

**DRAFT New Ebola Response Strategy:
Local Care Team Early Detection Response**

Sunday, October 12, 2014

Y. Bar-Yam,
New England Complex Systems Institute

The key to an effective response is to limit transmission. Quarantine requires providing food for everyone, which is the largest scale essential activity, so we focus on leveraging early detection of illness and subsequent isolation and care on the food distribution process. The key to the approach is rooted in three things: (a) Very early detection of symptoms, (b) Care in-situ of neighborhood population, (c) Dynamic cordon between affected neighborhoods and unaffected neighborhoods (this is the only sense there is a quarantine).

The plan includes:

0) Shutting down non-essential travel in the country for a period of not more than 21 days (just one incubation period, see below for explanation of time needed).

1) Care teams consisting of seven individuals:

 Sub team a:

 1 medical care provider for screening and health services for those not showing symptoms of Ebola

 1 police or military

 Sub team b:

 1 medical care provider for care of those showing symptoms of Ebola

 1 police or military

 1 army corp of engineers work supervisor

 1 communications person / cameraperson

 1 respected local community leader

Equipment:

 2 IR fever detectors

 1 iPad

Notes:

 Best to have one international care provider and one local care provider,

 Best to have one international police/military and one national police/military,

 Best to have a combination of men and women.

 The composition of the team is designed so that all essential functions will be met. Adaptive expansion of the team based upon experience and/or for specific local needs can be achieved first by adding local community members under supervision, and second by a coordinated central allocation of available manpower.

Each Care team is to be placed with a tent next to or in an intersection of streets. Each team has responsibility for approximately 2,000 individuals in the neighborhood of that location. They will live in place during the period of action. They will set up a facility, mostly outdoors (under a canopy, weather depending) for food distribution, screening and medical care for individuals

who do not have symptoms of Ebola ("screening station"). They will separately set up, only where needed, a care facility for those who have sufficiently defined symptoms of Ebola ("Ebola care facility").

The number of Care teams needed for Sierra Leone initially is roughly 3,000, i.e. 6 million divided by 2,000. This number may be somewhat reduced if there are regions of the country that are pre-cordoned and have no identified cases.

2) Public communications teams, perhaps including local clerics and PR experts:

Public communication teams drive/ride/walk through neighborhoods and use megaphones to inform the community.

This includes

a: specific instructions (relevant to actions below) and

b: general information messages about

avoiding any contacts that are not absolutely necessary,

being in contact only with a very few essential family and friends,

staying at home or within community,

not traveling to other locations,

etc.

The number of Public communication teams is determined by having enough to go through neighborhoods multiple times per day. They should be staying in their vehicles and not interacting directly with the public. Perhaps they should be assigned to a specific set of neighborhoods.

3) Food: Daily food will be dropped off for each neighborhood at the food and screening station. I don't detail the food supply system but assume that this will include basic foods from the existing food supply of the country diverted from local groceries and food processing facilities to the care provider stations, or specially shipped food supplies where necessary. The food will be pre-packaged for individual pickup without need for contact among people, and without one person taking the food for another. The packaging can be done before drop off at the neighborhood location or after drop off at the neighborhood location by additional recruited individuals (who are screened for disease).

4) Screening: All occupants of the neighborhood will pick up the food at the neighborhood screening station. They can pick initially which station to go to, but must go to the same one every day afterwards. (They will be informed to do so by megaphone). They will be photographed (iPad) and the photograph will be used for a checkoff list subsequently. Repeated photographing by iPad in each visit serves as a definite record. Each time they pick up food they undergo screening for fever by IR detector. The screening itself (i.e. pointing the IR detectors) may be done by individuals recruited from the neighborhood and need not be done by the medical care provider. There will be no physical contact during screening and food pickup. The pick up will be at least once a day (if logistics make this possible, twice a day should be required). The individuals will be told to come at the same time(s) each day (though there will be no penalty if they don't). If there is need for people to stand in line in this process (to be avoided by making the logistics work very smoothly) then markings on the ground should delineate

regions that each individual should be in as they advance one place in line at a time to prevent contact. Babies and children to accompany parents.

Notes: I am not detailing the medical process of care for those who show fever. This may include separating likely Ebola cases from cases that may not be Ebola, as well as the treating of other medical conditions. This may include having one or more “pending care areas” separate from the Ebola care facility and limiting contact between individuals. Medical authorities should provide appropriate instructions. See however, note below in the “Discussion” about neighborhood based care providing advantage in terms of transmission.

As indicated, every individual must pick up food for themselves, with exceptions only for the disabled. The disabled may be checked on but this is not essential. The community may report their illness and they are not likely to have much contacts.

As indicated, every individual will be screened for fever before picking up food.

5) Ebola Care Facility: If an individual is determined to be a likely case of Ebola, he/she will be directed to the neighborhood Ebola care facility, which is either a separate tent or a home nearby that is requisitioned for this purpose. It may be one of the homes of a feverish person. But only if this is sufficiently convenient. The care will be provided or supervised by 1 of the medical care providers, and they will be protected by 1 of the police or military individuals. The subteam responsibilities (screening and Ebola care) will not be switched. When safe to do so Ebola stricken individuals as well as others who require more extensive medical care than can be provided locally, can be moved to hospitals. This is to be coordinated to ensure that beds are available to receive them.

6) Work and pay: People will have time on their hands and we need to have something for them to do. This may include work, recreation or entertainment. Recommendation: Pay them for the work and pay them to study. Recruit them for pay for all the tasks that are needed: food distribution tasks, care tasks, guarding tasks, as well as community improvement through building, cleaning, washing, etc. Put the Army Corp of Engineers in charge of this. They should have one person on each team who will plan and coordinate the work and provide for pay. Note that the work and pay will provide incentives for people to remain in the neighborhood, and will serve to cover rents and other costs not covered by food delivery.

7) Region types and cordon for quarantine:

Note that up till this point there is no explicit quarantine, i.e. blockade, in this scenario. The behavioral recommendations, the availability of food, and the early detection and care, nevertheless are expected to limit travel and reduce contact.

We identify three types of Neighborhoods:

- A) Neighborhoods in which individuals are identified with Ebola.
- B) Neighborhoods of monitoring of fever and delivery of food.
- C) Neighborhoods in which conventional reporting of illness to medical authorities is being practiced.

A cordon enforced by military or police will be enforced separating regions of Type A and regions of Type C. Type B regions may be on one side or other of the cordon.

8) Time of initial shut down: Initially the entire country will be shut down (excepting areas where there has already been an enforced boundary separating them from areas of disease). The initial shut down period may be shorter than a single incubation period, 15 days may be sufficient, though an abundance of caution may suggest 21 days. At this point regions will be identified of Type A, Type B or Type C. Type A regions have detected cases of Ebola, Type B regions are geographically proximate to Type A regions but have no cases of their own, and Type C regions are those without cases and with geographical buffers between them and regions of type A (consisting of regions of Type B).

Because the regions of Type C have buffers between them and regions of Type A, the probability that cases will be detected there in the last few days of the latent period is small (it is larger due to the current exponential growth of cases but not very large even in that case). Thus, after 15 days, Type C Neighborhoods can be identified and the regions of Type C neighborhoods can be reverted to traditional process of disease reporting.

Every few days Neighborhoods can be reassigned to Type A, B and C. With the intent that Neighborhoods shift from A to B to C. Sick individuals or validated healthy individuals (by process of individual isolation and monitoring) may be moved from neighborhood to neighborhood during this process, either to aggregate cases or to move healthy people to healthy neighborhoods. The practicality and protocols for such movements can be evaluated separately from this specification.

Rural areas:

In rural contexts there are networks of villages along paths that often are inaccessible to automobile transportation. In these areas, a first assessment of the presence of Ebola can identify regions that require care providers. Areas where cases have not yet been identified should be isolated to the extent possible at point of entry. Communication with local leaders about the reasons for isolation are critical. These areas rely upon subsistence agriculture and hunting and therefore do not require food supplies from the outside, nor do they require monitoring for Ebola unless cases are reported. Where there are cases, the isolation boundary should occur at a finer scale, down to an individual village level. Care providers should be present at the level at which cases have been determined.

Discussion:

The early detection and care of individuals that just show fever should dramatically reduce the transmission rate. This is the key to rapid reduction in the incidence of new cases. The local care of individuals will further reduce contact between Ebola cases and non-Ebola cases as neighborhoods that don't have Ebola will not send their sick people to medical facilities with Ebola patients. Note that care providers will not generally move from neighborhood to neighborhood to avoid being vectors of transmission. They move from neighborhoods that have

been cleared (i.e. that shift from Type B to Type C) to neighborhoods of Type A to provide more care there and are reorganized to work under the supervision of the local team. In some cases, responsibility for supervision may be shifted to teams that have developed improved ways to perform the efforts involved.

Roll out:

Ideally this would be tested for a few days in a few local areas (urban and rural) to ensure that the daily process is smooth, and then rapidly rolled out to the entire country. If there is need for delay due to time for recruiting of teams, it might be rolled out region by region as teams are recruited and trained about the procedures. I would put the entire operation in the hands of the US Army Corp of Engineers, as I respect their ability to coordinate large projects. They can identify and engage those who need to do the tasks themselves.