

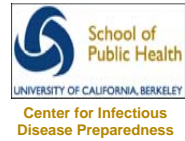


Developing a Comprehensive Prioritization Process for Pandemic Influenza Vaccine

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Background

Vaccination is a key prevention strategy and control measure for decreasing the health consequences of an influenza pandemic. Given the limited amount of vaccine that will be available early in a pandemic, The California Department of Health Services (CDHS) must have an effective prioritization plan to designate the target groups for initial vaccination.

To address the need for a prioritization process, The Immunization Branch of CDHS formed the Joint Advisory Committee on Pandemic Influenza Vaccine and Antiviral Prioritization. CDHS contracted with the University of California, Berkeley Center for Infectious Disease Preparedness (CIDP) to develop a comprehensive vaccine prioritization plan.

Objectives

CDHS has identified the following objectives for a California pandemic influenza vaccine prioritization plan:

- Systematic: based on a logical methodology to identify alternatives and project outcomes;
- Justifiable: based on epidemiologic, social science, and ethics literature and supported by best-practices research;
- Flexible: can be adjusted based on the changing epidemiologic characteristics of a pandemic;
- Adaptable: can be applied to different populations in different settings; and
- Transparent: clearly defined and incorporates expert opinion and feedback.

Analytical Method

CDHS developed the Decision Analysis Scoring Tool that simultaneously analyzes multiple goals, criteria, and alternatives to develop an optimal prioritization scheme. 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. [1] The Analytic Hierarchy Process evaluates target groups along competing vaccination criteria and assigns a numerical score to each group based on how well it matches the criteria. At the end of this process, the Scoring Tool produces a rank-ordered list of target groups prioritized for influenza vaccination that can be implemented within the state. These results will be evaluated on multiple implementation criteria to build an optimal vaccine implementation strategy.

[1] Ryan, M., et al. Eliciting public preferences for healthcare: a systematic review of techniques. Health Technol Assess. 2001. 5(5): p. 1-186.

Methodology Overview

The Decision Analysis Scoring Tool methodology comprises four stages:

- The Scoring Tool inputs (e.g. intervention goals, vaccination strategies, vaccination criteria, direct determinants, and target groups) are identified and defined in successive steps.
- The Scoring Tool survey is developed and administered to determine the importance of the criteria and assess how well each target group meets the criteria. In addition, the priority score calculation method is established. A target group's score is based on 1) the criteria weights; 2) the strength of match with a given criterion; and 3) the number of criteria met.
- The survey results are analyzed to develop the rank ordered priority list. The criterion scores for each target group are summed to produce the final prioritization score. These scores are arranged into a rank-ordered list of priority groups.
- The results are evaluated on multiple implementation criteria to develop an optimal vaccine implementation strategy.

Figure 1. Decision Analysis Scoring Tool Methodology (Stage 4 not shown).



Vaccination Strategies and Criteria

| Strategies | Criteria |
|--|---|
| Rationing by medical and prevention needs | <ul style="list-style-type: none"> Risk of transmission Risk of infection Risk of complication |
| Rationing by probability of successful immunization | <ul style="list-style-type: none"> Vaccine effectiveness |
| Rationing to those who perform essential emergency response role | <ul style="list-style-type: none"> Provides DIRECT pandemic emergency response service Provides SUPPORT pandemic emergency response service |
| Rationing to those who perform essential community role | <ul style="list-style-type: none"> Provides CRITICAL infrastructure service |

Target Group List

The target group list identifies populations that will likely meet one or more of the Decision Analysis Scoring Tool criteria and therefore should be targeted (or receive priority) for vaccine during the early stages of the pandemic. The target groups were selected based on health-related characteristics and professional roles. In total **72 target groups** were identified and included in the Related Tool.

| HEALTH RELATED CHARACTERISTIC TARGET GROUPS | ROLE-BASED TARGET GROUPS |
|--|--|
| People with Chronic Medical Conditions (all ages) People with Chronic Medical Conditions, ages 2-18 People with Chronic Medical Conditions, ages 18-64 People with Chronic Medical Conditions, ages 65+ | Medical care services industry General Medical and Surgical Hospitals Medical Care Practitioners Medical Care Technicians and Aides Medical Scientists and Laboratory Technicians Mental Health and Social Service Providers Health Care System Support and General Support Psychiatric and Substance Abuse Hospitals Some occupational groups as General Medical and Surgical Hospitals Ambulatory care facilities Some occupational groups as General Medical and Surgical Hospitals (except No Medical Scientists and Lab Technicians) |
| Program Warrant (all ages) Infants and Toddlers, Ages 4-23 months Household contacts of children <4 months, all ages Household Contacts of children <4 months, ages 3-17 Household contacts of children <4 months, ages 18-64 Household contacts of children <4 months, ages 65+ | Public Health Departments Public Health Emergency Responders Public Health Sage-Emergency Responders Non-emergency Public Health Professionals |
| Household contacts of severely immunocompromised person, all ages Household contacts of severely immunocompromised persons, ages 2-18 Household contacts of severely immunocompromised persons, ages 18-64 Household contacts of severely immunocompromised persons, ages 65+ | Commercial Health Industries Medical and Diagnostic Laboratories Medical and pharmaceutical manufacturing Pharmacies Other health and personal care stores Death care services Financial and Insurance Services Community and Individual Care Services |
| Other HEALTH POPULATIONS Healthy Children, ages 2-6 Healthy Children ages 6-17 Healthy Adults, ages 18-64 | Transportation and Warehousing (Selected Industries) Passenger transportation Non-passenger cargo transportation Postal Services Warehousing and Storage |
| Public Administration (Selected Industries) Executive Offices Legislative Bodies and Offices Tribal Governments Public Finance Services Departments of Fish and Game Departments of Food and Agriculture Departments of Food and Justice (Selected Industries) Judicial and Legal Services Police Protection/Law Enforcement Fire Protection/EMT Corrections Emergency and Disaster Management Services | Manufacturing Food Manufacturing All other manufacturing |
| Agriculture Poultry and Egg Production All other agriculture, forestry, fishing, and hunting | Mining Retail Trade (Selected Industries) Food, Beverage and Grocery Stores Gasoline Stations |
| Information Broadcasting and Publishing Telecommunications | Utilities Waste Management and Remediation Services |
| Educational Services | |

Vaccine Prioritization Survey

The Decision Analysis Scoring Tool methodology is centered on a self-administered survey that assesses the relative importance of the prioritization criteria and evaluates the target groups along the criteria. The three main objectives of the survey are:

- To determine the relative importance of the identified criteria in achieving the intervention goals;
- To determine how well each target group meets the relevant vaccination criteria; and
- To assess the strength and usability of a survey instrument to prioritize populations for influenza vaccine.

Calculating Vaccine Prioritization Scores

Calculating prioritization scores takes place in two major steps:

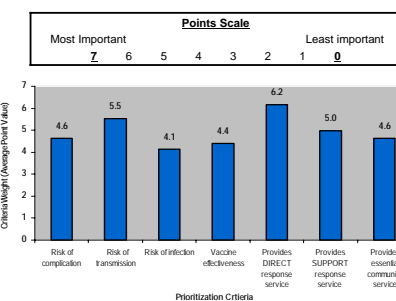
- Calculating individual criterion scores
- Calculating final prioritization scores

Points are assigned to a target group based on the following:

- Weight of the criteria
- Strength of the match
- Number of criteria met

Calculating Individual Criterion Scores: Derive Criteria Weights

Instructions: **RATE** the importance of each criterion in determining which groups should be vaccinated in the early stages of the pandemic



Calculating Vaccine Prioritization Scores

Calculating Individual Criterion Scores: Strength of Match
 Criterion points are assigned to a target group based on the following:

- Weight of the criteria: numerical point value of criterion
- Strength of the match: refers to how well a target group meets a criterion

Example: Police Protection/Law Enforcement Industry received 3.26 points on the "direct service" criterion

$$\text{"Direct Service" Criterion Weight (6.16)} \times \text{Strength of Match (53\%)} = \text{Total Points (3.26)}$$

Calculating Final Prioritization Scores

A target group's criterion scores summed across 7 criteria to obtain the final prioritization score.

The final prioritization scores for every target group are calculated and rearranged into a rank-ordered list

Example: Police Protection/Law Enforcement Industry received final prioritization score of 22.22 points

| Criteria | Criterion Scores |
|--|------------------|
| 1. Risk of Complication | 0.00000 |
| 2. Risk of Transmission | 3.68851 |
| 3. Risk of Infection | 4.13636 |
| 4. Vaccine Effectiveness | 4.39091 |
| 5. Provides Direct Emergency Response Service | 3.26537 |
| 6. Provides Support Emergency Response Service | 3.01293 |
| 7. Provides Essential Community Service | 3.72960 |
| Final Prioritization score | 22.22368 |

Final Priority List and Next Steps

CDHS will administer the prioritization survey to a representative statewide sample of pandemic preparedness experts beginning in Summer 2006. In addition to the medical care service and public health sectors, survey participants will include experts from commercial health, public administration, justice, and critical infrastructure industries. The results from this second round will be compared with priority recommendations in the HHS plan, as well as with other state pandemic plans. In addition, CDHS will recommend implementation strategies based on this priority list.