

Appendix 1. Description of Various Communication and Transportation Scenarios, With Travel Adjustment Parameter Ranges

Situation	Travel Time Adjustment (Minutes)		
	Low-Adjusted*	Moderate-Adjusted*	High-Adjusted*
Mobilization Times			
Sending facility has good facility-based communication capabilities, and is able to send ambulance ¹	10.00	15.00	20.00
Sending facility has moderate facility-based communication capabilities, and is able to send ambulance ¹	30.00	37.50	45.00
Sending facility has poor facility-based communication capabilities, and is able to send ambulance ¹	50.00	60.00	70.00
Sending facility must borrow ambulance, regardless of communication capacity at facility ²	20.00	30.00	40.00
Facility cannot access an ambulance immediately available, but has a private vehicle agreement ³	30.00	45.00	60.00
Patient is responsible for own travel between facilities (has to arrange own transport, with no communication assumed between facilities) ⁴	60.00	90.00	120.00

*The bounds defined in this table encompass estimated time, in minutes, needed to perform that certain action. A range of parameters was created to perform a sensitivity analysis.

Assumptions:

1. If a sending facility had functional ambulance capacity, the primary means of transportation was considered to be the ambulance at the facility. The mobilization time was dependent on different communication capacity, therefore $\text{mobilization time} = (\text{ambulance mobilization time} \& \text{communication time})$.
 - a. If a sending facility had ambulance capacity and good communication, an extra 10, 15 or 20 minutes was added to the pair for a good mobilization adjustment.
 - b. If a sending facility had ambulance capacity and moderate communication, an extra 30, 37.5, or 45 minutes was added to the pair for a moderate mobilization adjustment.
 - c. If a sending facility had ambulance capacity with poor communication, an extra 50, 60, or 70 minutes was added to the pair for a poor mobilization adjustment.
2. If a facility pair did not have ambulance capacity, but reported use of an ambulance from a DHO, a local council (in Buhigwe Town or Kigoma Town) or from another nearby facility with ambulance capacity, the primary mode of transportation was an "external ambulance". We could not make direct inferences on the communication to mobilize an external ambulance, communication to announce an upcoming referral to the receiving facility (sometimes the provider of an external ambulance), and mobilization time at an ambulance location. Therefore, we created a parameter to combine these times ("parameterized mobilization time") with low, middle and high values (20, 30 and 40 minutes respectively)." Mobilization time was calculated as $\text{mobilization time} = \text{external ambulance travel time from ambulance location to sending facility} + \text{parameterized mobilization time}$.

3. Some facilities without any access to an ambulance reported using a private vehicle agreement pre-arranged by the facility, making the primary mode of transportation a “private vehicle arrangement”. A private vehicle arrangement is a contract with a sending facility, and usually assumes a pre-negotiated fare between vehicle and sending facility. This arrangement requires a facility to contact the private vehicle organizer when services are needed, to stabilize and mobilize the patient needing referral, and perform other related duties. Since there is a large variation in the distance that privately-owned vehicles travel and the mobilization and communication efforts incurred to utilize them, the mobilization time for these referrals was estimated as a whole, with input from health practitioners who were project partners. Mobilization time was calculated as *mobilization time = private vehicle travel time from location to sending facility, inclusive of communication*. Mobilization times were estimated with an adjustment of either 30 minutes (low), 60 minutes (middle), and 90 minutes (high), with the time needed for the agreed-upon vehicle to travel to the sending facility.
4. If a facility had no ambulance capacity, was unable to borrow an external ambulance, and lacked a private vehicle arrangement between facilities, the primary mode of transportation was “self-arranged transportation”, referred to as “self-transport”. Unlike the private vehicle arrangement, self-transport did not assume a contract between a sending facility and a vehicle provider. The self-transport penalty not only included the duties performed in the private vehicle arrangement, but also included time to find and organize transportation. Mobilization time was also estimated as a whole (*mobilization time = self arranged vehicle travel time from location to sending facility, inclusive of communication with vehicle*). Mobilization time in this scenario was dependent on a self-arranged vehicle arrangement time of either 60, 90, or 120 minutes, to account for the patient identifying their own transportation, waiting for its arrival, and negotiating payments.