Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

The use of technology (eg image guidance, power or ultrasonic tools, etc), an increasing demand on the space around the surgical table (eg consoles, imaging, navigation, microscope, etc), and emerging technology[6] should not distract from investing more attention to this still-underdeveloped field of research.

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Challenges and Ethical Considerations for Trainees and Attending Physicians During the COVID-19 Pandemic

Shaikh Hai, MD, FACS, Amanda Baroutjian, BS, Adel Elkbuli, MD, MPH
Miami, FL

We read with great interest the article by Kramer and colleagues, "Ethics in the time of Coronavirus: Recommendations in the COVID-19 Pandemic."[1] It is a well-written synopsis of ethical issues from this pandemic. However, we have some concerns.

First, the use of the HIV/AIDS epidemic as a reference point for ethical consideration is not entirely appropriate because there are differences in the 2 disease processes. Even in the inchoate days of the AIDS epidemic, it was known that the main transmission was by bodily secretions and that one could not contract the disease simply by being near the infected person. Although HIV can result in no/mild symptoms in reservoir hosts, similar to the coronavirus,[2] comparison to the 1918 H1N1 Spanish flu pandemic seems more appropriate for mode of transmission and infectivity. Obligatory notification of suspected cases, hygienic practices, and quarantine were used to curb the spread of the Spanish flu[3] and are more applicable to the novel coronavirus (COVID-19) pandemic. Although ethical considerations at the time were not extensively documented, the Spanish flu and following H1N1 pandemics have taught us lessons on pandemic preparation and public health.[3,4]

Second, we do not agree that medical trainees, such as residents or medical students, be fully involved in the care of COVID-19 patients. Junior residents and medical students may not have the skill set and knowledge to fully protect themselves from this pandemic. This element of uncertainty and risk is unnecessary, especially when finite resources like personal protective equipment (PPE) may be in short supply. The justification that residents have inevitably signed up for some degree of risk and therefore are required to take on the same risk as attending physicians is not entirely equivalent. Residents do not assume the same level of responsibility as attending physicians do, and should not be required to assume the same level of risk. At our institution, we have established rules that minimize resident contact with COVID-19. These include alternate day schedules, reduced number per shift, and no medical students rotating on the service, among others. The Association of American Medical Colleges (AAMC) and the ACGME have guidelines for this, keeping in view trainees' personal safety balanced with their educational requirements and ethical considerations.[5,6]

Third, the authors recommend that non-FDA approved therapies not be used for these patients. There is currently no established treatment/cure for COVID-19. If therapies like retroviral drugs are administered in a safe fashion, under the guidance of disease experts, with transparency, involving the patient in the decision-making process, then these drugs should not be withheld. Providers are currently using potential therapies, with no ulterior motive, and this should not be considered a violation of the Helsinki declaration. The government should also provide certain legal safeguards to providers using pharmacologic treatments appropriately, so they are not held liable in the future.[7-9]

Nevertheless, we congratulate the authors for proposing some very valid recommendations. As our clinical experience with these patients' progresses and more data accumulate, we will be able offer evidence-based care and recommendations to these patients.

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Ethics in the Time of Coronavirus: Engaging the Conversation

In Reply to Hai and Colleagues

Jessica B Kramer, MD, Douglas E Brown, PhD, Piroska K Kopar, MD
St Louis, MO

We appreciate the feedback and thoughtful discussion offered by Dr Hai and colleagues. We are pleased our paper is generating meaningful conversations as we all move through this uncharted territory of ethical conundrums created by the COVID-19 pandemic. As Dr Hai and colleagues point out, we are certainly aware of the differences between the HIV/AIDS epidemic of the 1980s/1990s and the current COVID-19 pandemic. The COVID-19 pandemic exceeds what any of us have seen, and therefore requires learning from all similar healthcare crises in history. We chose to focus on the AIDS epidemic because it is timelier than the 1918 Spanish Flu pandemic. In addition, we wanted to reference an ethically suitable precedent rather than a clinically similar disease process, although both would have been ideal points of reference. The H1N1 flu did not disrupt clinical care to the same extent as COVID-19, and the Spanish flu was sufficiently long ago that current ethical standards would be quite different from those at the time. Neither public health nor medical ethics had been institutionalized in either medical practice or in residency training a century ago. From a public health perspective, however, both are instructive.

Dr Hai and colleagues raise an important distinction when they point out different expectations of duty for medical students and trainees. We wholly agree that medical students are under no obligation to provide care to COVID-19 patients. Residents, however, have formally entered the learned profession of medicine, having implicitly and explicitly dedicated themselves to prioritizing patients' interests above their own. There are certainly limits to such expectations. The same argument that protects attending physicians from attempting "suicide missions" holds true for trainees. Trainees should not be expected to provide care without appropriate personal protective equipment (PPE) or without sufficient safety training. We agree that when the availability of PPE is limited, minimizing the number of encounters with a patient makes practical sense, and therefore might guide institutional measures. One more consideration with regard to the possibility of requiring less of residents than of attendings would be that residents do not yet have the financial security of attendings, and therefore represent a vulnerable sub-group among physicians. We counter that the federal government, the source of funding for residents in training, should take actions like the programs enacted to protect injured first responders after the September 11th attacks on the Twin Towers.

We share the urgency expressed by Dr Hai and colleagues in defending a cautious introduction of off-label medications in caring for COVID-19+ patients. We did not intend to suggest any ulterior motive in doing so. However, we did intend to encourage researchers and caregivers to resist a "What have you got to lose?" promotion of therapy or prevention minus reliable scientific foundation. Analogous to keeping one foot braced on solid ice while testing the thinness of the ice ahead, we