To paraphrase the Ebola therapy unit (ETU) mantra, health-care workers (HCW) should remind themselves:

*Who is the most important person in a pandemic? ... I am...* 

How does one prepare and protect oneself during a pandemic? In this issue of *Neurocritical care*, Rajendram et al. [1] discuss the important topic of crisis resource management (CRM) in the COVID-19 pandemic. While there has been an explosion of COVID-19 basic, translational, and clinical science articles, few have touched on the fundamental cognitive psychology and organizational approach principles that protect health-care workers (HCW) during a COVID-19 surge. SCCM has provided preparedness statements and checklists, but these articles do not touch on other important principles covered in CRM [2–4]. The principles of CRM are pulled from various disciplines such as military triage, massive casualty/disaster management, flight industry, simulation, and behavioral psychology [2, 5, 6]. In retrospect, a discussion on CRM as it applies to neurocritical care is long overdue—especially in regard to fellowship and other training programs. While the authors primarily focus on stroke patient workflow in the COVID-19 pandemic for neuro-intensive care unit teams, the article is germane to other patient populations and complex patient care teams.

Why is CRM an important topic right now? Principles of CRM include situational awareness, triage and prioritization, role clarity, Kahneman’s System 1 and 2 cognitive heuristics and biases, cognitive overloading errors, and the process of debriefing to help create a learning system that is adaptable, sustainable, and safe [1, 2, 5, 6]. These are a foundational psychological approach to protecting HCWs from harm during the COVID-19 pandemic, and future pandemics.

These principles are important and will remain that way—because despite maximal efforts, patients with Ebola and COVID-19 (and future pandemics) will still die. And despite proper donning and doffing procedures for PPE, some HCW will contract illness. It is no surprise then that during the surges in New York and Italy, depletion of resources of PPE, personnel, or expertise was associated with higher rates of HCW infection [7]. Because the loss of a single health-care team member strains the entire system, CRM is needed to protect not only the HCW, but all of the patients they serve.

How do CRM principles help health-care teams in 2020 and beyond? First, CRM principles should build a strong foundation for high-performance teams based on trust [7, 8] and coupled with important psychological/physiologic needs as outlined by Maslow [9–11], and illustrated in Fig. 1. CRM principles build on a foundation of psychological/physiologic safety first; if HCW become sick, they become a burden to the system and change from a generator of resources to a consumer of resources. CRM requires a multilayered organizational approach for health-care teams to succeed [12].

We should also not forget that the SARS-CoV2 virus has claimed the lives of at least 700 HCW, and infected at least 156,000 [14] in the US thus far, which is sadly an underestimate. And we must consider a much larger secondary toll of psychological sequelae, such as post-traumatic stress disorder (PTSD) and financial pressures on HCW and their families [15]. Therefore, the authors work bespeaks the importance of fostering the right CRM cognitive framework [13] at the base of the
pyramid (Fig. 1) that leads to the genesis of high-performance teams [8, 11–13, 16, 17]. Ultimately, healthcare outcomes are the byproduct of team performance and organizational health [8, 16], which is in turn is the product of individuals health [18, 19]. The authors share several useful CRM suggestions to protect neurocritical care teams around a plausible scientific framework [18] that helps teams adapt and learn for the current and future pandemics.

So remember... Who is the most important person in a pandemic? You are...

Figure 1: A combined crisis resource management (CRM) pyramidal conceptual model synthesizing Maslow’s hierarchy of needs, Lencioni’s model of high functioning teams, and Kahneman and Tversky’s thinking fast and slow. The foundation of the pyramid is based on base needs (Maslow) and psychological safety (Lencioni) as well as inherent reflexive System 1 thinking described by Kahneman. Intermediate levels build upon concepts in CRM such as cognitive overloading, communication, role clarity, workload allocation, and accountability. Higher-level achievements occur with progressively higher functioning teams, with the pinnacle or top of pyramid (light bulb) being situational awareness (CRM), enlightenment (Maslow), or goals and outcomes (Lencioni). Also this self-reflection or slower thinking is described as ‘System 2’ Kahneman. System 2 thinking is slower and requires rest and time to think in contrast to System 1 which is more reflexive, more prone during sleep deprivation and when immediate stress is applied [13].

Publisher’s Note
Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Received: 7 October 2020   Accepted: 14 October 2020
Published online: 27 October 2020

References
1. Rajendram P, Notario L, Reid C, et al. Crisis resource management and high-performing teams in hyperacute stroke care. Neurocrit Care. 2020;33(2):338–46.
2. Aziz S, Arabi YM, Alhazami W, et al. Managing ICU surge during the COVID-19 crisis: rapid guidelines. Intensive Care Med. 2020;46(7):1303–25.
3. Society of Critical Care Medicine. Clinicians report high stress in COVID-19 Response. https://www.sccm.org/Blog/May-2020/SCCM-COVID-19-Rapid-Cycle-Survey-2-Report (2020). Accessed 1 Oct 2020.
4. Society of Critical Care Medicine. COVID-19 ICU preparedness checklist. https://www.sccm.org/Disaster/COVID-19-ICU-Preparedness-Checklist (2020). Accessed 1 Oct 2020.
5. Cane B, Kennedy M, Gray T. Review article: crisis resource management in emergency medicine. Emerg Med Australas. 2012;24(1):7–13.
6. Kim J, Neillipovitz D, Cardinal P, Chiu M, Clinch J. A pilot study using high-fidelity simulation to formally evaluate performance in the resuscitation of critically ill patients: the University of Ottawa critical care medicine, high-fidelity simulation, and crisis resource management study. Crit Care Med. 2006;34(8):2167–74.
7. Albolino S, Dagliana G, Tanzini M, et al. Human factors and ergonomics at time of crises: the Italian experience coping with COVID19. Int J Qual Health Care. 2020. https://doi.org/10.1093/intqhc/mzaa049.
8. Lencioni, P. The five dysfunctions of a team: a leadership fable. 1st ed. San Francisco, CA: Jossey-Bass; 2002.
9. Jackson JC, Santoro MJ, Ely TM, et al. Improving patient care through the prism of psychology: application of Maslow’s hierarchy to sedation, delirium, and early mobility in the intensive care unit. J Crit Care. 2014;29(3):438–44.
10. Karnatovskaia LV, Gajic O, Bienvenu OJ, Stevenson JE, Needham DM. A holistic approach to the critically ill and Maslow’s hierarchy. J Crit Care. 2015;30(1):210–1.
11. Maslow A. A theory of human motivation. Psychol Rev. 1943;50(4):370–98.
12. Bavel JJV, Baicker K, Boggio PS, et al. Using social and behavioural science to support COVID-19 pandemic response. Nat Hum Behav. 2020;4(5):460–71.
13. Kahneman D. Thinking, fast and slow. New York: Farrar, Straus and Giroux; 2013.
14. Centers for Disease Control and Prevention. CDC COVID data tracker https://covid.cdc.gov/covid-data-tracker/#health-care-personnel (2020). Accessed 1 Oct 2020
15. McCormack G, Avery C, Spitzer AK, Chandra A. Economic vulnerability of households with essential workers. JAMA. 2020;324(4):388–90.
16. Lencioni P. The advantage: why organizational health trumps everything else in business. San Francisco: Jossey-Bass, 2012.
17. Lencioni, P. Why organizational health trumps everything else in business. https://hbr.org/webinar/2016/03/why-organizational-health-trumps-everything-else-in-business (2016). Accessed 1 Oct 2020.
18. Physician, know thyself. Lancet 2010;376(9743):743. https://doi.org/10.1016/S0140-6736(10)61559-1.
19. World Medical Association. WMA Declaration of Geneva. https://www.wma.net/policies-post/wma-declaration-of-geneva/ (2020) Accessed 1 Oct 2020