

Duties of Christian Health Care Professionals in the Face of Pandemic Infection

Introduction

Humanity has endured the devastating effects of outbreaks of infectious diseases for millennia. Innumerable lives have been lost, families ravaged, and precious resources consumed. These occurrences have included both localized epidemics and world-wide pandemics where the infection was spread through close proximity and inadvertent transmission.

Prominent examples of these infections include: the Bubonic Plague (Black Death) in Europe and West Asia that was carried by fleas that fed on black rats carrying *Yersinia pestis*, and killed approximately 25-50 million people between 1347-1353¹; the Influenza A [H1N1 subtype] pandemic ("Spanish Flu"), of 1918-1920 that was estimated to have killed 50-100 million people worldwide²; the HIV/AIDS (human immunodeficiency virus) pandemic with a proposed inception date of 1980 that to date has claimed more than 32 million lives, with approximately 75 million people currently infected³; and the COVID-19 (coronavirus) pandemic, first identified in December 2019, claiming at the time of this writing over 130,000 lives and infecting more than 2 million persons.⁴

As members of CMDA, motivated by a desire to share God's love and follow the example of Christ through medicine, our ethical responsibility and professional duty, collectively and individually, is to assist in combating the spread of infection, offer aid in the diagnosis and care of those who become ill, promote the development of appropriate treatments such as medications and vaccinations, and provide guidelines for decision-making regarding the allocation of limited resources [See parallel CMDA policy analysis, Triage and Resource Allocation During Crisis Medical Surge Conditions (Pandemics and Mass Casualty Situations)]. The duty to care extends despite the potential for personal risk of contracting the infectious agent or suffering harm, even to the point of death.

We ground this ethical duty in the following sources:

A. Biblical Guidance

There is scriptural precedent for putting oneself at some degree of risk for the greater well-being of the community. We need to consider the following categories:

1. Sacrificial Service

- a. The ultimate servant and model for Christian servanthood is Jesus Christ, who came into the world (Phil 2:5-8) to sacrificially take on himself the sin of the world and to give his life for us (Mark 10:45, 1 Pet 2:24).
- b. Jesus spoke to us clearly that we, too, are to serve others, even to the point of death (Matt 20:25-28). He gave his followers a command to love the Lord our God with all our heart, mind, soul, and strength, and to love our neighbor as ourselves (Mark 12:29-31). He also said, "Greater love has no one than this, that someone lay down his life for his friends" (John 15:13).
- c. Jesus came to serve and did so to the point of death (Matt 20:28). Other examples include Aaron (Num 16:41-50) and his grandson, Phinehas (Num 25:1-9, Ps 106:28-31), both of whom assumed personal risk and entered a vicinity of plague to save their community.
- d. Numerous passages admonish us to unselfishly serve those in need (Is 58:6-8, Matt 25:37-40). We are commanded to value their well-being ahead of our own (Phil 2:3, Eph 6:2).
- e. In Jesus' Parable of the Good Samaritan (Luke 10:29-37), the Samaritan cared for a stranger, likely considered an enemy, at personal expense and potential risk to himself. Jesus concluded with "You go, and do likewise" (Luke 10:37).
- f. We have been saved by Christ, not just for ourselves, but so that, like him, we may give of ourselves to a broken and suffering world (Rom 12:1).

2. Stewardship

God has sovereignly called each of us into a vocation of service to others, especially those who are vulnerable to, and afflicted with, disease. We have worked to develop our

- professional skills and competencies, and our families, teachers, and society have invested in our education. God has given us our abilities for his glory and for human good (Matt 25:14-30). Jesus told his disciples that, "Everyone to whom much was given, of him much will be required" (Luke 12:48). Before assuming personal risk on behalf of her people, Queen Esther was reminded that she had attained the position she had "for such a time as this" (Esth 4:14). God may have called us for such a time as this.
3. **Wisdom**
God may call us to take some personal risk in our service for him. He also wants us to use the minds and wisdom he has given us. We are not to be reckless (2 Sam 23:15-17). Wisdom should underlie all our actions (Is 10:13; Acts 6:3; Col 4:5). Jesus admonished us to "count the cost" before embarking on a course of action (Luke 14:28). If we ask for wisdom, God has promised to supply it generously (Jam 1:5).
 4. **Citizenship**
Just as Paul was a Roman citizen, so we as Christian health care professionals (HCPs) are citizens of our countries. Unless we are ordered to do something contrary to the law and direction of God (Acts 4:19), we are to work with the governing authorities to be a constructive force for good in the community (Rom 13: 1-7). (See below, Covenantal Model of Medicine, D.2.).
 5. **Peace and Faith**
Scripture also reminds us that, in times of great stress, we should not be mastered by anxiety or fear (Matt 6:27; Rom 8:35-39, Phil 4:5b-7).

B. Biological Facts

1. Epidemics and pandemics have been with humankind throughout recorded history. There have been ongoing scourges such as malaria, influenza, measles, cholera, polio, dengue fever, and yellow fever, to name a few.
2. Currently, there are growing numbers of antibiotic-resistant organisms, once treatable, but now increasingly difficult to manage effectively, such as certain strains of tuberculosis, enterococcus, streptococcus, and staphylococcus.
3. Since 1970 the rapid development of newly emerged pathogens has caused serious illness or let to worldwide epidemics or pandemics, including strains of influenza, Ebola, ehrlichiosis, hantavirus, HIV/AIDS, SARS, MERS, Lyme Disease, Zika, and now coronavirus SARS-Co-V-2 (COVID-19).

C. Medical Factors

1. Each new pathogen presents new challenges because, as it initially spreads throughout the population, we begin from a point of significant ignorance, and, to manage an epidemic, we must rapidly answer a multitude of questions:
 - a. What is the agent (bacterial, viral, prion)?
 - b. How does it spread (food, airborne, blood and secretions, feces, human to human, insect or animal to human, etc.)?
 - c. How infectious is the agent?
 - d. How contagious are those infected?
 - e. Is it spread when the infected person is asymptomatic, or spread after resolution of illness?
 - f. What is the incubation period before symptoms are evident?
 - g. What is the duration of contagion and illness?
 - h. What are the most common and the atypical clinical presentations?
 - i. What is the extent of morbidity?
 - j. What is its lethality?
 - k. Are there individuals more susceptible? What medical factors influence the risk of complications and mortality?
 - l. Does it produce any permanent disability?
 - m. Can we contain it? Is so, how?
 - n. Can we develop a diagnostic test for it?
 - o. Can we identify, develop, and test treatments for it?

- p. Do we have adequate resources (diagnostic testing, personal protective equipment, ventilators, medications, blood products, hospital beds, physicians, nurses, etc.) to meet escalating demand?
 - q. When should we employ public health measures to contain the pathogen? How restrictive should those measures be, upon which people, and who decides?
- 2. Medical resources are not unlimited, and will be strained during epidemics, pandemics, and other high-risk situations.
- 3. The healthcare workforce is also a resource that is impacted. Infected HCPs may not be available to continue working during a pandemic. Absenteeism may also occur as a result of providing care to family members who are infected, high-risk medical conditions leading to self-quarantine, providing childcare, and fear of contracting the disease. Data from previous epidemics regarding the risk of HCPs contracting the disease are included in Appendix 1. HCPs are also at risk of exposure from the community, just as are non-HCPs. Many HCPs continue contact with patients and colleagues after onset of symptoms, potentially contributing to transmission of the disease.

D. Historical Context

In the classical world human worth was not regarded as intrinsic. Nor was there a concept of universal human rights. Economics, class, kinship, and other factors determined a person's rights before the law. But for Christians, every human being, especially the vulnerable, were objects of the duty to care because every human being is an imager of God. Throughout the ages, Christians – often at significant risk to themselves – have cared for victims of disasters and infectious diseases, leaving us a worthy legacy to emulate. During the Antonine Plague of the 2nd century, which was thought to have killed a quarter of the Roman Empire, followers of Jesus were known for their care of the sick.¹ During the third century, under the direction of Cyprian, the Bishop of Carthage, "Christians buried the dead left in the streets and cared for the sick and dying," while they were under the threat of persecution as well as death from the disease itself.¹ Bishop Dionysius wrote that Christians, "Heedless of danger...took charge of the sick attending to their every need."⁵ The pagan emperor Julian, of the next century, wrote of the "Galileans" who would care for even non-Christian sick.⁶

Christians who attended the sick, and did not abandon them, changed society. William H. McNeill, the historian, noted, "when all normal services break down, quite elementary nursing will greatly reduce mortality."³ Solidarity developed amongst Christians who served together. Others, including the recovered ill, were attracted to the Christians' "capacity to cope with the horrors and psychic shock of unexampled epidemic."³ Out of obedience to Christ (Matt 5:16), Christians provided the basic survival needs of those with whom they came in contact, whether Christian or non-Christian, whereas many non-Christians fled from sick friends and family in the face of the plagues.³ There has been an enduring formative impact on society as a result of these Christians' service to their neighbors.³

During the Reformation period, Martin Luther refused to leave the stricken city of Wittenberg, Germany, when it was smitten by the bubonic plague in 1527. Instead of fleeing the city to protect himself, Luther stayed and ministered to the sick.⁷ In his tract, "Whether Christians Should Flee the Plague," Luther's emphasis was that Christians were called to serve God and man.⁸ He allowed for the possibility that one could legitimately flee "as long as he does not neglect his duty toward his neighbor," adding, "We die at our post." Further, he wrote that "Christian doctors cannot abandon their hospitals, Christian governors cannot flee their districts, Christian pastors cannot abandon their congregations. The plague does not dissolve our duties: it turns them to crosses, on which we must be prepared to die."⁶ Similarly, theologian Andreas Osiander (1498-1552) criticized those who, "out of inordinate fear of this plague, leave their calling and office, maliciously withdrawing the love, help, and faithfulness which they (out of God's commandment) are bound to show unto their neighbors...."²

John Calvin also took a stand against abandoning the victims of the plague. Pastor John Benson Sloan observes that, "When Calvin was in exile in Strasbourg he visited some of his parishioners

who had the plague. Keep in mind the plague was seen as very contagious, but Calvin visited the afflicted anyway. Calvin instituted a hospital in Geneva just for people who had the plague, and also a separate hospital just for visitors who got sick – probably to keep the plague in isolation.”⁹

The driving theological force for these decisions was undoubtedly the Christian doctrine of the *imago Dei* (image of God). Viewed in light of Christ’s Incarnation, the understanding of the *imago Dei* had four important consequences for practical ethics according to historian Gary B. Ferngren¹⁰:

- “The first was the impetus that the doctrine gave to Christian charity and philanthropy.” The Greco-Roman world did not have a robust notion of philanthropy; in fact, it actively discouraged it. Yet Christian love answered the question, “who is my neighbor?” with the recognition that all human beings bear the *imago Dei*. Thus, every person is a neighbor to whom loving care is due.
- “The second consequence of the doctrine of the *imago Dei* was that it provided the basis for the belief that every human life has absolute intrinsic value as a bearer of God’s image and as an eternal soul for whose redemption Christ died.”
- “A third consequence of the doctrine of the *imago Dei* was,” he suggests, “in providing early Christians with a new perception of the body, and indeed of the human personality.” Unlike the ascetics, Christians thought that embodiment mattered. Consequently, treatment of the body’s ills also mattered.
- Finally, the fourth consequence of the doctrine of the *imago Dei* was a “redefinition of the poor.” “The human body in all its parts shared in the divine image. This was true of the bodies not merely of Christians but of all people. It was true particularly of the poor, who acquired a new definition in Christian thought: those who had true worth because they bore the face (*prosopon*) of Christ.”

Ferngren maintains that, “even for Christian physicians the role of the physician was defined not by Christian ideals but by Hippocratic precepts that had long been enshrined in the Hippocratic Corpus. With the exception of issues like abortion, exposure, and assisted suicide, the medical ethics of Christian physicians are not likely to have been deemed very differently than those of their pagan colleagues, except perhaps for a greater willingness to care for the poor.” Christian physicians were not less concerned than their Hippocratic peers, but more.¹⁰

E. Medical Professionalism

1. Covenantal Model of Medicine

- a. Medicine is not fundamentally a contractual profession, but a covenantal profession. Modern healthcare is a team effort requiring the mutual commitments and cooperation of multiple individuals, groups, and levels of authority, including individual HCPs, medical institutions, and governmental bodies at all levels, including all three major branches of government: executive, legislative and judicial. Within the executive are regulatory elements such as the FDA, HHS, NIH, CDC, and other public health services. For the public good to be achieved and our patients to receive the best care possible, HCPs and institutions should work as closely and reciprocally as we can to achieve solidarity of purpose toward the common good.
- b. The contemporary HCP is privileged to practice due to a number of contributions and authorizations from society. These include public support for health care education and training programs, permission to train on fellow human beings, licensure, prescribing of restricted substances, and the ability to engage in surgery and other high-risk interventions which other members of the society are forbidden to do. With these privileges come an expectation from society that HCPs will care for patients in need, even at risk of great personal inconvenience, cost of time, sacrifice of relationships, and risk of exposure to harm in the case of infectious diseases.
- c. What are the duties of HCPs to care for the sick in situations of significant risk to themselves? Dr. John Bartlett, specialist in Infectious Diseases from Johns Hopkins University, noted: Historical experience on this point is varied.... Many physicians, including Galen and Sydenham, are said to have fled patients with contagious epidemic diseases. But AIDS, SARS, and smallpox have focused attention on the duty to serve,

and a consensus has emerged.¹¹ The American Medical Association Code of Medical Ethics states, "Individual physicians have an obligation to provide urgent medical care during disasters. This obligation holds even in the face of greater than usual risks to physicians' own safety, health, or life."¹² Some states regard the obligation to treat during an emergency as a legal duty punishable by criminal sanctions for failure to act or abandonment of patients.¹¹

- d. The CMDA Position Statement on AIDS states: "We extend compassion to all who have acquired this disease by whatever means. We urge the provision of medical care for them to the same degree that patients with other life-threatening diseases receive it. Christian physicians and dentists, following the example of Christ, should care for HIV-infected persons *even at the risk of their own lives* (emphasis added).
 - e. Physicians and other HCPs, by nature of their profession (their covenantal promise), have a duty to care for the afflicted. This duty is not limited by such factors as inconvenience, difficulty, stress, or even personal risk. This duty is fulfilled by each HCP personally as we maintain the virtues of medicine: fidelity, humility, compassion, empathy, generosity, faith, hope, and practical wisdom. Dr. Edmund Pellegrino stated, "No matter to what depths a society may fall, virtuous persons will always be beacons that light the way back to moral sensitivity; virtuous physicians are the beacons that show the way back to moral credibility for the whole profession."¹³
2. Obligation versus Going Beyond the Call of Duty
- a. While it is the duty of every HCP to care for the sick, even at personal risk, might there be a level of risk to which the individual moves beyond obligation to an act beyond the call of duty? In the case of infectious disease, are there risks of contracting the disease, despite all measure of protection, with such a high degree of lethality for the infected, that it would not be appropriate to require an individual to engage in the activity? Although soldiers at times have been ordered to do their duties despite certain death, there have also been military situations of very high risk in which only volunteers have been accepted for the mission. It may also be the case for HCPs that there are situations in which only volunteers should be allowed to expose themselves to certain risks, but there is no established formula or guideline for determining in all situations the level or degree of risk that distinguishes a supererogatory act from the ordinary act of doing what duty requires.
 - b. Some HCPs may feel very strongly that they must fulfill their duty to care, regardless of the degree of personal risk. In general, it would appear appropriate to respect the individual's choice. In an epidemic or pandemic, however, respecting that choice must be weighed against the consequence of the HCP contracting the infection, as that could affect many more than the individual himself or herself. These communal risks include:
 - i. the risk of infecting co-workers,
 - ii. a decreased force strength of the health care team, or
 - iii. increased consumption of limited medical resources in his or her care once infected.
 - c. Public health authorities may order the individual HCP to refrain from engaging in some aspects of patient care for the good of the overall health care effort, and such orders should be obeyed.¹⁴
 - d. The HCP is one of the resources that must be carefully allocated in surge situations [See the associated CMDA policy statement, Triage and Resource Allocation During Crisis Medical Surge Conditions (Pandemics and Mass Casualty Situations)].
 - e. The duty to care may be fulfilled in other, less intimate ways than directly treating individual patients in person. Continuing to be part of the ongoing health care effort and focusing on minimizing morbidity and mortality to as many as possible are also engaging in care.

3. The Role of Conscience

- a. The Christian physician's duty to care for patients in situations that pose risks to the physician can also be considered as a matter of Christian conscience, and this extends to all HCPs. Conscience is the gift of God that allows rational human beings to understand moral truth because of the moral law God has written on the human heart (Rom 2:15). Because of our universal fallen nature, conscience alone does not always provide objective moral guidance, and therefore we need the moral illumination provided by the Word of God as revealed in the Bible. By the power of the Holy Spirit and in the edifying bonds of Christian fellowship, God uses Scripture to renew our minds so that we can discern God's will (Rom 12:1-2). This allows Christians to respond to complex practical situations with consciences informed by reason and evidence, and motivated by faith, hope, and love (I Cor 13:1-13) (see CMDA position statement on Healthcare Right of Conscience).
- b. Conscientious practice that is love-centered must also be wise. Wisdom is needed in situations where a physician's duty to show love to his or her patient creates tension with simultaneous obligations to other neighbors – to other patients (present and future), family (I Tim 5:8), the fellowship of faith (Eph 4:1-16), employers (Eph 6:5-8), society (Matt 22:21), and the obligation to be a faithful steward of one's own body (I Cor 6:19-20; Eph 5:29; I Tim 5:23). Conscientious practice needs to demonstrate love that abounds in knowledge and deep insight to discern what is best so that God is praised (Phil 1:9-11). This task of deliberation is a moral burden that each Christian must undertake (Gal 6:4-5), and each of us must ultimately entrust our decisions to Christ's mercy (Ps 68:19; Rom 14:4).
- c. In the setting of a pandemic, tensions among competing obligations may be acute, causing uncertainty and profound concern for the welfare of one's family and oneself. In such circumstances, Christian physicians should begin with a presumption that we have and should fulfill a duty to love our neighbor by caring for our patients who are in need, even when doing so may come at a cost. This means we should not abandon our patients. As Martin Luther wrote when he himself was caring for victims of a plague, "when a deadly epidemic strikes, we should stay where we are, make our preparations, and take courage in the fact that we are mutually bound together...so that we might not desert one another or flee from one another."⁸ In all circumstances, we should pray for conformity of our conscience to our freely accepted obligations, for wisdom in how to fulfill our multiple responsibilities (Jam 1:5), and for courage to perform our duties as physicians and Christians (Jam 4:17). We should encourage each other in the knowledge that we are safe in our Lord's providential care (Ps 23; Matt 5:27-34), that our Lord's grace is sufficient for our need (2 Cor 12:9), and that we can confidently entrust ourselves, body and soul, in life and in death (Rom 14:8), to the Lord who promises to protect His children as we serve Him by caring for the weak in their time of medical need (Ps 41:1-3).

F. Health Care Institutions and Society

1. Medical institutions and society, in the interest of solidarity in caring for the afflicted in medical emergencies, also have duties to HCPs who place themselves in harm's way in the care of patients during epidemics and pandemics. These duties center around providing protection for the HCPs to the extent that protection is possible, providing the tools necessary to treat the afflicted, and using their community influence to help support the HCPs' needs during the crisis to minimize distractions from fulfilling their duties.
 - a. Medical institutions should provide the tools and equipment necessary to optimize safety in the care of high-risk patients. In the case of individual practitioners, public health mechanisms should be the source for these materials.
 - b. HCPs often have other roles of responsibility, such as caring for a family, that serve as a distraction or conflict of interest to performing their medical duties. Medical institutions could use their local influence to coordinate support mechanisms for HCPs' families, which may lessen the conflicting burdens they feel.
 - c. Institutional leadership should remember that individuals are more likely to be committed to serving their institution, even to going into harm's way, when they feel there is a

bilateral commitment of parties to each other. This commitment from the institution may be expressed in multiple ways, some of which may be unique to the identity of the institution and needs of the HCPs.

- d. Due to the frequency of public health emergencies, every medical institution should maintain regularly reviewed protocols for responding to epidemic or pandemic events and conduct regular inventories of critical resources.
 - e. Some HCPs may experience moral distress in these crisis situations. Institutions should prepare and provide resources for the distress that occurs in HCPs in these trying circumstances.
2. Society's duties to HCP and institutions include helping medical institutions fulfill their obligations, such as ensuring adequate supplies of critical materials. The legislative and executive powers of the government should assist these higher bodies in helping to address issues that ensure manufacturing and supply chains are secure within the borders of the country and not dependent upon global networks that can be disrupted by international conflict.¹⁵
- a. Reduction in legal risk is important in order to allow HCPs to focus on the care of patients. HCPs should not be faced with the distraction of worrying about whether they will be sued when dealing with novel situations or when called to perform duties outside of their usual practice, because of lack of adequate personnel in the crisis. When public health or governmental officials declare a public health emergency, legal liability, aside from gross negligence, deliberate harm, or clear malpractice, should be placed on hold until the emergency is declared over. Afterward, adjusted standards of liability should take into account the extreme conditions and limitations under which HCPs were forced to practice during the crisis.^{16,17}
 - b. In addition to standard materials, new diagnostic and therapeutic tools are required when combating a novel infectious agent. Therefore, the regulatory bureaucracies should be flexible and responsive, capable of dealing with high-volume situations, allowing for rapid innovation, and facilitating release and distribution of new agents and tools to combat novel pathogens.
 - c. Regulatory agencies and public health departments should have regularly reviewed protocols for responding to potential health emergencies, and regularly conduct simulations to challenge those protocols.
 - d. Means to limit the spread of an infectious agent or other health emergency may lead to economic and social disruption, with the potential for anarchy and violence. In the spirit of solidarity across all levels of society, to maintain undisrupted operation of medical activities to care for the afflicted, law enforcement and military forces may be necessary to protect health care institutions, resources, and professionals from harm.

G. The Global Church and Christian HCPs

1. Pandemics, by definition, do not only affect the people of a single nation, but potentially those of most or all nations, irrespective of technological or financial resources. Christian HCPs in resource-rich nations should not focus only on our brothers and sisters within the boundaries of our countries. We are called to share the love of Christ to every human being on the planet, which is why we send missionaries and establish medical missions. We have an obligation to help our fellow professionals with the resources they need, reliable lines of logistical support, and timely medical knowledge. We must take into consideration the suffering of all of God's image-bearers in our distribution of medical resources, recognizing the unique role of the Church, which is not defined by geographical, governmental, or political interests (John 18:36).

Conclusion

- HCPs have a long-established professional duty to care for the sick, even in the face of potential personal harm.
- By virtue of their call to follow the example of Christ and potentially sacrifice themselves for the benefit of others in a broken world, Christian HCPs have an even higher calling to serve others who are in distress or danger from illness.

- HCPs are also a part of a team and a community and must temper their individual willingness to engage in risk in light of the needs and direction of the larger health care effort.
- Medical institutions and the state have significant obligations to HCPs to best enable those professionals to fulfill their duties safely and effectively to care for patients.
- Advance preparation is key to effective and ethical response to pandemics. HCPs, health care systems, and government agencies should continually prepare to address the potential and existing challenges of novel and longstanding infectious illnesses.
- No matter how dire a pandemic becomes, Christians hold to the eschatological promise that, in the end, Jesus Christ will wipe away every tear and definitively defeat death (1 Cor 15:51-58, Rev 21:4).

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Appendix 1- Pathogen Risk to HCP Summary

- H1N1
 - 70 reported HCP infected with H1N1 in the US in May/June 2009¹⁸
 - 20% nurses, 19% physicians, 13% nursing assistants
 - 50% infected in healthcare setting; 26% in community setting
 - 57% in inpatient settings, 13% ED, 9% long-term care
 - 20% non-clinical care occupations (office manager, intake coordinator, pharmacist, receptionist, etc.)
 - 23 cases probable or possible patient-to-HCP transmission
 - Only 1082 hospitalizations/estimated 1 million infections reported, therefore most exposure in outpatient settings
 - Likely underestimates HCP reported infections
 - In 4 hospitals in Korea¹⁹
 - Estimated infection rate in HCP was 9.1% (3365 HCP surveyed)
 - 27.6% of study HCP reported influenza-like illness
 - Many HCP did not have a diagnostic test, thus underreporting infection rates
 - Chicago hospital surveyed 20 HCP with H1N1²⁰
 - 65% had healthcare-associated cases
 - 11 (55%) worked for 1 day or more after onset of illness
 - CDC guidelines for 2010-2011 influenza season advises HCP with fever and respiratory symptoms to be excluded from work for 24 hours after resolution of fever
 - Argentina June-July 2009²¹
 - 1519 HCP total, 96 (6.3%) diagnosed with influenza-like illness
 - 85/96 swabbed for H1N1, 43/96 positive (43/1519=2.8% of those with influenza-like illness)
- SARS
 - In US²²
 - 110 HCPs exposure within droplet range
 - Varying degrees of PPE
 - No serological evidence of transmission
 - Hospital outbreak in Toronto²³
 - 128 probable cases, 47 in HCP (36.7%)
 - 17 deaths total (13.3%)
 - Additional precautions implemented halted transmission in hospital
- Ebola
 - Liberia, June-August, 2014²⁴
 - 810 cases of Ebola, 97 in HCPs (12% of total)
 - Human-to-human transmission with direct contact of infected bodily fluids
 - Nurse or nurse aide (35%), physician or physician assistant (15%)
 - HCPs employed at hospitals not Ebola treatment centers, 60%
 - Sierra Leone, May- Oct, 2014²⁵
 - 199 HCPs (5.2%) out of 3,854 laboratory confirmed cases of Ebola
 - 12.1% death in HCPs, and 12.3% in non-HCPs
 - Sierra Leone, May-Dec 2014²⁶
 - 293 HCPs, 153 nurses, 9 doctors (3.1%)
 - 47.4% exposed in hospital setting (not Ebola wards), 19% at home, 17.8% at health centers, 10.7% in Ebola isolation units
 - 60% said they had been trained in infection prevention and control
- Covid-19
 - Incubation period of 181 confirmed cases from 4 Jan 2020 to 24 Feb 2020²⁷
 - Median incubation period was 5.1 days
 - 97.5% of people who develop symptoms will do so within 11.5 days
 - Current period of active monitoring by CDC (14 days) supported by the evidence
 - Potentially infected HCP²⁸

- Restrict HCP from working if they have upper respiratory tract symptoms, even in absence of fever
- Preventing HCP with mild illness from working will compromise staffing
- Transmission to HCP from exposure from Covid-19 patient in Singapore²⁹
 - 41 HCP identified as having exposure to aerosol-generating procedures for at least 10 min at distance of less than 2 meters from patient (85% wore surgical mask, 15% wore N95 mask)
 - All 41 placed under home isolation for 2 weeks with daily monitoring
 - 2 nasopharyngeal swabs (day 1 and day 14 of home isolation)
 - No HCP developed symptoms or tested positive