

SUPPLEMENTAL DOCUMENT D.

Prioritization Score Calculation Method

The purpose of this Supplemental Document is to review how the results of the DAST survey will be used to derive vaccine prioritization scores for target groups. This document is divided into two main parts: I) Review of Calculation Method; and II) Review of Survey Question Values.

PART I: REVIEW OF CALCULATION METHOD

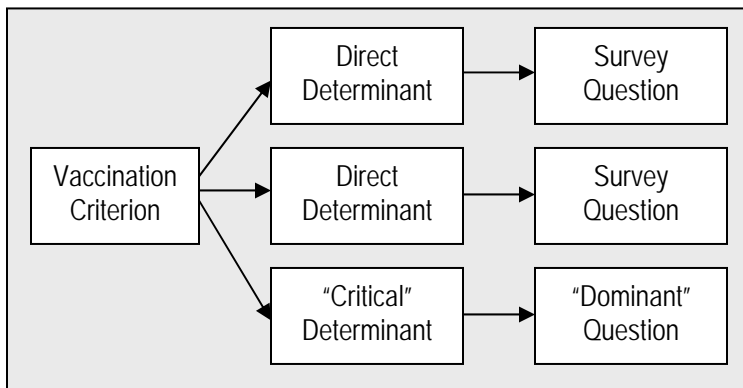
Part I of this document reviews the method use to calculate prioritization scores. Calculating prioritization scores takes place in two major steps: A) Calculate Criterion Scores; and B) Calculate Prioritization Scores.

**Calculate Criterion Scores**

**Relationship between Criterion Score Inputs**

Before reviewing how a criterion score is calculated, it is important to understand the relationship between vaccination criteria, direct determinants, and survey questions. As a reminder, each criterion is broken down into direct determinants. These direct determinants were translated into survey questions to elicit a single response. These questions test how well each target population group fulfills the vaccination criterion. Furthermore, certain determinants are more important components of a criterion than others. In these cases, the questions that test for the critical direct determinants are called “dominant questions.” See Figure 1 below for a graphical representation of the relationship between these three elements.

FIGURE 1: Relationship between Vaccination Criteria, Direct Determinants, and Survey Questions



**Criterion Score Inputs**

This section reviews the two main inputs into a criterion score: 1) criterion weight; and 2) “strength of match” between target group and criterion. An example of how to calculate the criterion score for one target population group on the “Direct Emergency Response Service” criterion will be used to illustrate the process of calculating criterion scores. (Refer to Tables 1, 2, 3, and 4 as needed throughout this document.)

**1. Criterion Weight**

The criterion weight serves as the numerical point value for the criterion. The criterion weight is equal to the *average* level of importance assigned to each criterion by DAST survey respondents. In the example shown, the “Direct Emergency Response Service” criterion received an average weight of 8.818182 by DAST survey respondents (Table 3, Label E).

**2. Strength of Match**

The “strength of the match” refers to how well each target group matches a criterion. The “strength of match” is affected by two components: A) value of survey questions; and B) average survey question answer. To find the “strength of match,” these two values are first multiplied together *for each question* and then summed together across all questions for a given criterion. Figure 2 below shows an example of this calculation for a criterion that contains two questions

FIGURE 2: Calculating “Strength of Match”

$\left( \begin{array}{cc} \text{Value of Survey} & \text{Average Answer for} \\ \text{Question \# 1} & * \text{ Survey Question \# 1} \end{array} \right) + \left( \begin{array}{cc} \text{Value of Survey} & \text{Average Answer for} \\ \text{Question \# 2} & * \text{ Survey Question \# 2} \end{array} \right) = \text{Strength of Match}$
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The two components of “strength of match” are described in further detail below.

- A. **Value of Survey Questions:** Each survey question is worth a percentage of the total criterion points available. Points are distributed equally for questions in which there is no dominating determinant. When a dominant determinant is present, it is worth twice as much as questions, which test for non-dominant determinants. Column B in Table 1 presents an example of how the criterion points were distributed across the survey questions within the “Direct Emergency Response Service” criterion. Within this criterion, the level of training and expertise that is required to perform the essential service is considered the dominating component. Q4 tests for level of expertise and is worth 40% of the criterion points whereas Q1, Q2, and Q3 are worth 20% (Table 1, Column B).

See Part II of this document to view the breakdown of the point values of survey questions for each criterion.

TABLE 1: Distribution of Criterion Points for “Direct Emergency Response Criterion”	
Survey Question [A]	Percentage Distribution of Total Criterion Points [B]

1. Are these people directly involved in the production, distribution, dissemination, or administration of influenza vaccine?	20%
2. Do these people provide direct patient care services as it relates to the pandemic emergency response?	20%
3. Do these people directly provide public health and/or front line emergency response services?	20%
4. Do these people perform services that require a high level of training as it relates to the pandemic emergency response? <b>[dominates]</b>	40%
<b>Total Criterion Points (Criterion Weight)</b>	<b>100%</b>

B. **Average Survey Question Answer:** The second component of “strength of match” is the average survey question answer. In this calculation method, a target group receives one point if a survey respondent concludes that the group meets the determinant (answers “yes” to the question). If a respondent does not believe that the group meets the determinant (answers “no”), the target group receives zero points for that question. If a respondent is unsure (answers “not sure”), the response is excluded from the analysis. Columns A, B, and C in Table 2 below present three different respondents’ answers to the “Direct Emergency Response Service” criterion questions. For example, Respondent #1 (Column A) felt that the target group met the criterion determinants tested for in Q1, Q3, and Q4, but did not meet the determinant tested for in Q2. Therefore, one point was given to Q1, Q3, and Q4 and zero points to Q2.

Survey Question	Respondent #1 Answers [A]	Respondent # 2 Answers [B]	Respondent #3 Answers [C]	Average Answer [D = (A + B + C) / 3]
1. Are these people directly involved in the production, distribution, dissemination, or administration of influenza vaccine?	1 (Y)	0 (N)	0 (N)	0.333 (1/3)
2. Do these people provide direct patient care services as it relates to the pandemic emergency response?	-- (“Not Sure”)	0 (N)	0 (N)	0 (0/2)
3. Do these people directly provide public health and/or front line emergency response services?	1 (Y)	-- (“Not Sure”)	1 (Y)	1 (2/2)
4. Do these people perform pandemic response roles that require at least two years of advanced training and the role is difficult to replace? <b>[Dominates]</b>	1 (Y)	0 (N)	1 (Y)	0.666 (2/3)

For each question, the answer points were averaged across respondents.<sup>1</sup> For Q1 in Table 2, only one respondent answered “yes.” This means that this target group received only one point across three respondents. All the average answers are displayed in Column D of Table 2.

<sup>1</sup> Average question scores are calculated by summing the total number of points received for each question and then dividing by the total number of yes/no answers.

After the “point value of survey questions” is determined and the “average survey question answer” is calculated, the “strength of match” can be calculated. To calculate the “strength of match,” the percentage of the total criterion points (Table 3, Column A) is multiplied by the average survey question answer (Table 3, Column B). The product equals the strength of match *per direct determinant*. To find the criterion “strength of match,” these values are summed across all questions within that criterion (Table 3, Column C). In this example, the target group met 53.3% of the “Direct Emergency Response Service” criterion determinants (Table 3, Label D).

**TABLE 3: Example of “Direct Emergency Response Service” Criterion Score**

Survey Question	Percentage of Total Criterion Points [A]	Average Question Answer [B]	Strength of Match [C= A * B]
1. Are these people directly involved in the production, distribution, dissemination, or administration of influenza vaccine?	0.2	0.333	0.0666
2. Do these people provide direct patient care services as it relates to the pandemic emergency response?	0.2	0	0
3. Do these people directly provide public health and/or front line emergency response services?	0.2	1	0.2
4. Do these people perform services that require a high level of training as it relates to the pandemic emergency response? [dominates]	0.4	0.666	0.2664
<i>Total Strength of Match</i>			0.533 (D)
<i>Criterion Weight</i>	1.0		8.818182 (E)
<i>Criterion Score</i>			<b>4.700 (F)</b>

**Calculating Criterion Scores**

This section reviews how the above inputs are combined and calculated into criterion scores. To calculate the criterion score, the “total strength of match” (Table 3, Label D) is multiplied by the total criterion points (Table 3, Label E). In this example, the final criterion score is calculated by multiplying 53.3% (e.g., strength of match) by 8.818182 (e.g., criterion weight). Therefore, the target population would receive 4.700 points for the “Direct Emergency Response Service” criterion (Table 3, Label F). This process of calculating criterion scores will be repeated for each of the seven criteria.

**Calculate Final Prioritization Scores**

Each target group’s criterion scores will be summed across the seven criteria to determine the group’s “final prioritization score.” Table 4 shows an example of the final prioritization score for one target group. In this example, the target group received a score of 34.162 out of a maximum 49.18 (Table 4, Label A). This calculation process will be repeated for all target groups. After the total scores have been calculated, they will be rearranged into a rank-ordered list of priority groups. Those with the highest scores will be ranked first and should be the first to receive the vaccine.

Table 4: Final Prioritization Score Calculation Example	
Criteria	Criterion Scores
1. Risk of Transmission	0.000
2. Risk of Infection	5.272
3. Risk of Complication	5.909
4. Vaccine Effectiveness	6.273
5. Provides Direct Emergency Response Service	8.337
6. Provides Support Emergency Response Service	3.233
7. Provides Essential Community Service	5.147
<b>Final Prioritization score</b>	<b>34.162 [A]</b>

PART II: REVIEW OF SURVEY QUESTION VALUES

Part II of this document reviews how points were distributed across survey questions for each of the seven criteria. Each survey question is worth a percentage of the total criterion points (criterion weight). The point values are based on the number of questions within each criterion and whether a dominant question is associated with that criterion. The default distribution is to distribute points equally across the questions. When a “dominant question” is present, it is worth twice as much as non-dominant questions. Below is a description of how points were distributed across the questions within each criterion.

**1. Risk of Transmission**

The definition of “risk of transmission” is the following: Once infected, the probability of transmitting the virus to a susceptible contact at high risk of influenza complications.

“Risk of transmission” has two survey questions associated with it: 1) duration of infectiousness; and 2) risk of contact with susceptible persons. CIDP judged that Q2 was a more important determinant of “risk of transmission”; therefore, this question is worth twice as many points as Q1. Table 1 below shows the actual point breakdown for this criterion.

TABLE 1: Point Value of “Risk of Transmission” Survey Questions	
Survey Question	Question Value (% of Total Criterion Weight)
1. On average, are these target groups infectious (e.g. shedding virus) for more than 7-10 days?	33%
2. On average, do these target groups have frequent, prolonged, and close	66%

(face-to-face) contact with <i>susceptible persons</i> at high risk of developing complications if infected? <b>[Dominant Question]</b>	
<b>TOTAL</b>	100%

**2. Risk of Infection**

The definition of “risk of infection” is the following: The probability of becoming infected through close and/or prolonged contact with potentially infectious cases.

“Risk of infection” has only one survey questions associated with it (e.g., risk of contact with potentially infectious persons); therefore, this question receives all of the criterion points. Table 2 below shows the actual point breakdown for this criterion.

Scale Question	Question Value (% of Total Criterion Weight)
On average, do these target groups have frequent close (face-to-face) and/or prolonged close contact with potentially infectious persons throughout the course of a normal day?	100%
<b>TOTAL</b>	100%

**3. Risk of Complication**

The definition of “risk of complication” is the following: Once infected, the probability of developing severe illness and/or dying as a result of the disease.

“Risk of complication” has two survey questions associated with it: 1) risk of hospitalization; and 2) risk of death. CIDP judged that both determinants are equally important determinants of “risk of complication”; therefore, these questions are each worth half of the criterion value. Table 3 below shows the actual point breakdown for this criterion.

Survey Question	Question Value (% of Total Criterion Weight)
1. On average, are these target groups at greater risk of developing influenza illness that results in hospitalization if infected?	50%

2. On average, are these target groups at greater risk of developing influenza illness that results in deaths if infected?	50%
<i>TOTAL</i>	100%

**4. Vaccine Effectiveness**

*The definition of “vaccine effectiveness” is the following: Ability of vaccine to prevent illness and death from pandemic influenza by promoting an effective immune response.*

“Vaccine effectiveness” has three survey questions associated with it: 1) high efficacy; 2) moderate efficacy; and 3) low efficacy. The point distribution for this criterion was done slightly differently than for the other six criteria. All three questions are worth equal points even though having a ‘high efficacy’ clearly dominates. This was done because the questions are collectively exhaustive such that an individual with ‘high efficacy’ will actually receive points on all three questions and therefore receive 100% of the criterion points available. This approach was taken in order to maintain the binary format that the other criteria employ on the DAST survey. Table 4 below shows the actual point breakdown for this criterion.

TABLE 4: Point Value of “Vaccine Effectiveness” Survey Questions	
Survey Question	Question Value (% of Total Criterion Weight)
1. Do these people have HIGH (70% or greater) rates of vaccine efficacy?	33.33%
2. Do these people have at least a MODERATE (40% or greater) rate of vaccine efficacy?	33.33%
3. Do these people have at least a LOW (1% or greater) rate of vaccine efficacy?	33.33%
<i>TOTAL</i>	100%

**5. Provides Direct Emergency Response Service**

The definition of “provides direct emergency response service” is the following: Provides

DIRECT service essential to carrying out an emergency response.

“Provides direct emergency response service” has four survey questions associated with it: 1) direct role in vaccine response; 2) direct patient care role; 3) direct public health and/or emergency response role; and 4) role requires advanced training and is difficult to replace. CIDP judged that Q4 tested for a more important determinant because target groups that provide a direct emergency response role *and* are difficult to replace in less than two years should receive priority. Therefore, Q4 is worth twice as many points as Q1, Q2, and Q3. Table 5 below shows the actual point breakdown for this criterion.

TABLE 5: Point Value of “Provides Direct Emergency Response Service” Survey Questions	
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Survey Question	Question Value (% of Total Criterion Weight)
1. Are these target groups directly involved in the production, distribution, dissemination, or administration of influenza vaccine?	20%
2. Do these target groups provide direct patient care services as it relates to the pandemic emergency response?	20%
3. Do these target groups directly provide public health and/or front line emergency response services?	20%
4. Do these target groups perform pandemic response roles that require at least two years of advanced training and the role is difficult to replace? <b>[Dominating Question]</b>	40%
<i>TOTAL</i>	100%

**6. Provides Support Emergency Response Service**

*The definition of “provides support emergency response service” is the following: Provides SUPPORT service that is essential to carrying out an emergency response.*

“Provides support emergency response service” has four survey questions associated with it: 1) support role in vaccine response; 2) support patient care role; 3) support public health and/or emergency response role; and 4) role requires advanced training and is difficult to replace. CIDP judged that Q4 tested for a more important determinant because target groups that provide a support emergency response role *and* are difficult to replace in less than two years should receive priority. Therefore, Q4 is worth twice as many points as Q1, Q2, and Q3. Table 6 below shows the actual point breakdown for this criterion.

**TABLE 6: Point Value of “Provides Support Emergency Response Service” Survey Questions**

Survey Question	Question Value (% of Total Criterion Weight)
1. Do these target groups directly support the production, distribution, dissemination and administration of influenza vaccine?	20%
2. Do these target groups directly support those who perform emergency medical care roles by providing services essential to maintaining an operational medical care delivery system?	20%
3. Do these target groups directly support those who perform front line emergency response roles by providing services essential to maintaining an operational public health and emergency response system?	20%
4. Do these target groups perform pandemic response support roles that require at least two years of advanced training and the role is difficult to replace? <b>[Dominating Question]</b>	40%
<i>TOTAL</i>	100%

**7. Provides Essential Community Role**

The definition of “provides essential community role” is the following: Directly contributes to social and economic continuity.

“Provides essential community role” has four survey questions associated with it: 1) life-saving/life-preserving role; 2) provide basic needs; 3) provide basic financial needs; and 4) role requires advanced training and is difficult to replace. CIDP judged that Q1 and Q4 tested for more important determinants than Q2 and Q3. Regarding Q1, individuals that save lives are more critical to the community than those who provide other basic needs. Regarding Q4, target groups that are difficult to replace in less than two years should receive priority. Therefore, both Q1 and Q4 are worth twice as many points as Q2, and Q3. Table 7 below shows the actual point breakdown for this criterion.

Survey Question	Question Value (% of Total Criterion Weight)
1. Do these target groups directly perform essential life-saving/life-preserving roles that are essential to the community? [Co-Dominate Question]	33%
2. Do these target groups provide services in order to meet the basic needs of California residents and to ensure that the state functions?	17%
3. Do these target groups provide essential services in order to meet the basic financial needs of California residents and to ensure that vital economic activities within the state continue to function?	17%
4. Do these target groups perform essential community roles that require at least two years of advanced training and the role is difficult to replace? [Co-Dominate Question]	33%
<i>TOTAL</i>	100%