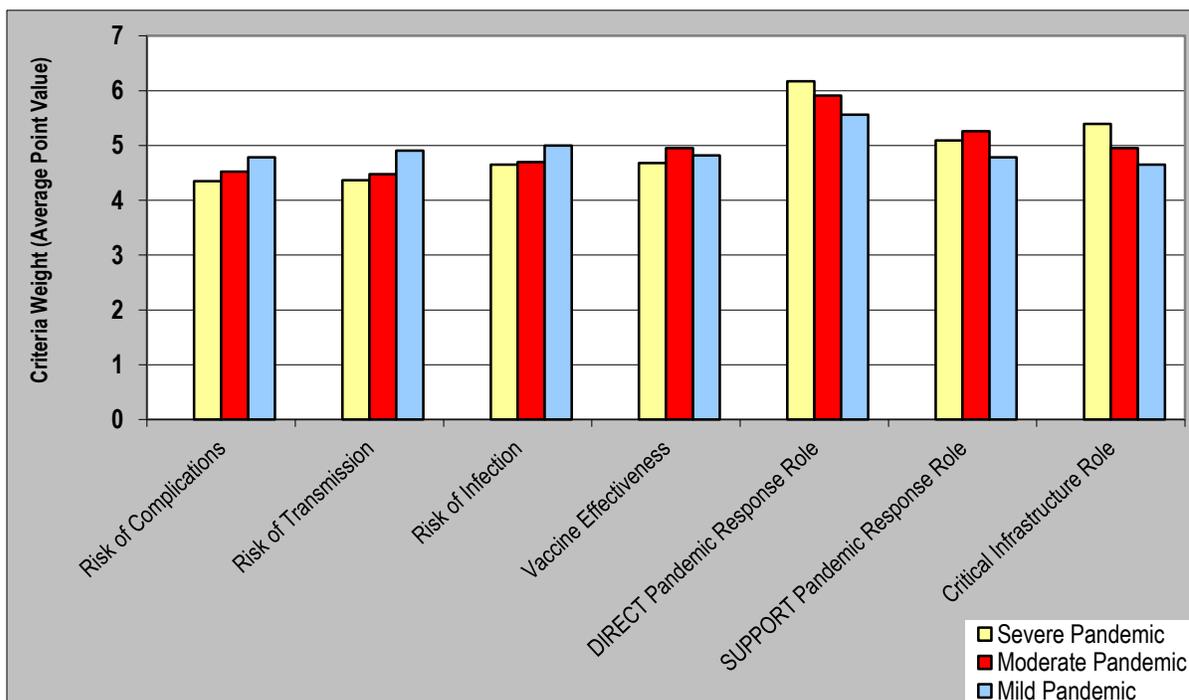
Results

Figure S3-2 presents the criteria weights by pandemic severity. The average point values (weights) for each individual criterion were generally consistent across the three pandemic scenarios. As a result, the differences in the criteria weights had a minor impact on the target groups' final prioritization scores and subsequent rankings.

However, several trends persisted. The health-related criteria (e.g. risk of complication, risk of infection, and risk of transmission) were considered more important during a mild pandemic than during a severe or moderate pandemic. Conversely, the role-based criteria (e.g. performing a support pandemic response role and performing a critical infrastructure role) were considered more important during a severe or moderate pandemic than during a mild pandemic. As a result, the final prioritization scores and subsequent rankings increased for health-vulnerable and general population target groups during a mild pandemic and decreased for role-based target groups.

² Pandemic Severity Index found in DHHS CDC Interim Pre-pandemic Planning Guidance: [Community Strategy for Pandemic Influenza Mitigation in the United States](#) – Early, Targeted, Layered Use of Non-pharmaceutical Interventions.

Figure S3-2. Prioritization Criteria by Weight and Pandemic Severity



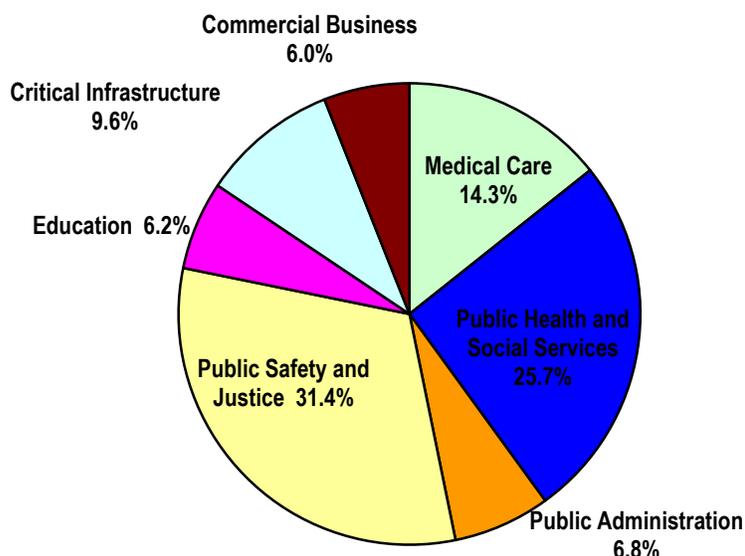
Stratified Prioritization Lists by Industry Sector

Description

The statewide sample of pandemic response experts included representatives from each of the 53 role-based target groups from the prioritization list. In order to determine whether the results differed across the sample of survey participants, the sample was divided into seven strata based on the participants’ employment within a specific industrial sector.

Figure S3-3 presents the distribution of participants from the survey sample that comprised each of the seven industry-based strata.

Figure S3-3. Distribution of Survey Participants by Industry Sector



Next, criteria weights were calculated for each of the seven industry-based strata and compared to the criteria weights from the statewide sample (baseline data) to determine the range of values for these weights. In addition, rank-ordered prioritization lists were developed for each stratum and compared to the prioritization list from the statewide sample.

These lists were then divided into the three categories (general public, health care, and critical infrastructure) and compared to the categorized prioritization lists from the statewide sample. These lists were analyzed to determine if the positions of the target groups (movement between levels) changed between the strata.

Results

Criteria Weights Stratified by Industry Sector

The levels of agreement (variability) across the strata are reflected in the rankings of the criteria weights in order of importance within each occupational stratum (Table S3-4). All seven strata considered “performing a direct pandemic response role” to be the most important criterion and “risk of complications” to be the least important criterion.

There was less agreement across the seven sectors in determining the importance of the “risk of transmission”, and “vaccine effectiveness” criteria (shaded below). The education sector considered the “risk of transmission” criterion as the second most important criterion whereas the commercial business and public safety sectors felt it was the second least important criterion (ranked 6th). Conversely, the critical

infrastructure and commercial business sectors considered the criterion “performing a critical infrastructure role” to be much more important than the education sector. Finally, the public health and social services sector considered the “vaccine effectiveness” criterion to be much less important (ranked 6th) than the education sector (ranked 3rd) in determining which target groups should receive priority for vaccine. These differences in the criteria weights likely reflect the different risks and response roles each of these sectors will face in responding to an influenza pandemic in California.

Table S3-4. Rankings of Prioritization Criteria Weights (Average Point Values) by Industry Sector

Strata	Total Sample (385)	Commercial Business (23)	Critical Infrastructure (37)	Education (24)	Medical Care (55)	Public Administration (26)	Public Health and Social Services (99)	Public Safety and Justice (121)
DIRECT Pandemic Response Role	1	1	1	1	1	1	1	1
SUPPORT Pandemic Response Role	2	3	3	4	2	2	2	2
Critical Infrastructure Role	3	2	2	5	3	3	4	3
Risk of Transmission	4	6	5	2	5	5	3	6
Vaccine Effectiveness	5	5	4	3	4	4	6	4
Risk of Infection	6	4	6	6	6	6	5	5
Risk of Complications	7	7	7	7	7	7	7	7

Categorized Prioritization Lists Stratified by Industry Sector

There was widespread agreement among the strata concerning the role-based target groups’ final prioritization scores. Most of the targets groups in the Health Care and Social Services and Critical Infrastructure Categories remained within the same levels across all seven industry-based strata.

However, there were some differences in the final prioritization scores across the seven strata for Category 1. Health-vulnerable and General Population. (Table S3-5 presents this graphical comparison across the seven industry-based strata for this category.)

The Critical Infrastructure Stratum’s final prioritization scores were several points lower for all of the target groups within this category compared to the scores for the entire sample (baseline). Conversely, the Education Stratum’s final point scores were several points higher than the baseline. However, the effects of the differences

between these two strata and the baseline data were small relative to the entire sample.

In addition, the final prioritization score for pregnant women was substantially higher in five out of the seven strata compared to the baseline data. This should be taken into account when making the final prioritization recommendations.

Table S3-5. Category 1. Health-vulnerable Groups and General Population: Stratified by Industry Sector

	= Moved to Level A (≥ 11.71)
	= Moved to Level B (< 11.71 and ≥ 10.33)
	= Moved to Level C (< 10.33)

Level	Target Group	Total Sample (baseline) (385)	Commercial Business (23)	Critical Infrastructure (37)	Education (24)	Medical Care (55)	Public Administration (26)	Public Health and Social Services (99)	Public Safety and Justice (121)
A	Household Contacts of Severely Immunocompromised Persons, Ages 65+	12.96	12.54	11.22 (B)	15.05	12.52	12.39	13.78	12.86
	Household Contacts of Children <6 Months, Ages 65+	12.85	13.65	10.96 (B)	14.10	12.44	13.02	13.83	12.37
	Healthy Young Children, Ages 2-5	12.67	14.17	11.00 (B)	13.77	11.94	13.04	13.31	12.43
	Infants and Toddlers, Ages 6-23 months	12.07	12.72	10.30 (C)	13.41	11.49 (B)	12.26	12.98	11.69 (B)
B	People with Chronic Medical Conditions, Ages 2-17	11.35	11.47	9.66 (C)	12.98 (A)	10.90	11.65	11.49	11.55
	People with Chronic Medical Conditions, Ages 65+	11.26	11.71 (A)	10.24 (C)	11.92 (A)	10.61	11.12	11.73 (A)	11.32
	Pregnant Women (all ages)	11.18	12.00 (A)	9.20 (C)	12.07 (A)	11.03	11.66	11.48	11.20
	People with Chronic Medical Conditions, Ages 18-64	11.14	10.94	10.27 (C)	12.66 (A)	10.57	11.13	10.79	11.67
C	Household Contacts of Children <6 Months, Ages 2-17	9.52	10.87 (B)	7.84	10.48 (B)	9.71	10.07	9.96	9.04
	Healthy Children, Ages 6-17	9.52	10.57 (B)	8.82	9.64	9.36	9.60	9.19	9.83
	Healthy Adults, Ages 18-64	9.26	11.03 (B)	8.54	9.26	9.03	9.30	9.01	9.49
	Household Contacts of Children <6 Months, Ages 18-64	9.10	10.42 (B)	7.63	10.32	8.77	9.43	9.30	9.03
	Household Contacts of Severely Immunocompromised Persons, Ages 2-17	8.75	8.45	7.90	11.30	8.72	8.54	9.01	8.42
	Household Contacts of Severely Immunocompromised Persons, Ages 18-64	8.64	8.96	7.71	11.26	8.46	8.15	8.63	8.58

Note: Several age categories are slightly different than recommended in the federal guidance because the DAST survey was administered before the federal guidance was issued.

Limitations

This section describes the limitations that arose from administering the prioritization survey and analyzing the survey results. The discussion below presents four key limitations with the prioritization survey process along with the rationale as to why these limitations did not have a large impact on the final results.

1. Non-random survey sample

The Pandemic Influenza Vaccine Prioritization Survey was administered to a statewide sample of 385 pandemic preparedness and response experts. It would have become too costly and time consuming to draw this sample size from our sampling frame using random sampling methods.

Furthermore, the main goal for the survey sample was to obtain participation from each of the 53 role-based target groups on the prioritization list; which we achieved. We recruited participants from 270 different organizations who have specialized knowledge and expertise in pandemic influenza planning, and who are developing pandemic influenza response plans for their organization. These participants understand the roles their target group will need to perform during a pandemic as well as the unique risks persons within their target group will face in the event of a pandemic. Therefore, we feel that our sampling techniques provided us with excellent survey participants who in turn gave us consistent and high-quality results.

2. Use of supplemental survey with small sample size

In order to align the California prioritization process with federal recommendations, a supplemental prioritization survey was developed. This modified survey incorporated several critical components that were not included in the statewide survey. The supplemental survey rated the importance of the vaccination criteria in prioritizing populations for influenza vaccine under different pandemic scenarios. In addition, this survey asked participants to determine the “level of criticality” and “degree of expertise” for professional role-based target groups. The information obtained from this supplemental survey was incorporated into the analysis to produce California’s rank ordered prioritization list.

It would have been too costly and time consuming to re-survey 385 participants from the statewide sample. Instead, this survey was administered to **23** members of the California Joint Advisory Committee on Emergency Preparedness (JAC). The supplemental survey results were very useful. Furthermore, these results did not have a large impact on the target groups’ final prioritization scores or rankings.

3. Survey contained limited number of answer choices

The statewide survey instrument provided a limited number of answer categories for questions asking respondents to determine if target groups fulfill the criteria. These categories included: “yes”, “no” and “not sure” (or “direct role”, “support role”, “no role” and “not sure” for the role-based questions). This limited range of options forced respondents to make an absolute assessment of whether groups matched or did not match a criterion.

One key objective of this survey was to force participants to make decisions concerning the importance of the prioritization criteria and how well target groups met these criteria. Therefore, providing more answer choices with vague qualifiers (e.g. somewhat yes, somewhat no) would lead to poor quality results.

4. Use of survey does not allow for consensus decision-making

There are tradeoffs between using a survey versus a collective bargaining process to make decisions. The use of a self-administered survey questionnaire provides an opportunity for decision-makers to express their opinions independently and in a confidential environment. Because the responses from these decision-makers are averaged together, each response is of equal importance in calculating the final prioritization scores. However, using a survey as the sole method for decision-making does not allow individuals within the group to express strong opinions nor does it allow members to influence others' decisions in order to gain a consensus.

Oftentimes, collective bargaining processes use a very small group of stakeholders who may not accurately represent the entire target population. Furthermore, these stakeholders engage in a process where they recommend target groups for prioritization and then develop the rationale that supports the inclusion of that group. Our process is unique in that we have documented the **rationale** for why persons should be prioritized and the survey results will determine which groups qualify for vaccination under that rationale.

Conclusion

The results from the vaccine prioritization survey represent one key component of the CDPH prioritization process. These results will be compared to the national vaccine prioritization list in order to align the California prioritization process with federal recommendations. In addition, the CDPH vaccine prioritization recommendations are being used to develop implementation recommendation to determine how to allocate and administer vaccine to individuals within these target groups.

SUPPLEMENTAL DOCUMENT 4. ALIGNMENT OF CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH) AND FEDERAL GOVERNMENT VACCINE PRIORITIZATION PROCESSES

This appendix outlines the key similarities and differences between the US Federal Government and the California Department of Public Health (CDPH) prioritization processes including the selection of participants, the decision analysis approaches, the development of prioritization inputs, the rationales for prioritization, and the structure of the prioritization lists. Table S4-1 presents a comparison of the two processes and the decisions made to align the CDPH process with federal prioritization recommendations.¹²

Table S4-1. Alignment of CDPH and US Federal Government Prioritization Processes

Prioritization Process Component	US Federal Government vs. CDPH Comparison	Aligning CDPH and Federal Prioritization Processes
Prioritization Process Participants	<ul style="list-style-type: none"> Both CDPH and the Federal Government obtained input from a variety of participants including pandemic emergency response experts, policymakers and analysts, public health scientists, and bioethicists. The Federal government obtained input from both stakeholders and the general public. CDPH obtained input from stakeholders, but has not obtained input from the general public. 	<ul style="list-style-type: none"> CDPH convened the Pandemic Influenza Vaccine and Anti-viral (PIVA) Workgroup to advise CDPH and assist in developing recommendations for administering vaccine and dispensing antivirals to prioritized target group members.
Decision Analysis Approaches	<ul style="list-style-type: none"> Both CDPH and the Federal Government obtained input from a variety of sources including scientific assessment of influenza vaccine, historical analyses of past pandemics, discussions of national and homeland security issues, and identification of essential community services. Federal government used multiple approaches including a prioritization survey and a consensus-based decision making approach from a small group of influential stakeholders. CDPH developed a formal decision analysis tool and administered a prioritization survey to a large group of stakeholders. 	<ul style="list-style-type: none"> The formal decision analysis process formed the basis of prioritization recommendations for both the Federal Government and CDPH. CDPH engaged in consensus decision making within the Immunization Branch to align federal and CDPH recommendations and to draft the CDPH guidance.

¹ Refer to federal [Guidance on Allocating Pandemic Influenza Vaccine](#) for the federal government prioritization process.

² Refer to Supplemental Document 2 for additional detail on the CDPH prioritization process.

Prioritization Process Component	US Federal Government vs. CDPH Comparison	Aligning CDPH and Federal Prioritization Processes
Prioritization Inputs: Vaccination Objectives (Criteria)	<ul style="list-style-type: none"> • Both the Federal Government and CDPH determined that there was no single overriding criterion and therefore they considered all criteria simultaneously. • Federal Government and CDPH identified many similar criteria. • Several of these criteria were defined differently by CDPH and Federal government. • Several criteria included on the federal list were not included on the state list (and vice versa). • Federal criteria not initially considered by CDPH: <ul style="list-style-type: none"> ○ To protect children ○ To protect persons who maintain national and homeland security ○ To protect persons who delay entry of pandemic virus into the United States • CDPH criteria not considered by the federal government: <ul style="list-style-type: none"> ○ To protect persons who are at high risk of transmitting the virus to health vulnerable populations ○ To protect persons at high risk of infection (in the community) 	<ul style="list-style-type: none"> • The differences in the number of vaccination criteria and the definitions had a minor impact on the CDPH v. Federal Government prioritization recommendations. • CDPH did not include “protecting children” as a criterion, but did include this as a rationale for prioritizing children highly among groups defined by age and health status. • CDPH did not include the other two federal objectives: “national and homeland security” and “delay entry of virus into US,” because these are federal objectives.
Prioritization Inputs: Target Groups³	<ul style="list-style-type: none"> • Both the Federal Government and CDPH target group lists include every resident in their jurisdiction (US and CA respectively). • Federal Government and CDPH identified many similar target groups. • Several of these target groups were defined slightly differently by CDPH and Federal Government. • Several groups included on the federal list were not included on the state list and vice versa. • Federal Government list identified 38 distinct target groups. • Federal target groups not initially designated in CDPH process included: <ul style="list-style-type: none"> ○ <i>Homeland and National Security Sector (all target groups)</i> ○ <i>Financial Clearing and Settlement Personnel</i> ○ <i>Chemical Manufacturing and Production Sector</i> • CDPH groups not designated by the 	<ul style="list-style-type: none"> • CDPH incorporated federal definitions for most target groups where differences in target group definitions existed. • CDPH included the “Financial Clearing and Settlement Personnel” and the “Chemical Manufacturing and Production Personnel” as critical infrastructure target groups. • CDPH did not include target groups in the Homeland and National Security Sector, except the California National Guard. • CDPH subprioritized many of their target groups within the broader “federally defined” target groups. Including the following: <ul style="list-style-type: none"> ○ Severely Immunocompromised Persons (not their household contacts) were

³ Refer to Appendix A for a comparison of CDPH and federal government target group lists and recommended CDPH sub-prioritization within these target groups.

Prioritization Process Component	US Federal Government vs. CDPH Comparison	Aligning CDPH and Federal Prioritization Processes
	<p>Federal Government included:</p> <ul style="list-style-type: none"> ○ <i>Household Contacts of Severely Immunocompromised Persons</i> ○ <i>Health Care Providers -Psychiatric and Substance Abuse Hospitals</i> ○ <i>Tribal Governments</i> ○ <i>Warehousing and Storage Personnel</i> ○ <i>Educational Services Personnel</i> ○ <i>Broadcasting and Telecommunications Personnel</i> ○ <i>Solid Waste Management Personnel</i> 	<p>included within the “Persons with High-risk Medical Conditions” Target Groups.</p> <ul style="list-style-type: none"> ○ Health Care Providers in Psychiatric and Substance Abuse Hospitals were included within the “Health Care Providers in Other Inpatient and Long Term Care Facilities” Target Group. ○ Tribal governments were included within the two federally defined government target groups (e.g. “Critical Government Personnel”, and “Other Important Government Personnel”). ○ Warehousing and Storage Personnel was included within the “Postal, Shipping, Warehousing and Storage Personnel” Target Group. <ul style="list-style-type: none"> • CDPH included “Educational Services Personnel,” “Broadcasting and Publishing Personnel,” and “Solid Waste Management Personnel” as separate target groups. These groups may provide essential community services during a pandemic and are an important part of California’s critical infrastructure.
<p>Prioritization Rationale: Policy Implications</p>	<ul style="list-style-type: none"> • Federal Government incorporated multiple policy implications (public health and economic rationales) in determining target group prioritization rankings. • CDPH did not initially consider any of these rationales in determining target group prioritization rankings. • Policy rationales considered by the Federal Government included the following: • <u>Economic Rationale</u> <ul style="list-style-type: none"> ○ Efficient Allocation of Vaccine (effectiveness per dose for health-related target groups) ○ Sector interdependencies ○ Worker redundancies ○ Types of goods and services provided 	<ul style="list-style-type: none"> • CDPH incorporated the following policy rationales into the justification for determining priority ranking of target groups: <ul style="list-style-type: none"> ○ Efficient allocation of vaccine ○ Sector interdependencies ○ Worker Redundancies ○ Types of goods and services provided • CDPH did not incorporate the following policy rationales into their justification for determining priority ranking of target groups. • <u>Supply and Demand for Goods and Services</u> <ul style="list-style-type: none"> ○ CDPH felt it will be too

Prioritization Process Component	US Federal Government vs. CDPH Comparison	Aligning CDPH and Federal Prioritization Processes
	<p>(durable v. nondurable goods)</p> <ul style="list-style-type: none"> ○ Anticipated supply and demand for goods and services ● <u>Public Health/Social Rationale</u> <ul style="list-style-type: none"> ○ Implementation of community mitigation strategies ○ Reducing social consequences 	<p>difficult to predict availability of goods and services 4-5 months into a pandemic (when vaccine becomes available) and shouldn't be incorporated into prioritization decision making until a pandemic occurs.</p> <ul style="list-style-type: none"> ● <u>Reducing Social Consequences</u> <ul style="list-style-type: none"> ○ CDPH's main goal is to reduce health consequences. Protecting critical role-based target groups who provide essential health and community services will save lives and contribute indirectly to maintaining social and economic continuity. ○ CDPH indirectly addresses this policy rationale by prioritizing critical health care and critical infrastructure workers in the highest vaccination tiers.
<p>Prioritization List Framework: Categories</p>	<ul style="list-style-type: none"> ● Both the federal government and CDPH divided the target groups into prioritization categories corresponding to the federal vaccination program criteria. ● Federal prioritization categories included: <ul style="list-style-type: none"> ○ Health-vulnerable and General Population ○ Health Care and Community Support Services ○ Critical Infrastructure ○ Homeland and National Security. ● CDPH Prioritization Categories included <ul style="list-style-type: none"> ○ Health-vulnerable and General Population ○ Health Care and Community Support Services ○ Critical Infrastructure 	<ul style="list-style-type: none"> ● CDPH did not include the Homeland and National Security Category because target groups in this category are federal employees (exception-California National Guard). ● CDPH included the remaining three federal prioritization categories.
<p>Prioritization List Framework: Tiered Structure</p>	<ul style="list-style-type: none"> ● Federal government developed tiers (defined by pandemic severity) to integrate target groups from the four vaccination categories. ● All target groups within a tier have equal priority for vaccine unless otherwise indicated. ● Target groups within tiers can differ 	<ul style="list-style-type: none"> ● CDPH applied the federal government's tiering structure to CDPH categorized prioritization lists. ● CDPH incorporated the federal government's rationale for making different prioritization decisions based on pandemic

Prioritization Process Component	US Federal Government vs. CDPH Comparison	Aligning CDPH and Federal Prioritization Processes
	<p>depending on pandemic severity.</p> <ul style="list-style-type: none"> • The Federal Government sub-prioritized target groups in Tier 1 to ensure critical workers can provide essential emergency services and to protect the most vulnerable populations. • CDPH compared target groups prioritization rankings by pandemic severity but did not initially incorporate a tiered structure into the prioritization framework. • There were no significant differences between the Federal Government and CDPH tiered structures. 	<p>severity.</p>

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