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## Ethics

### PHYSICIANS' MORAL DUTIES DURING PANDEMICS

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**Abstract—Background:** Pandemics with devastating morbidity and mortality have occurred repeatedly throughout recorded history. Each new scourge seems to surprise governments, medical experts, and the public. The SARS CoV-2 (COVID-19) pandemic, for example, arrived as an unwelcome surprise to an unprepared world. **Discussion:** Despite humanity's extensive experience with pandemics and their associated ethical dilemmas, no consensus has emerged on preferred normative standards to deal with them. In this article, we consider the ethical dilemmas faced by physicians who work in these risk-prone situations and propose a set of ethical norms for current and future pandemics. As front-line clinicians for critically ill patients during pandemics, emergency physicians will play a substantial role in making and implementing treatment allocation decisions. **Conclusion:** Our proposed ethical norms should help future physicians make morally challenging choices during pandemics. © 2023 Elsevier Inc. All rights reserved.

**Keywords—**Pandemics; COVID-19; triage; crisis standards of care; professionalism; emerging infections; resource scarcity; health care equity

#### INTRODUCTION

“Death has climbed in through our windows and has entered our fortresses; it has removed the children from

the streets and the young men from the public squares.”  
 Jeremiah 9:21

Today's physicians have multiple sources of moral guidance, including medical codes of ethics, professional society and institutional ethics policies, and legal rules that impose duties. Students and trainees are taught medical ethics in undergraduate and graduate medical education. These sources of guidance identify moral goals of medical practice and professional responsibilities needed to accomplish those goals. Physicians accept a primary duty to provide medical care, which can also be understood as both an implicit and explicit contract with society (1). Implicit components, often described under the rubric of “professionalism,” arise from the moral nature of medical practice and physicians' internalization of “values and ethical reasoning so they can develop an altruistic disposition toward patients and colleagues” (2,3). Explicit elements include statutes and administrative rules that define physicians' social obligations and privileges.

Pandemics have, since antiquity, posed distinctive moral challenges for physicians that have barely changed over time (4). Despite this long history, normative standards to guide pandemic care remain a matter of considerable debate. In this article, we address the following moral questions present during pandemics (Table 1):

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- 32 • What should be the goals of physicians and health
- 33 care systems when pandemics strike?
- 34 • How should physicians prioritize patients for treat-
- 35 ment when resources are scarce?
- 36 • What role should emergency physicians play in im-
- 37 plementing pandemic triage protocols?
- 38 • How should physicians act in the face of consider-
- 39 able risks to themselves or their families?

40 Rather than focusing on a specific pandemic, we will  
41 propose a set of norms to guide physicians when they con-  
42 front marginally controllable illnesses, including those yet  
43 to emerge (5–7). Among the norms we will propose and  
44 defend are the following:

- 45 • When the demand for treatment or preventive mea-
- 46 sures outstrips available resources, established rules
- 47 and procedures, rather than ad hoc, individual deci-
- 48 sions, should determine allocation.
- 49 • Resource allocation rules should be based on util-
- 50 itarian principles of distributive justice, knowledge
- 51 about which interventions will have the most benefi-
- 52 cial consequences, and avoidance of discrimination
- 53 against underserved or marginalized groups.
- 54 • Crisis standards of care should incorporate agreed-
- 55 upon triage algorithms and provide legal protection
- 56 for physicians who adhere to them in good faith.

## 57 DISCUSSION

58 We propose that health care systems and individual physi-  
59 cians should pursue the following four goals during pan-  
60 demics:

- 61 (1) Maximizing patient benefits by providing the most
- 62 effective preventive and treatment measures,
- 63 (2) Allocating limited available health care resources
- 64 equitably,
- 65 (3) Delivering accurate information to health care pro-
- 66 fessionals and the public, and
- 67 (4) Minimizing risks to those who provide patient care
- 68 and essential services.

69 This section will examine each of these four goals.

### 70 (1). Maximizing Patient Benefits by Providing the Most 71 Effective Preventive and Treatment Measures

72 Providing care that benefits patients is arguably the  
73 fundamental goal of health care systems and individual  
74 physicians. That goal persists during pandemics; it moti-  
75 vates efforts to diagnose pandemic diseases and to develop  
76 and disseminate effective preventive and treatment mea-  
77 sures for those diseases. It also mandates ongoing care  
78 for patients with the full spectrum of other illnesses and

injuries that occur during a pandemic. The increased over- 79  
all burden of disease during pandemics, however, may 80  
compromise or overwhelm the ability of local or national 81  
health care systems to provide the full range of care to 82  
all those in need. To address a surge of pandemic disease 83  
patients, health care systems may decide to postpone elec- 84  
tive treatments and divert human and material resources to 85  
the areas of greatest need. If scarcity persists despite ef- 86  
forts to conserve the available resources, pandemic health 87  
care will require rationing, with attention to equitable al- 88  
location of those limited resources. 89

### (2). Allocating Limited Available Health Care Resources Equitably 90

91  
92 In severe pandemics, scarcity becomes the norm, with  
93 health care resources insufficient to meet all demands.  
94 Ventilators, intensive care unit beds, medications, vacci-  
95 nations, or other scarce resources, therefore, cannot be  
96 equitably distributed based solely on individual patient  
97 needs. How, then, should scarce resources be allocated,  
98 and who should make those decisions? We contend that  
99 the goal should be to distribute available resources to max-  
100 imize benefits for the overall population.

101 Under nonpandemic circumstances, physicians are of-  
102 ten guided by what bioethicist Albert Jonsen termed the  
103 “Rule of Rescue,” the imperative to save an “identifiable”  
104 patient from imminent death or other substantial harm (8).  
105 During pandemics, expending all available resources on  
106 one or a few patients without considering the needs of  
107 others is ethically suspect, so the paradigm must shift.  
108 In contrast to the Rule of Rescue’s focus on responding  
109 to individual needs, the moral theory of utilitarianism de-  
110 fended by philosophers Jeremy Bentham and John Stuart  
111 Mill holds that an action should be judged by whether it  
112 results in the greatest net benefit for all persons affected  
113 (9,10). Philippa Foot’s “Trolley Problem” illustrates this  
114 approach, asking whether it is acceptable to flip a switch  
115 to change a runaway trolley’s path so that it kills only one  
116 person instead of five (11). The solution seems obvious to  
117 most people (unless they have significant additional infor-  
118 mation, as, for example, they know the single person who  
119 is at risk). In pandemics, this situation is analogous to re-  
120 moving long-term intensive treatment from one patient so  
121 that it can benefit multiple other patients. Such a decision  
122 should be based on an ethically defensible, societally ac-  
123 cepted, and previously established allocation plan rather  
124 than as an ad hoc bedside decision for a particular patient  
125 (12).

#### Utilitarian algorithms 126

127 We contend that the morally preferred approach to this  
128 rationing problem is to develop and apply algorithms to al-  
129 locate scarce resources to the patients who are most likely  
130 to benefit from those resources. Physicians should fol-

**Table 1. Moral Questions in Pandemics**

What should be the goals of physicians and health care systems when pandemics strike?	Promote scientifically sound preventive and treatment measures and combat misinformation. Minimize risks to health care workers and those providing care to the elderly and the disabled. Allocate scarce health care resources equitably. Prioritize patients using algorithm-based rules.
How should physicians prioritize patients for treatment when resources are scarce?	Develop and adopt equitable, ethically justifiable triage rules to allocate scarce resources and to prioritize patients, including disadvantaged populations. Legally shield physicians who must use crisis standards of care, i.e., prioritize resource use?
What role should emergency physicians play in implementing pandemic triage protocols?	Provide initial assessment and treatment for ED patients. Alert triage officers to ED patients' needs for scarce life-sustaining treatments. Make rapid decisions regarding emergency use of life-sustaining treatments for ED patients in extremis.
How should physicians act in the face of considerable risks to themselves or their families?	Balance real vs. imagined pandemic risks. Stay and participate if the risks are reasonable.

ED = emergency department.

low these algorithms rather than make individual bedside decisions. Using justifiable algorithms to make triage decisions can relieve physicians of the burden (and potential feelings of guilt) of making ad hoc decisions to deny treatments to their patients.

These resource allocation algorithms should be designed to maximize the benefits of resource use, including minimizing the number of avoidable deaths. Several examples of such algorithms have been created (13–15). Algorithm developers for a particular pandemic should use available knowledge about which interventions are most likely to provide the greatest overall benefit, considering factors that directly affect survival, such as disease severity and pre-existing conditions. These recommendations should be disease-specific and will undoubtedly change as physician-investigators acquire more knowledge about the pandemic disease.

Public officials, as representatives of the societies they serve, should review and endorse triage algorithms drafted by expert medical, public health, ethical, and legal advisors. Input from societal stakeholders is vital to provide consistency among triage decisions and to prevent discrimination against disadvantaged or underserved groups. Publicizing pandemic triage plan details also helps to ensure consistent rationing decisions and avoid subjective, arbitrary decisions that individual physicians may make at the bedside due to their “inability to maintain ... con-

sistent standards of care (resulting from] ... the desire to satisfy patients' preferences” (16).

Straying from an ethically established utilitarian model for triage and treatment algorithms is morally problematic for several reasons. First, it departs from the public health goal of using society's resources to achieve the greatest social benefit. Second, it fails to recognize that triage systems are not the most effective or appropriate mechanisms for redressing societal inequities. As Benjamin Tolchin argues, “while triage protocols should not exacerbate disparities, they are not an adequate mechanism for redressing systemic health inequities ... [Rather,] entrenched health disparities must be addressed through broader social change” (17). Tabery and Mackett suggest that a sound way forward is to use a hybrid-model, with initial sorting based on medical utility and, to a lesser extent, on social utility. When there is insufficient prognostic information to determine which patient should receive a scarce resource, an egalitarian mechanism such as a lottery might be employed (18).

#### Prioritization

Moral philosophers have engaged in lively debate over the question of whether maximizing the number of lives saved should be the overriding moral consideration in the allocation of scarce medical resources (19–23). As Francis M. Kamm has noted, “in situations of dire scarcity, we cannot save the lives of all those who seek our assis-

185 tance, and we know that saving some lives is unavoidably  
186 linked with allowing others to die” (24). In this debate, we  
187 side with the position defended by Kamm and David Ozar  
188 that maximizing the number of lives saved is the morally  
189 preferable goal (24,25). As Ozar observes, failure to help  
190 some individuals may be necessary to get “the best real-  
191 ization of value” for all affected (patients) (25).

192 We contend that the appropriate focus for pandemic  
193 triage should be medical need and the likelihood to benefit  
194 from treatment. Nonmedical considerations, such as so-  
195 cial status, wealth, race, or prior contributions to society,  
196 should not play a role in prioritization for scarce resources  
197 in a severe pandemic. Arguably, one exception might be  
198 to prioritize those whose work is vital to controlling the  
199 pandemic and those charged with maintaining social sta-  
200 bility. Caring for these workers will enable them to resume  
201 providing essential social services, thus maximizing the  
202 overall social benefit of treatment. This includes, but is  
203 not limited to, frontline health care workers, lay caregivers  
204 for the elderly and disabled, essential government workers  
205 (e.g., firefighters, Emergency Medical Services person-  
206 nel, and law enforcement officers), food producers and  
207 distributors, and public utility workers (e.g., power, wa-  
208 ter, sanitation, and vital communication). We have argued  
209 elsewhere that “during pandemics ... emergency health  
210 care and public service workers [should be among those  
211 who] receive priority for treatment since they will, when  
212 they have recovered sufficiently (or in the case of vac-  
213 cination or preventative medication, kept healthy) act as  
214 multipliers of beneficial effects for future patients” (26).

215 The concept of medical futility as a criterion for  
216 denying access to treatment has been controversial for  
217 decades. Some professional organizations and health care  
218 institutions, and several states, have addressed futility  
219 in policy or statute (27–29). Yet the controversy contin-  
220 ues, and disease- or condition-specific futility guidelines  
221 are uncommon. Pandemic conditions of extreme scarcity,  
222 however, may require acknowledgement of medicine’s  
223 limitations (30,31). In circumstances of dire resource  
224 scarcity, pandemic treatment algorithms should recognize  
225 the likely futility of available treatments for some patients.  
226 Effective algorithms may limit or deny those treatments  
227 to patients least likely to benefit, instead providing only  
228 comfort care to them.

229 When designing algorithms for treatment priority, spe-  
230 cial efforts should be taken to avoid insidious forms of  
231 discrimination (18). We support triage and allocation pro-  
232 tocols that promote equity in distribution of resources so  
233 traditionally marginalized groups are not negatively af-  
234 fected by overt or implicit bias. These measures should  
235 not, however, provide resources to those less likely to  
236 survive than other patients (28). During the COVID-19  
237 pandemic, some states revised their triage protocols so  
238 as not to discriminate against disadvantaged persons, in-

cluding using the narrow goal of maximizing survival to  
hospital discharge, although we believe the broader goal  
of long-term survival is more appropriate (32–36).

239  
240  
241  
242 A particularly controversial decision is the reallocation  
243 of potentially life-sustaining measures from one patient to  
244 another. An example is removing a ventilator, if in limited  
245 supply, from someone who is very likely (though not cer-  
246 tain) to die and using it for another patient whose potential  
247 for survival is significantly higher. Many commentators  
248 support using triage systems (rather than first-come, first-  
249 served) for *the initiation* of potentially life-sustaining  
250 measures, and a lesser number assert that reallocation of  
251 life-sustaining measures from one person to another in  
252 times of resource scarcity is ethically justified, although  
253 this is controversial and has not been resolved by legis-  
254 lation or in the courts (37–39). We believe that effective  
255 triage criteria and evaluation procedures can be developed  
256 for both the initial allocation of scarce intensive care re-  
257 sources and determination that continuing intensive care  
258 will not be successful. If that can be done, both initial  
259 allocation decisions and reallocation decisions can justi-  
260 fiably serve the goal of maximizing the benefits provided  
261 by those resources.

262 The American College of Emergency Physician’s  
263 *Code of Ethics for Emergency Physicians* recognizes that  
264 emergency physicians have both unique expertise and  
265 a moral duty to respond to societal emergencies (40).  
266 The *Code* addresses the challenge of allocating scarce re-  
267 sources in disaster situations, and it explicitly endorses the  
268 use of utilitarian triage criteria in the following passage:

269 *In a situation where the resources of a health care fa-*  
270 *cility are overwhelmed by epidemic illness, mass casu-*  
271 *alties, or the victims of a natural or manmade disaster,*  
272 *the prudent emergency physician must make important*  
273 *triage decisions to benefit the greatest number of po-*  
274 *tential survivors. When the numbers of patients and*  
275 *severity of their injuries overpower existing resources,*  
276 *triage decisions should classify patients according to*  
277 *both their need and their likelihood of survival. The*  
278 *overriding principle should be to focus health care re-*  
279 *sources on those patients most likely to benefit, who*  
280 *have a reasonable probability of survival. Those pa-*  
281 *tients with fatal injuries and those with minor injuries*  
282 *should be made as comfortable as possible while they*  
283 *await further medical assistance and treatment (40).*

284 Emergency physicians will assume multiple roles in  
285 the care of patients during pandemics. They will provide  
286 initial assessment and treatment for patients who present  
287 to the emergency department (ED) with pandemic dis-  
288 ease and other life-threatening conditions. They will be  
289 responsible for alerting institutional triage officers of ED  
290 patients’ needs for scarce life-sustaining treatments, such

291 as intensive care, mechanical ventilation, and extracorporeal  
 292 membrane oxygenation. They will also need to make  
 293 rapid decisions for and against emergency use of life-  
 294 sustaining treatments to prolong the lives of ED patients  
 295 in extremis, and enable those patients to be considered  
 296 for continuing treatment under the institution's pandemic  
 297 triage protocol. All these roles require that emergency  
 298 physicians understand their institution's pandemic triage  
 299 protocol and their responsibilities under that protocol.  
 300 Emergency physicians' expertise as triage officers will,  
 301 moreover, make them valuable members of institutional  
 302 pandemic triage planning teams.

### 303 (3). *Delivering Accurate Information to Providers and* 304 *the Public*

305 As important as it is to practice optimal clinical  
 306 medicine during pandemics, physicians also have a  
 307 moral responsibility to promote sound public health mea-  
 308 sures and combat pandemic denial and misinformation.  
 309 Physician-sociologist Nicholas Christakis notes that "denial  
 310 and lies about what's happening [are themselves]  
 311 almost an intrinsic part of an epidemic ... everywhere  
 312 you see the spread of germs for the last few thousand  
 313 years, you see right behind it the spread of lies ... partly  
 314 ... because the person on the street wants to deny what's  
 315 happening. And partly, it's because our political leaders  
 316 don't want to take it seriously either" (41). Scapegoat-  
 317 ing of minority populations also frequently occurs, as  
 318 was seen in attacks on some of these communities dur-  
 319 ing the severe acute respiratory syndrome 2–coronavirus  
 320 disease (SARS 2-COVID) pandemic, the early human im-  
 321 munodeficiency virus (HIV)/acquired immune deficiency  
 322 syndrome (AIDS) epidemic, and the 1918 influenza pan-  
 323 demics, among others (42–44). As professional healers  
 324 and teachers with societally conferred roles and privi-  
 325 leges, physicians have a duty to educate the populace and  
 326 model optimal behavior during health crises (45).

327 During crises, accurately assessing risks requires iden-  
 328 tifying genuine threats and discounting those that are  
 329 theoretical or imagined. Physicians may need to provide  
 330 reassurance in settings with limited verifiable informa-  
 331 tion, emotional volatility, and a plethora of rumors, specu-  
 332 lation, assumptions, and inference. Without their calming  
 333 influence, panic may drive people's actions. People may  
 334 assume that their perception is accurate, although it has  
 335 more to do with fear and lack of knowledge than with  
 336 the actual probability and magnitude of risk (46). This  
 337 defines "an unstable information environment" in which  
 338 distorted perceptions may supplant reality, making ethi-  
 339 cal reasoning difficult (47). Internet and social media sites  
 340 that instantaneously and broadly spread lies or misinfor-  
 341 mation amplify these problems.

Accurate and complete information is especially vital  
 for frontline workers. In times of crisis, hospitals, health  
 care systems, and societies have a duty to provide their  
 workers with transparent communication about the cur-  
 rent situation, measures being taken to maintain a safe  
 working environment, and available personal protection  
 (48). Using risk communication methods increases health  
 care professionals' willingness to participate in pandemic  
 care (Table 2) (49,50).

### (4). *Minimizing Risks to Those Providing Patient Care* *and Essential Services*

During pandemics, frontline medical personnel are  
 among the groups at highest risk. Those who treat patients  
 with virulent pandemic diseases before the causative  
 agent is identified, or before preventive and treatment  
 measures are available, are often viewed as heroes, that  
 is, those "who attempt to save others from physical harm  
 or death while knowingly putting their own lives at risk"  
 (51). In health care settings, this group also includes envi-  
 ronmental service workers, security guards, transporters,  
 ward clerks and other team members. In return for their  
 beneficent service to others, societies have a duty to pro-  
 vide these workers with effective methods to minimize  
 their risks. Protective measures, which change as scien-  
 tists acquire more information about the nature of a partic-  
 ular pathogen, include respiratory and barrier protections  
 as well as prophylactic measures such as vaccines, anti-  
 biotics, antivirals, monoclonal antibodies, or other novel  
 agents. Specific risk mitigation tools vary with the in-  
 fection agent. Failure to employ available protections  
 signals that society does not value workers' well-being  
 and may spread the pandemic to other patients and work-  
 ers' families.

Consistent with utilitarian principles, policymakers  
 should decrease health care workers' exposure by limit-  
 ing high-risk, low-benefit, resource-intensive procedures.  
 During a severe pandemic, this may include forgoing  
 medical or traumatic cardiac resuscitation and intensive  
 care for patients with multi-organ-system failure and other  
 terminal conditions (52–55). For example, during the  
 COVID-19 pandemic, the American Heart Association is-  
 sued interim guidance that limited basic and advanced life  
 support, stating that prior to beginning a procedure, it is  
 reasonable to consider the likelihood of success "against  
 the risk to rescuers" (56).

Medical educators and policymakers also should as-  
 sess the activities of medical students and other trainees  
 during pandemics. Although there is uncertainty about  
 risk–benefit assessment in many situations, it is morally  
 unacceptable to expose trainees to significant risk of harm  
 unless the experience provides both significant education

**Table 2. Elements of Effective Health Care Risk-Communication in Pandemics**

- Communicate the disaster plan and risk-reduction measures to all health care workers by all available means, including the internet, in writing, or in person. Implement and modify it as necessary based on circumstances.
- Involve staff at all levels and of diverse backgrounds in developing policy.
- Give all health care community members a chance to express their concerns about the plan and its implementation.
- Maintain clear, frequent, consistent, honest, and easily accessible communication to all health care workers based on the best available evidence.
- Provide all pertinent information, listen to concerns, and be willing to change course.
- Provide information about risk management/mitigation options and involve health care workers in strategies in which they have a stake (49,50).

393 to trainees and present and future benefits to their patients  
394 that outweigh those risks.

#### 395 **Liability protections**

396 'In addition to increased health risks, physicians may  
397 also face increased risk of liability in pandemic situations.  
398 Physicians are ordinarily required to adhere to the legal  
399 standard of care that defines what a reasonable and pru-  
400 dent practitioner would do in similar circumstances (57).  
401 Standards of care can change as available resources fluctu-  
402 ate, even in nonpandemic settings. There is no clearly  
403 established a priori standard of care during times of crisis.  
404 When the normal standard of care cannot be maintained,  
405 such as during a disaster when treatment needs exceed  
406 available resources, physicians must operate under a dif-  
407 ferent standard. Crisis standards should be designed to  
408 direct scarce, resource-intensive treatments to those pa-  
409 tients most likely to benefit from them and to provide  
410 supportive care to those less likely or unlikely to benefit  
411 (30,31,58,59).

412 Most U.S. states have recognized some form of cri-  
413 sis standards of care with at least limited civil immunity,  
414 though few have invoked those standards, and their abil-  
415 ity to shield clinicians from liability is uncertain (60–62).  
416 When policymakers adopt rules under which physicians,  
417 health care institutions, and other clinicians can employ  
418 crisis standards of care, we maintain that they should also  
419 enact a legal liability shield for those who use them in  
420 good faith without conduct deemed “gross negligence” or  
421 “criminal negligence.” Providing this legal protection re-

inforces physicians' ethical duties to provide care at the 422  
level that scarce resources allow (63). These protections 423  
should end either at a predetermined time or at the termi- 424  
nation of a declared emergency (63). 425

#### 426 *How Should Clinicians Act in the Face of Extraordinary* 427 *Risks?*

Throughout recorded history, some physicians have ig- 428  
nobly abandoned their patients in the face of widespread 429  
contagion (64). Epidemics in which physicians fled in the 430  
face of personal risk include the Antonine Plague of 165 431  
to 180 AD, during which Galen and colleagues fled Rome; 432  
Black Plague episodes in Europe; a yellow fever epidemic 433  
in Philadelphia in 1793 (though notably, Benjamin Rush 434  
remained and treated patients); and the AIDS epidemic of 435  
the late 20<sup>th</sup> century, during which some physicians re- 436  
fused to treat HIV-infected patients (65). 437

438 Despite these notorious historical examples, the Amer-  
439 ican Medical Association (AMA) promoted physician  
440 courage in its first Code of Medical Ethics in 1847, stating  
441 that “When pestilence prevails, it is the duty of physi-  
442 cians to face the danger, and to continue their labors for  
443 the alleviation of suffering, even at the jeopardy of their  
444 own lives.” The AMA now recommends that “physicians  
445 should balance immediate benefits to individual patients  
446 with [their] ability to care for patients in the future” (66).  
447 As this AMA statement suggests, there is wide contem-  
448 porary agreement that physicians and other health care

**Table 3. Physicians' Professional Responsibilities and Expectations**

Assume risks comparable with those of similarly situated colleagues.
Assess the consequences of not helping.
Fulfill the professional duty to help those in need.
Contribute to community welfare.
Fulfill public expectations and trust.
Provide medical care using their societally underwritten special training and professional status.

professionals should accept some risk in caring for patients. This is, however, a prima facie and not an absolute duty—that is, it may be overridden by stronger duties to protect oneself or one's family, or by other competing moral duties.

Although physicians are generally expected to provide care in medical disaster and crisis situations, including pandemics, despite heightened danger to themselves, there is no consensus about the degree of risk they should accept (67). Identifying one's actual duty in specific circumstances depends on accurate risk assessment. It should not be based on irrational fear or a lack of knowledge about known risks. Physicians must therefore balance conflicting personal and professional moral responsibilities, basing decisions on their assessment of the consequences of those decisions for themselves and their families, patients, colleagues, and others (39).

When does personal risk and one's responsibility to self and family outweigh the professional duty to assist? A clinician's duty to respond may diminish as the level of personal risk increases and the anticipated benefit to patients decreases (66). Clinicians need not assume potentially lethal risks to care for patients, although, as seen in the West African Ebola epidemic (2014–2016), some have done that (39,46,49,68). Whereas some individual physicians perform actions that go far beyond the "call of duty" as delineated in ethical oaths and codes (i.e., supererogatory actions), such actions are neither ethically nor legally required.

From a social perspective, some actions physicians take may be predicted by models based on decisional (game) theory. The Prisoner's Dilemma, a well-known example, explains why individuals or groups may act against their best interests despite the risk of worse outcomes. Eschewing ethical norms, some clinicians may shun their responsibilities or fail to adhere to social safety protocols. Others must then assume the extra work and additional risks these "shirkers" create. Referred to as the tragedy of the commons or the free-rider problem, this model posits that many individuals will pursue their own self-interest, the game-theory optimal behavior, rather than cooperating as a community (50). Increased knowledge

alone has not been shown to decrease shirking behavior (69). Ways to overcome this behavior include pointing out that an individual's social group will suffer from his or her selfish behavior and that many other people are not shirking, providing incentives, using persuasion, and appealing to altruism (70,71). When deciding what to do in a risk-prone situation, each of us will ultimately rely on our fundamental personal and professional ethical values (Table 3) (47,72).

## CONCLUSION

Physicians, together with other health care professionals, including health system leaders and public health officials, have a professional duty to prepare for and respond to future pandemics. When pandemics occur, we have argued that their ethical responsibilities include the following:

- In situations of resource scarcity, after exhausting all avenues to obtain additional equipment and supplies, physicians should provide available preventative measures and treatments to those who are most likely to benefit from them, using a utilitarian principle of distributive justice. Patients retain the right to refuse treatment, though societies may mandate preventive measures, such as immunization, in some circumstances (73).
- In advance of pandemics, institutional and public policymakers should adopt disaster planning criteria and rules that allocate resources to maximize overall benefit. Physicians should use these criteria for allocating treatments rather than making bedside decisions that may be arbitrary or discriminatory.
- Emergency physicians should be familiar with their institution's pandemic triage protocol and be prepared to carry out their responsibilities under that protocol.
- Policymakers should give extra consideration to those workers essential to maintain public welfare, including certain health care personnel.

- 529 • Physicians should carefully assess and balance risks  
530 to their own and their family's health and welfare  
531 against the benefits they can provide to their current  
532 and future patients.
- 533 • Risk assessment must be based on the best available  
534 information about both the pathogen and the at-risk  
535 population.
- 536 • Policymakers and educators should protect health  
537 care trainees from significant risk unless their ser-  
538 vices provide benefits to patients that outweigh the  
539 personal risk.
- 540 • Physicians should model optimal public health  
541 practices and stay up to date with scientific ad-  
542 vances so that they can help educate their patients  
543 and the public.
- 544 • Health care institutions should advocate for legis-  
545 lation that includes immunity from the potentially  
546 heightened liability risks of implementing crisis  
547 standards of care.
- 548 • Physicians, institutions, and policymakers should  
549 transparently communicate all known information  
550 with health care workers and the public using stan-  
551 dard risk-communication methods.

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