

## Supplemental Document H. Discussion of DAST Limitations

This supplemental document describes the limitations of the DAST methodology and presents recommendations on improvements that can be made to minimize these limitations. Limitations were identified in the following four stages: (1) defining and identifying DAST inputs; (2) developing and administering DAST survey; (3) analyzing results and developing priority list; and (4) developing an implementation strategy.

### **Stage 1. Defining and Identifying DAST Inputs**

#### **1. Potential for missing inputs**

The DAST inputs were identified and defined by researchers at the UC Berkeley Center for Infectious Disease Preparedness (CIDP) and approved by the Pandemic Influenza Joint Advisory Committee (JAC). The JAC is comprised of a homogenous group of experts working in the medical care and public health industries. Soliciting feedback from a homogenous group of stakeholders may have resulted in the development of an incomplete list of goals, criteria, or target groups.

#### ***Recommendation***

The DAST survey instrument asks respondents to suggest additional inputs (criteria, determinants, and target groups); redefine existing ones; and exclude non-critical inputs. In addition, the survey instrument summarizes existing epidemiologic information and provides a space for respondents to identify additional research evidence. Respondents' comments will be reviewed by CIDP researchers and incorporated into the DAST. This survey will also be administered to a larger sample of respondents from a variety of health and non-health related organizations. Feedback from this heterogeneous sample will be incorporated into the DAST.

#### **2. Potential for overly complex input definitions**

While effort was made to define inputs in layperson terms, it is possible that the definitions and descriptions of the inputs (goals, criteria, and target groups) are too technical for those respondents who lack infectious disease knowledge. Respondents' lack of comprehension will impede their ability to accurately evaluate populations on the prioritization criteria.

#### ***Recommendation***

The DAST survey instrument includes open-ended questions asking respondents to redefine existing input definitions. Furthermore, the survey evaluation section asks respondents if sufficient information was provided to enable them to complete the survey. Key inputs will be reformulated and incorporated into the DAST as necessary. This issue will need to be reviewed prior to administering the survey to a large and heterogeneous sample of respondents.

#### **3. Inconsistent target group categorization**

The DAST was developed to assist CDHS in making between and within group decisions regarding who should be prioritized for vaccine. The list of target groups is

comprehensive and contains 69 groups who likely meet one or more of the criteria. Some of these groups are defined as an entire industry (e.g., food manufacturing) whereas medical care and public health groups are defined within a specific setting or occupation (e.g., medical care practitioners in hospital settings). It may be difficult for survey respondents to evaluate target groups of different sizes and different settings on the same criteria. Furthermore, this categorization adds a layer of complexity to structuring the prioritization list into tiers or bands in order to implement the vaccination policy.

### ***Recommendation***

One recommendation on improving the DAST methodology is to separate the priority group list into a “between group” list (that defines groups exclusively at the industry level) and a series of “within group” lists (that defines target groups at the occupational level within an industry or setting). The DAST survey would then be conducted in two phases. First, the statewide expert group would be asked to prioritize the “between group” list at the industry level. Then a representative group of experts that work in each of the settings would be asked to prioritize occupational groups within that setting. The DAST instrument would then create separate prioritization lists across all industries and within industries that provide direct emergency response services.

## **Stage 2. Developing and Administering DAST Survey**

### **1. Survey instrument may not adequately reflect range of individual opinions**

The survey instrument provided a limited number of answer categories for questions asking respondents to determine if target groups fulfill the direct determinants. 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 direct determinant; the survey did not allow respondents to weakly agree or disagree that the target group matched the direct determinant. Many respondents answered “not sure” and these answers were excluded from the analysis to calculate the DAST prioritization scores. The high amount of uncertainty may reflect that respondents felt constrained by the answer categories and that they were unable to express more subtle relative judgments regarding match.

### ***Recommendation***

The survey instrument could provide a greater range of answer categories to incorporate strong and weak opinions. For example, for question #20 “Do these target groups directly perform essential life-saving/life-preserving roles that are essential to the community?” The answer categories could be extended to include “yes,” “somewhat,” “no,” and “not sure.” Breaking down the answer categories in this manner may more accurately reflect the range of respondents’ opinions and capture subtle differences in degree of match. However, this could decrease the robustness of the survey results. This issue needs to be reviewed by CIDP researchers prior to administering the survey to a larger group.

### **2. Small and homogenous survey sample**

The DAST prioritization list incorporated the judgments of only 11 experts. This sample size is too small to accurately measure the relative importance of criteria weights and to calculate the target groups’ final prioritization scores. Furthermore, the expert sample

consisted entirely of medical and public health infectious disease experts from state and local health departments, hospital and community clinics, and college/universities. No representatives from other emergency response organizations (e.g., law enforcement, fire, emergency response agencies) participated in the DAST Survey.

***Recommendation***

A second round of surveying is currently being considered. A larger and more representative statewide sample of emergency preparedness experts will be drawn. Administering the survey to a large, heterogeneous group of experts will increase the strength of the survey results and facilitate stakeholder involvement.

**Stage 3. Analyzing DAST Results and Developing Priority List**

**1. Difficult for some respondents to assess relative importance of criteria**

Because the rating scale exercise asked respondents to assign points to criteria on an eleven point ordinal scale, it was difficult for respondents to determine the criteria's *relative* importance to one another. Furthermore, it is doubtful that respondents assigned points to criteria in proportion to their relative importance. The exercise asked respondents to assign twice as many points to criteria they deemed twice as important. However, individual responses did not provide these ranges. This is evidenced in the small point differential between the most important and least important average criteria weight. In addition, two out of eleven respondents did not feel that the rating scale exercise adequately assessed the criteria's relative importance.

***Recommendation***

Researchers will follow up with respondents who evaluated the rating exercise unfavorably. Suggestions for improvement in the design of the exercise or the instructions will be incorporated into the DAST survey instrument to be used in the next round.

**2. High level of uncertainty in determining whether target groups meet certain criteria**

Survey respondents had particular trouble with determining whether target groups met the following direct determinants: "close contact with susceptible individuals" and "close contact with potentially infectious individuals." (On average, 16 percent of respondents indicated that they were "not sure" whether target groups had "close contact with susceptible individuals" and 18 percent of respondents indicated that they were "not sure" whether target groups had "close contact with potentially infectious individuals.")

Because target groups are made up of individuals with myriad health risks, professional and caretaker roles, and professional expertise, respondents may not have felt comfortable answering the questions for all individuals within a target group. While the DAST survey instrument included detailed descriptions that assigned health, age, and role profiles to target groups, this may not have been sufficient to answer all of the questions. In addition, this information was presented as an appendix after the questionnaire and many respondents may not have referred to these role profiles when completing the survey. Finally, respondents may have felt that the information needed to evaluate target groups on certain criteria was not known and could not be reasonably estimated and therefore they chose to not answer the questions.

***Recommendation***

One recommendation to deal with heterogeneous population groups could be to reorganize the role based target groups to ensure that individuals within a group have similar risks, perform similar roles in similar settings and demonstrate comparable levels of expertise. However, this would likely result an even longer list of target groups. Another recommendation would be to separate individual level and group level questions; meaning, industry-level groups would be evaluated on “role-oriented” questions and occupational and health-related groups would be evaluated on “risk-related” questions.

While respondents felt that the information provided in the survey was sufficient to answer the questions, a more detailed discussion needs to take place to determine how respondents used the information and whether they referred to the target population profiles in completing the survey. Finally, CIDP researchers will organize a group discussion with pandemic influenza preparedness experts to determine which professional groups will play a role in the State’s pandemic response effort.

### **3. Inability to estimate epidemiologic impact of an influenza pandemic**

Epidemiologists cannot predict the epidemiologic impact of the next pandemic with any great certainty. Interpandemic evidence for risk of complication, risk of infectiousness, and vaccine effectiveness were incorporated into the DAST model. The burden of influenza illness during interpandemic versus pandemic years may differ widely. For example, during a pandemic, healthy children and young adults could be at greater risk of complications as opposed to older adults and those with chronic medical conditions. Therefore, the current DAST prioritization list may not reflect the epidemiologic impact of the pandemic. This would result in an ineffective vaccination plan.

#### ***Recommendation***

Flexibility was identified as a key objective of the California’s prioritization process. The DAST model is designed to incorporate pandemic epidemiologic data when it becomes available. If this data (risk of transmission, risk of disease, risk of complication) differs from that during interpandemic years, the DAST priority list rankings will change and target groups facing the greatest risks will receive greater priority.

### **4. Inability of DAST to evaluate individuals who fall into multiple target groups**

In reality, individuals can belong to multiple target groups. For example, a 40-year old doctor who is the primary caregiver for a child under 6 months would meet multiple criteria; however, the doctor would be assessed only on the features of their role and not their other health problems and caregiver responsibilities. This simplification in the model would lead to the doctor receiving a lower DAST prioritization score than their actual situation merits.

#### ***Recommendation***

The DAST model was designed to handle decision-making at the group-level rather than individual-level. For this reason, individuals that are in multiple groups will be categorized with the group that receives the highest prioritization score and is ranked the highest. More discussion will be given to this limitation and improvements to the DAST survey instrument will be explored.

### **5. Use of survey does not allow for consensus decision-making**

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 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.

**Recommendation**

One recommendation could be to create a structured group-level discussion to complete the DAST. The advisory committee would engage in group discussion to decide how important the criteria are and whether target groups fulfill the criteria. This would allow group members to share knowledge on the roles and risks of target groups as well as allow members to influence others' decisions in order to gain a consensus. There are tradeoffs between using a survey versus a collective bargaining process to make decisions. In engaging in a collective bargaining process it is important to select a diverse group of individuals who will accept and adhere to the final group decisions.

**Stage 4. Recommend Implementation Strategy****1. Lack of well-documented implementation strategies in other jurisdictions**

No existing vaccination plan includes recommendations on how other jurisdiction will implement their prioritization list to allocate vaccine. In particular, most plans did not detail the degree of coverage each target groups should receive, the distribution approach, dose allotment, or distribution mechanism. It was difficult to evaluate the implementation options against the "political acceptability" criterion without knowledge of how other jurisdictions were handling these dimensions. It was especially difficult in the absence of federal implementation recommendations.

**Recommendation**

One recommendation could be to interview key decision makers within the CDC and DHHS to determine if they have engaged in discussions involving implementation of the vaccine intervention and if so, to find out whether implementation recommendations will be included in the upcoming federal pandemic influenza preparedness plan or whether they will advise states to make all implementation decisions themselves. In addition, the draft implementation recommendations should be evaluated and approved by the JAC as well as high level staff within CDHS before being included in the prioritization plan. Finally, the state could lead a focus group or survey Phase 2 DAST survey participants (most notably local public health responders) to determine whether these recommendations will be politically acceptable and can be implemented during a pandemic

**2. Certain criteria are more important determinants of an optimal implementation strategy than others**

We evaluated each implementation option on six criteria we deemed most important. The options were evaluated to see if these met the criteria and were assigned points accordingly. We did not ascertain the relative importance of the criteria in relation to one another. It is likely that some criteria are more important determinants of a strategy than others. For this reason, the numerical scores for the options within each dimension were conservative estimates that masked the importance of select criteria.

**Recommendation**

One recommendation could be to survey JAC members by developing a question which asks respondents to rate the importance of the criteria on an eleven point scale (0=least important and 10=most important). The average point values could be used to derive the criterion weights and calculate the implementation scores for each option. Another recommendation could be to engage in a structured group discussion with the JAC and high level staff within CDHS IZ branch to determine whether some criterion should be deemed more important or “dominant” than others within each dimension’s analysis. The discussion would also determine how these criteria should be weighted in the implementation analyses.

**3. Certain characteristics are more important determinants of implementation criterion than others**

Each of the six implementation criteria were broken down into a series of characteristics. The options were evaluated to see if these met the relevant characteristics and were assigned points accordingly. We did not ascertain whether some characteristics dominated e.g. were more important determinants of a criterion than others. This is likely the case, and for this reason, the numerical scores for the options within each dimension were conservative estimates that masked the importance of select characteristics. For example, the “dose allotment” dimension revealed that implementation options must promote an effective emergency response in order to meet the intervention goals. Therefore, the characteristic “promotes effective emergency response” is a more important or dominant determinant of criterion #1 “meets intervention goals” than the characteristic “favors highest ranked groups.” However, the points that were allocated to the dose allotment dimension options masked this importance.

**Recommendation**

One recommendation could be to engage in a structured group discussion with the JAC and high level staff within CDHS IZ branch to determine whether certain characteristics should be deemed more important or “dominant” than others within each criterion. The discussion would also determine how these criteria should be weighted in the implementation analyses.

**4. Inability to estimate and quantify the effectiveness of implementation options**

The implementation analysis qualitatively evaluated the impact and effectiveness of the implementation options within each dimension. This analysis is limited in accurately predicting whether implementation options will minimize illness and death and whether they are economically efficient and cost effective. As a result, the current implementation recommendations contain a great deal of uncertainty and can be questioned in terms of their ability to meet the intervention goals and their feasibility.

**Recommendation**

An analytically robust implementation analysis should be performed to verify the implementation recommendations. An economic and epidemiologic simulation model should be developed to determine the cost effectiveness or benefit of vaccinating the target groups on the DAST list under each implementation option. In particular the model should compare the cost of vaccination per person with the social benefits or effectiveness in terms of reducing health consequences (illness, death, disease

transmission), economic consequences (economic losses e.g. workdays missed, loss of productivity), and social disruption.