The Ebola suspect's dilemma

In 1950, Merrill Flood and Melvin Dresher of the RAND Corporation developed a theoretical model of cooperation and conflict, which was later formalised by Albert W Tucker as the prisoner's dilemma.[1] This model represents a situation in which two prisoners each have the option to confess or not, but their sentencing outcomes depend crucially on the simultaneous choice of the other (figure).[1] Fittingly, it has become the paradigmatic example of individual versus group rationality and is an often used heuristic when conveying introductory social theory to students.

Although not a homologous predicament, the Ebola virus disease suspect also faces a consequential dilemma (figure). The 'rational'—that is, not informed by superstition or baseless rumour—aversion to West Africa's ill-equipped and poorly sanitised hospitals was described even before the 2014–16 Ebola outbreak.[2] This characterisation could a fortiori be extended to those Ebola virus disease suspects who eschewed presentation to an Ebola treatment unit, especially those units that offered little in the way of aggressive intravenous resuscitation or management of electrolyte disturbances. Consider the situation in which you are an Ebola virus disease suspect (you have fever, vomiting, muscle pain, and headache), but don't know whether you have Ebola virus disease: (1) if you have undiagnosed malaria and stay at home, your chance of dying is 0·2%;[3] (2) if you have undiagnosed malaria and go to an Ebola treatment unit, your chance of dying from Ebola virus disease is 16·1% (around 25% chance of nosocomial Ebola virus transmission with 64·3% mortality);[4] or (3) if you have Ebola virus disease, stay at home, and self-isolate, your chance of dying is 70·8%.[4] Given equal chances of having malaria (West Africa is the region with the world's highest incidence of malaria) or Ebola virus disease, your overall mortality risk for staying at home is 35·5% versus 40·2% for going to a Ebola treatment unit.

Thus, you would be acting in your rational self-interest by staying at home, since the suspect who is uninfected might become so nosocomially through ambulance transport with actual cases or unsafe triage at an Ebola treatment unit—not factoring in (1) rational desires to die at home rather than in (or in the queue in front of) a far off tent; (2) rational fears that you might never see your family again; (3) rational responses to the pervasive messaging that Ebola has no cure; or (4) the irony that, once admitted to an Ebola treatment unit that does not offer intravenous volume replacement, a rational decision might be to deliberately infect yourself with malaria: emerging evidence suggests that *Plasmodium* parasitemia offers a greater survival benefit than the oral rehydration approach used at many Ebola treatment units in 2014.[5] And therein lies the Ebola suspect's dilemma—at least according to the rational choice lens that refracts the world around us into binary options for our moral retinas.

Now consider a Special Report[6] by the WHO Ebola Response Team. In it, the authors rightly—if not tautologically—suggest that shortening the delay to isolation of Ebola virus disease suspects would lead to quicker overall outbreak containment, yet they fail to adequately discuss the reality that suspects will continue to be "unwilling to seek medical care,"[6] when such care is non-existent. Indeed, our extensive interviews with survivors of Ebola virus disease and their families reveal—among a variety of reasons for Ebola treatment unit avoidance early in the outbreak—the common suggestion that international non-governmental organisations in future epidemics not be allowed to set up Ebola treatment units if they do not provide intravenous resuscitation as standard of care.

Conversely, if Ebola suspects maximise their chances of survival (by staying at home in the case above), they risk—according to the methodological individualist

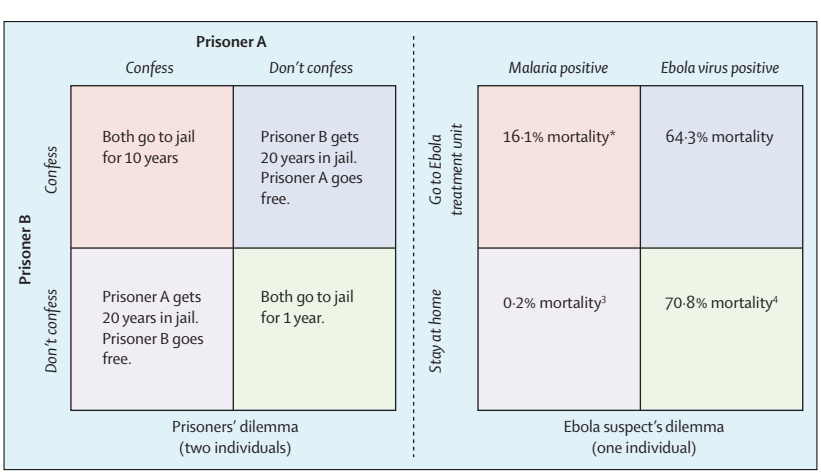

Figure: **Prisoners' and Ebola suspect's dilemmas**
*Around 25% chance of nosocomial Ebola virus transmission with 64·3% mortality.

framing of a multitude of after action reports—being dubbed "superspreaders"[6] (or rather "vectors"[7] if they actively flee admission to an Ebola treatment unit). Such terminology perniciously diverts us from structural determinants of Ebola virus transmission by positing bounded individuals and their unconstrained, calculating agency—or its contralateral blinder, fear-related behaviour[7] (a term originally applied to lab rats)—as the engines of transmission, and potentially engenders stigmatisation towards patients with Ebola virus disease, including posthumously. We find the descriptor, personal protective equipment (PPE)-bereft care-nexus, more appropriate, both anthropologically and philosophically. It highlights the fact that Ebola virus disease is a caregivers' disease that thrives in underdeveloped[8] and historically plundered regions, and that the use of terms such as superspreader or vector factitiously implicates marginalised individuals as sources of outbreaks, instead of lending analytical weight to how social forces (ie, the complex fields of power in which we are all nodes) become embodied as pathology.[9]

In the final analysis, however, the implication that there is a decision to be made (seek medical care or not) or a 'spreader' to be found is merely a cognitive convention that has been imposed on the PPE-bereft care-nexus by western philosophy. Such language is couched in rational choice models and other scientistic paradigms—that is, technocratic ways of thinking which elevate the formal rationality practised in modern science to a quasi-divine faculty for isolating truth, without considering the plurality of roles that reason can take[10]—which comprise the modern missionary's (ie, aid worker's) faith and sanctify the individual at a specific point in time as opposed to webs of relations and how they change diachronically. These platonic shadows-on-the-wall, so to speak, also divert attention from outside the cave, where legacies of the transatlantic slave trade, colonialism, indirect rule, structural adjustment, and extractive foreign companies—the real superspreaders—have been, and continue to be, embodied as viral disease in West Africa, resulting in the preventable demise of large swaths of humanity.[11]

Therefore, we can view the Ebola suspect's dilemma as a heuristic for the most recent outbreak in West Africa. First, we must temper the fetishisation of containment-through-isolation by a greater commitment to carry out aggressive resuscitation in future infectious disease outbreaks where shock is a predominant feature (evidence for the "injection of saline solutions in extraordinary quantities"[12] in such a scenario existed as early as 1832, but was poorly translated to the 2013–16 outbreak in West Africa). Second, we must recognise the practical and interpretive limits of rationalist epistemologies—including the categories of thought that are instilled by our training as scientists, clinicians, and public health professionals[13]—while exploring paradigms informed by biosocial analysis and methodological relationalism.[14]

*Eugene T Richardson, Mohamed Bailor Barrie, Cameron T Nutt, J Daniel Kelly, Raphael Frankfurter, Mosoka P Fallah, Paul E Farmer

Division of Global Health Equity, Brigham and Women's Hospital, Boston, MA 02115, USA (ETR, PEF); Partners In Health, Freetown, Sierra Leone (ETR, MBB, CTN, JDK, RF, PEF); Department of Anthropology, Stanford University, Stanford, CA, USA (ETR); Department of Global Health and Social Medicine, Harvard Medical School, Boston, MA, USA (CTN, PEF); UCSF School of Medicine, San Francisco, CA, USA (JDK, RF); Community-Based Initiative, Ministry of Health, Monrovia, Liberia (MPF); National Institute of Allergy and Infectious Diseases, Monrovia, Liberia (MPF); and A M Dogliotti College of Medicine, University of Liberia, Monrovia, Liberia (MPF)

erichardson@bwh.harvard.edu

This Comment was done with the support of a KL2/Catalyst Medical Research Investigator Training award from Harvard Catalyst/The Harvard Clinical and Translational Science Center (National Center for Research Resources and the National Center for Advancing Translational Sciences, National Institutes of Health Award KL2 TR001100). The content is solely the responsibility of the authors and does not necessarily represent the official views of Harvard Catalyst, Harvard University and its affiliated academic healthcare centers, or the National Institutes of Health.

We declare no competing interests.

1 Kuhn S. Prisoner's dilemma. 2014. https://plato.stanford.edu/entries/prisoner-dilemma/ (accessed Jan 18, 2017).
2 Ferme MC. Hospital diaries: experiences with public health in Sierra Leone. 2014. http://www.culanth.org/fieldsights/591-hospital-diaries-experiences-with-public-health-in-sierra-leone (accessed Jan 18, 2017).
3 WHO. 10 facts on malaria. 2016. http://www.who.int/features/factfiles/malaria/en/ (accessed Jan 18, 2017).
4 WHO Ebola Response Team. Ebola virus disease in West Africa–the first 9 months of the epidemic and forward projections. *N Engl J Med* 2014; **371:** 1481–95.
5 Rosenke K, Adjemian J, Munster VJ, et al. *Plasmodium* parasitemia associated with increased survival in ebola virus–infected patients. *Clin Infect Dis* 2016; **63:** 1026–33.
6 WHO Ebola Response Team. After Ebola in West Africa–Unpredictable risks, preventable epidemics. *N Engl J Med* 2016; **375:** 587–96.
7 Shultz JM, Cooper JL, Baingana F, et al. The role of fear-related behaviors in the 2013–2016 West Africa Ebola virus disease outbreak. *Curr Psychiatry Rep* 2016; **18:** 104.
8 Rodney W. How Europe underdeveloped Africa. London: Bogle-L'Ouverture, 1972.

9 Farmer P. Social inequalities and emerging infectious diseases. *Emerg Infect Dis* 1996; **2:** 259–69.

10 Rorty R. Contingency, irony, and solidarity. Cambridge: Cambridge University Press, 1989.

11 Richardson ET, Barrie MB, Kelly JD, Dibba Y, Koedoyoma S, Farmer PE. Biosocial approaches to the 2013–16 Ebola pandemic. *Health Hum Rights* 2016; **18:** 167–79.

12 Lewins R. Injection of saline solutions in extraordinary quantities into the veins in cases of malignant cholera. *Lancet* 1832; **18:** 243–44.

13 Richardson ET, Polyakova A. The illusion of scientific objectivity and the death of the investigator. *Eur J Clin Invest* 2012; **42:** 213–15.

14 Bourdieu P, Wacquant LJD. An invitation to reflexive sociology. Chicago, IL: University Of Chicago Press, 1992.