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The U.S. Public Health Response to Mpox: Historical, Medical, Governmental, and Ethical Perspectives

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Abstract: The mpox pandemic of 2022 signaled the global reemergence of a virus that had for years been endemic in Africa. While now the global outbreak has been relatively contained, the early months of the U.S. response were characterized by stigma, deficient resources, and a lack of coordination as thousands of individuals suffered. This paper first analyzes the history and origin of the monkeypox virus to put the current outbreak in context and illustrate what has and has not been learned. The medical aspects of the virus itself will be presented along with transmission, prevention, and treatment details. Next, despite the criticisms drawn from the U.S. public health response to the COVID-19 pandemic, the response to the mpox outbreak will be highlighted, focusing on the missteps and analyzing the consequences of the ill preparedness. Then, in order to begin remedying many of the issues seen over the past year, this issue is analyzed from a Catholic Social Teaching perspective to establish an ethical basis for the U.S.'s future responsibilities to its citizens and the world. Lastly, recommendations will be made to prepare the country for the next pandemic using language, federal, sexual health, vaccination, and research perspectives.

Keywords: *mpox, pandemic, stigma, vaccines, public health.*

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I. INTRODUCTION

Only two years after the initial outbreak of the coronavirus, another virus has quickly and slyly upended and exposed the public health deficiencies of the US and the world: monkeypox. Since the beginning of May 2022, cases of monkeypox began appearing in areas where the virus is not endemic, such as Portugal, Spain, Sweden, and North America.[1] As of May 17, 2023, there have been 30,401 confirmed cases in the United States and its territories, places that previously did not consider this virus a threat at all.[2] Almost all cases have been among gay men and other men who have sex with men, but it is a threat to everyone given its mode and potential rate of transmission. And regardless of the virus's history, the current reality is that the United States's public health personnel and resources, much like during the initial SARS-CoV2 outbreak, have proven insufficient to handle such crises and protect its citizens.

Thus, this paper aims to explore all facets of the current crisis. First, a detailed account of the history and origin of the mpox virus will be given, focusing specifically on how it has remained dormant for so long and why researchers think it has returned to become a global threat. The difference between the variant circulating in non-endemic countries and its more fatal counterpart will be highlighted, as the disease's low fatality rate has likely contributed to the overlook of its urgency. Next, this paper will detail the medical aspects of the virus, including modes of transmission, frequency of mutations, symptoms, and treatment options. Next, the main focus of this paper will highlight the public health response by the United States after mpox was declared a global health emergency, including the notable shortcomings in the response and leadership during that time. This issue will then be evaluated ethically with particular attention to Catholic Social Teaching and the responsibilities we all share as human beings in society. The principles of human dignity, solidarity, Common Good, and the stewardship of resources will be examined in light of this topic to ensure a full ethical analysis. Lastly, the paper will offer recommendations to improve response to the ongoing pandemic and avoid future outbreaks, specifically as it pertains to the structure of the US public health system and ways to reallocate funds effectively, concluding with a call to action and encouragement to learn from our history.

II. ORIGIN AND HISTORY

The originally named "monkeypox" virus is so-called because it was first discovered in 1958 in a group of monkeys that was being held for research in Copenhagen.[3] The first time mpox was discovered in humans was in a 9-month-old boy in the Democratic Republic of the Congo in 1970.[4] Although the original animal source of the virus is unknown at this time, the virus can lay dormant in and can be transferred to humans via rope squirrels, tree squirrels, monkeys, and other species of rodents and non-human primates.[4] Thus, mpox is a zoonotic virus, meaning a virus that is transmitted from animal to human. Since the initial human case in 1970, human cases have been reported in 11 African countries, and it has remained endemic in many areas of Africa since.[4] However, while the virus has remained associated with Africa, it is of global health importance due to its emergence outside of Africa in the 21st century. In 2003, the first known mpox outbreak in humans outside of Africa occurred in the United States, totaling over 70 probable and confirmed cases in six states.[4-5] This initial outbreak was traced back to prairie animals imported from Ghana, and notably, zero cases were attributed to transmission via human-to-human contact.[5] Since that event in 2003, cases have been reported in the United Kingdom, Singapore, and the US in travelers from Nigeria, but none of these outbreaks raised significant alarm in Western countries, as Western public health officials generally adopted a "why should we care" mindset.[3,5] However, certain mpox events in Africa since 2003 should have eradicated that mindset in favor of a more concerned approach to preventing similar occurrences in Western countries. For instance, in the Democratic Republic of the Congo between November 2005 and November 2007, cases of mpox increased 20-fold compared to rates in the 1980s.[3] Additionally, in 2017, a severe outbreak occurred in Nigeria almost 40 years after the country's previous known case.[3] However, preventative measures from the West remained nonexistent until the issue became a more direct concern with the

multicountry outbreak in May 2022.[3] In the US alone, the first case of this current outbreak was identified on May 18, and by July 26, there were 3,591 known cases of mpox.[6]

The mpox virus is a member of the *Orthopoxvirus* genus and the *Poxviridae* family of viruses.[7] Other poxviruses, such as *Vaccinia virus*, *Cowpox virus*, and *Variola virus* (smallpox virus), also belong to this genus.[7] These viruses all share the characteristic of being animal pathogen zoonotic poxviruses. There have emerged two genetically distinct "clades" on the mpox virus, meaning two separate strains of the virus that share a common ancestor.[7] Clade I has been found predominantly in the Democratic Republic of the Congo and has been associated with more severe disease and higher mortality than its counterpart.[7-8] Clade II, formerly called the West African clade, has been linked to the recent pandemic that has seen a very low mortality rate and low symptom severity.[7-8] It is suspected that differences in the sequences in the protein-coding region of the genomes account for the difference in virulence and pathogenesis among clades.[7] Poxviruses in general share the traits of extraordinary desiccation resistance, survival in high temperatures, and resistance to large pH fluctuations compared to other enveloped viruses, which generally are more resistant to environmental changes than their non-enveloped counterparts.[7]

III. MEDICAL ASPECTS

The primary mode of transmission of the virus is through direct skin-to-skin contact of pus-filled lesions of an infected person.[9] However, although one report from the Centers for Disease Control and Prevention (CDC) stated that 94 percent of the cases occurring in men, who account for 99 percent of all cases, were among those who had recent male-to-male sexual contact, this virus is not only a sexually transmitted pathogen. [9] Rather, transmission can also occur via all forms of close contact, respiratory droplets, and even through contact with contaminated objects, such as used utensils.[9] As mentioned previously, transmission can be transmitted from infected animals to humans, and this must have been true for the virus to reach the human population originally.[10] Additionally, research is ongoing with regard to asymptomatic transmission of the virus, although some studies from Europe have demonstrated that this type of transmission is a very real possibility.[11] One author of such studies has recognized that the clinical presentation of mpox is variable and represents a wide spectrum of severity, so some so-called asymptomatic cases may be due to unnoticed symptoms.[11] Thus, conclusions regarding this are not final, but the risk has certainly been established.

Another important mode of transmission currently being studied is via semen. One study published in The Lancet found that mpox virus was able to replicate and remain within semen samples of 11 patients for weeks after symptom onset.[12] Interestingly, the virus was not found in blood or urine samples of these patients over the same timeframe, and replicability of the virus in semen was only found in patients who were also Human Immunodeficiency Virus (HIV)-positive.[12] While preliminary, these findings suggest that exchange of genital fluids may be another mode of transmission that has contributed to the prevalence of cases resulting from sexual activity.[12] If further research confirms the ability of the virus to utilize the genital tract as a reservoir and transmission path, we must ask the question: how many cases have we missed from this novel mode of transmission?

Given these modes of transmission, it is important to next analyze the mechanisms of action of the virus once it reaches a susceptible host. Regardless of if the virus enters the host via the oropharynx, the nasopharynx, or within the skin through lesions, it will replicate at the inoculation site and infect the local lymph nodes.[13] During the initial viremia or incubation period, the virus spreads to other organs throughout the body, lasting anywhere from 7-21 days.[13] The secondary viremia stage is indicated by symptom onset including but not limited to a fever, myalgia, fatigue, and swollen lymph nodes.[13] This stage's conclusion correlates with the appearance lesions at which point antibodies are detectable.[13]

Lesion progression is a primary indicator of the state of the disease. In general, they are characterized as firm, deep-seated, and are anywhere from 2-10 millimeters in size.[13] In the men who have sex with men (MSM) community, lesions are localized to clusters in the genital region, but rashes have the ability to spread throughout the body and vary in number.[13] They progress through phases until

crusts begin to form and remain for 7-14 days.[13] In most cases, the symptoms completely resolve themselves within 3-4 weeks of onset, though permanent scarring and discoloration of the skin may occur.[13]

When discussing symptoms and prognosis, it is imperative to talk about the exacerbations seen among individuals with HIV. First, according to a study conducted by the CDC, while lesions in most mpox patients are limited to the exposure site, those with advanced HIV experience larger lesions that spread throughout the body.[14] The study also found that many of these patients had nodules in their lungs that caused acute respiratory distress in the population of patients.[14] Second, a study from The Lancet, which analyzed the outcomes of 382 mpox patients with advanced HIV (less than 350 CD4 cells per mm^3), found a fatality rate of 15% among patients with less than 200 CD4 cells per mm^3.[15] These results support the U.S.'s decision to add mpox to the list of possible opportunistic infections in persons with HIV, which occurred in September 2022.[15] However, the World Health Organization (WHO) has yet to take the same action. Thus, it appears imperative that the WHO makes this declaration so that awareness of the vulnerability of this population specifically can grow globally.

Currently, there are no approved treatments specifically for mpox.[16] For most patients, flu-like management of symptoms. However, several antivirals that treat other conditions have proven helpful in treating mpox patients with severe symptoms.[16] The one most prescribed to mpox patients is tecovirimat or TPOXX, which is an antiviral U.S. Food and Drug Administration (FDA)-approved (2018) for smallpox treatment that can be administered orally or intravenously.[16] Clinical trials are ongoing regarding TPOXX's FDA approval for treatment of mpox. One such trial is being run by both the National Institute of Allergy and Infectious Diseases and the Acquired Immunodeficiency Syndrome (AIDS) Clinical Trials Group, and its subjects include individuals with severe mpox, those at risk, and those with no particular increased risk for mpox.[16] Two other antiviral options for severe mpox cases are brincidofovir (Tembexa) and cidifovir (Vistide).[16] Tembexa was approved for smallpox treatment by the FDA in 2021, and Vistide is used to treat cytomegalovirus retinitis in AIDS patients.[16]

In terms of prevention, behavioral changes are the most effective way to avoid the spread of mpox. Because mpox is most prevalent among the MSM community and those who have multiple sexual partners, it is advised that individuals participate in monogamous relationships and use protection during sexual activity.[17] As with any transmissible condition, sanitation is an effective prevention strategy. For those showing symptoms, specifically lesions, testing involves a swab of the lesion, and individuals are advised to isolate until the results come back.[9] If positive, a strict isolation protocol is advisable in which individuals do not come in contact with anyone except for emergency reasons until the lesions disappear.[9]

Vaccination is also available for mpox prevention and sometimes treatment. Similar to the antiviral treatment options, the vaccination options were primary vaccines for smallpox. Vaccine administration is most advisable as close as possible to the time of exposure, although those at high risk of being exposed to the virus are advised to receive vaccination preemptively.[17] The vaccine recommended by professionals due to its relative safety and efficacy is the JYNNEOS two-dose vaccine. This vaccine, approved by the FDA for smallpox and mpox prevention in 2019, features a weakened form of live vaccinia virus that cannot replicate.[18] While usually administered subcutaneously, in August 2022, the FDA authorized intradermal administration of the JYNNEOS vaccine in an effort to reduce the dosage and extend supply to more individuals.[18] This dose-sharing strategy involves administering one-fifth of the normal vaccine amount to individuals via direct injection into the dermis layer of the skin. However, a study released in September 2022 showed that the reduced dose resulted in relatively low levels of antibodies needed to fight infection against the virus.[19] And while a May 2023 study published in the New England Journal of Medicine showed that the one-fifth intradermal injection provided protection roughly equivalent to that of the conventional administration, this new data clearly did not inform the initial decision to employ dose sharing.[20] Rather, it was the result of a lack of stockpile preparedness and represented a bit of a risk initially. This reflects one of the major shortcomings of the U.S. public health response to the mpox outbreak that will be highlighted later in this paper. Another smallpox vaccine, ACAM2000, is also available for mpox treatment and prevention.[18] There is a much greater supply of this option and it is only a one-dose regimen, but its serious side effects in many cases in individuals with weakened immune systems make it less desirable.[17,18]

IV. U.S. PUBLIC HEALTH RESPONSE

While the recent mpox threat has been global, affecting many non-endemic countries, the following outline of events will highlight the series of actions taken by the U.S. government in response to the perceived threat of the mpox. In late May of 2022 during the initial diagnosis and spread of mpox to non-endemic countries, President Joe Biden declared that quarantine would not be necessary to prevent the spread of the virus and that the U.S. has enough vaccine doses to tame any flare-ups in the country.[21] President Biden delivered this statement as other countries, including Germany, the United Kingdom, and Belgium, began detecting cases and implementing preventive measures.[21] A few weeks later, on June 10, 2022, the U.S. purchased an additional 500,000 doses of smallpox vaccines that were approved to treat and prevent mpox from Bavarian Nordic, the manufacturer.[22] A little over one week later, the U.S. announced an expansion of its testing capacity to commercial laboratories across the country as cases continued to rise and officials feared that counted cases were a large underestimation.[21] Subsequent to this action, the Biden administration announced the immediate release of 56,000 doses of JYNNEOS vaccine with another 240,000 doses to be made available short thereafter on June 28, 2022.[21] On July 1, 2022, the Department of Health and Human Services ordered another 2.5 million doses in preparation for a larger outbreak of the virus.[23] As more deaths were reported around the world in the days following this purchase, on July 7, 2022, the U.S. announced the release of 144,000 more doses of vaccine for immediate usage.[21] However, demand for vaccines soon greatly outgrew supply, and complaints of the public health response of the U.S. flooded in.[21] And, on July 26, 2022, just days after the WHO declared mpox a Public Health Emergency of International Concern (PHEIC), the U.S. became the country with the largest number of recorded cases, though this would partly due to the increased testing capacity within the country.[24]

Then, on July 30, 2022, in the first move of its kind in the U.S., New York declared mpox a Public Health Emergency (PHE).[21] Following intense scrutiny from the public regarding the lack of urgency with which the spread of the virus was being handled thus far, on August 2, 2022, President Biden appointed a mpox coordinator whose sole function was to facilitate initiatives aimed at preventing mpox transmission.[21] Finally, in order to provide more funding for mpox programs, on August 4, the U.S. government pronounced mpox a PHE.[21] On August 9, the U.S. both expanded purchasing of the TPOXX treatment and announced the new dose-sharing protocol of vaccines to spread supply among more individuals, leading to increased criticism.[21] Finally, in late August, rates of positive cases began declining, though experts reported that 97% of all administered vaccine doses were the first of a two-dose regimen, indicating that most people had not received the full vaccine.[21] Over the subsequent months, vaccination rates increased and cases declined, though startling statistics arose about the vulnerability of minority groups through the spread.[21] And, it was not until November 28, 2022, that the WHO officially recommended renaming the virus to "mpox."[21]

Though the virus is still circulating at low levels, now that the emergency has abated, it is important to highlight three main reasons why the U.S. is at fault for its subpar response: failure to learn from the mistakes of the coronavirus response, the vaccine shortage, and the perpetuation of stigma against the MSM community.

One of the major criticisms of the U.S.'s response to the coronavirus response was the delay in testing capability and capacity. In particular, while the threat of the SARS-CoV-2 was recognized by the CDC in early January 2020, diagnostic testing capacity remained an issue in the U.S. during the initial wave and also during the subsequent surges of variants like the Omicron version.[25] Additionally, the FDA did not allow commercial laboratories to begin creating their own tests until late February 2020, which contributed to the lackluster testing initiative run by the government.[25] Similarly, while the first case of mpox was reported in the U.S. in May 2022, it was not until June 22, 2022, that the government authorized the use of commercial laboratories for the testing of mpox, a similar delay to that one seen during the coronavirus pandemic. Likewise, similar to the early days of the COVID-19 pandemic when ventilators, masks, and other life-saving supplies were drastically understocked, low levels of stockpiled mpox vaccines and treatments were characteristic of the early mpox response.[26]

Second, the vaccine shortage observed during the mpox response comprises two aspects: deficient stockpiling and faulty rollout. In terms of stockpiling, while the Department of Health and Human Services (HHS) owned more than enough doses of the Bavarian Nordic vaccine from the onset of the outbreak to begin sufficient administration of the vaccine in the U.S., it delayed ordering them because it did not regard the need for them as urgent enough in late May 2022 and early June 2022.[27] In fact, in late May, the U.S. authorized the release of 215,000 doses of vaccine it technically owned to Europe instead of holding onto them due to the misjudgement of the situation [27] To make matters worse, due to the U.S.'s investment of over $1 billion in vaccine development, it had at one time stockpiled as much as 20 million doses, but it failed to replenish the expired doses, resulting in just 372,000 doses in late May 2022.[27] Most of the owned vaccines were not ordered quickly enough, resulting in the delivery of midsummer orders until October and into 2023.[27]

The rollout of vaccine distribution within the U.S. has also been a point of weakness, specifically because of lapses in communication between the state and federal governments. In fact, as of mid-August, officials of at least 20 states have aired grievances regarding the distribution of vaccines.[28] Anecdotes of lost doses arriving in untended states and deliveries being completely outside of the vaccine's "viability window" are plentiful and have led to wasted resources, which has contributed to the subpar vaccination campaign beyond the supply shortages.[28] The vaccine distribution system VTrckS, which has historically moved billions of doses of vaccines throughout the country for various reasons including annual immunizations, was not used for this vaccine rollout.[28] Instead, JYNNEOS vaccine has been distributed by the National Strategic Stockpile via a different HHS agency, which has no experience handling on-going orders and shipments.[28] State officials have claimed that vaccine shipments have arrived unannounced and that there is no way for them to know exactly when to expect order deliveries.[28] When asked about the decision to refrain from utilizing VTrckS in mpox vaccine distribution, the HHS said that the system could not be integrated in time for JYNNEOS distribution.[28]

Lastly, the perpetuation of the stigma has been another focal point of criticism and shortcoming in the U.S. and globally. This stigmatization has been both against African people and against the MSM community. First, the initial naming of the virus and the continued use of the name "monkeypox" was a point of contention for African nations, as they declared their discomfort in the virus's description being primarily of African descent and in the use of African people to display the lesions in media.[29] In fact, in May 2022, the Foreign Press Association, Africa issued a statement calling for the cessation of the spread of images of African people throughout Europe to describe the virus.[30] This statement also claimed that failure to address the discriminatory nature of the nomenclature of the virus would only hamper containment efforts.[30] And while the WHO claims that the move to change the name took so long due to scientific accuracy concerns and other considerations, I still question why this was not one of the top priorities for leaders globally.

With regard to the MSM community, when the U.S. finally declared mpox a PHE in August 2022, gay rights activists were quick to proclaim that this action was not taken quickly enough.[31] The reason for this was because although deaths were low in the U.S., the virus had already affected thousands of individuals and there was an apparent deficiency within the government in terms of the level of concern or perceived threat that the virus presented. And while there was no blatant joking about mpox like there was in the Regan administration at the start of the AIDS epidemic, members of the MSM community are still drawing intimate parallels.[32] David France, a gay rights activist and writer of the AIDS-centered documentary "How to Survive a Plague", claims that while there are more treatments and empathy available for the MSM community this time around, there remains a lack of intentional communication to the communities most at risk, which he feels mirrors the feeling of being an afterthought experienced during the AIDS response.[32]

V. ETHICAL ANALYSIS

Given the nature of the mpox pandemic and the shortcomings of the U.S. in properly protecting its citizens from the dangers of the virus, I now analyze this issue ethically and find a basis for the ethical imperative that the U.S. has moving forward to remedy the pitfalls of pandemic response. The U.S. government notoriously operates with a utilitarian approach, seeking to do that which is best for

the greatest number of Americans. However, numerous examples of the shortcomings of this approach show that this cannot be the approach of the government if it is to aptly protect its citizens and global neighbors from devastation in the future. An ethical basis must be rooted in something else, namely Catholic Social Teaching. To do this, I employ the Catholic Social Teaching principles of respect for human dignity, solidarity, the common good, and stewardship of available resources. In addition, I cite the principle of quality of life at the individual level to reemphasize the ethical need to address public health crises in the future.

The Principle of Human Dignity

The United States Conference of Catholic Bishops (USCCB) claims that human dignity is a foundational principle of Catholic Social Teaching and defines it as follows:

> "Every human being is created in the image of God and redeemed by Jesus Christ, and therefore is invaluable and worthy of respect as a member of the human family."[33]

This principle is conditional only upon one's being human, and it does not consider one's race, religion, sex, age, or any other characteristic about the individual.[34] This entails that every human being is treated as an end in himself or herself and never as a means to an end.[34]

Application of this principle to the mpox response would entail providing adequate access to resources to those who need them most regardless of personal characteristics, country of origin, and other considerations. However, within the country, although the mpox virus was primarily affecting one community of individuals, the urgency of the response should have been such that the affected community is protected as best as possible. This should be true of the response regardless of if a phenomenon afflicts the entire country or is predominant in one community. The principle of human dignity requires this. There is vast evidence, namely the inadequate testing, the shortage of vaccines, and the delay in the declaration of a PHE, to support the idea that human dignity was not a priority early on in the response to mpox. Catholic Social Teaching requires that this be placed at the heart of interventions moving forward to ensure that all individuals are treated with dignity and respect.

The Principle of Solidarity

The principle of solidarity promotes inclusion and justice in the implementation of the respect for human dignity. In other words, the USCCB defines it as the following:

> "...We are our brothers' and sisters' keepers, wherever they live. We are one human family.... Learning to practice the virtue of solidarity means learning that 'loving our neighbor' has global dimensions in an interdependent world."[33]

Solidarity reinforces the type of relationships we are to have with each other as human beings that was laid out by the principle of human dignity. It requires that this approach to others is extended beyond any barrier, be it physical, political, social, or economic, that separates oneself from others.

While this principle certainly applies to the domestic response by the U.S. to mpox in that we are to recognize the suffering of our neighbors and join with them to combat the affliction, I extend this to the role that the U.S. played in the lackluster mpox response in Africa. During the early days of the mpox pandemic, while the U.S. and other European countries stashed stockpiles of smallpox vaccine and began administering it in their respective countries, Africa, having seen three times as many mpox cases by the summer of

2022 than Europe and the U.S. combined, had little access to any vaccination or treatment options.[35] Instead, as a mpox response leader in Nigeria contends, many African countries have had to resort to quarantine and and contact tracing to handle mpox cases, which have persisted throughout Africa prior to this most recent global outbreak.[35] Since the smallpox virus was declared eradicated in 1980, the WHO had built a storage of 31 million doses of smallpox vaccine to guard against any reemergence, but none of these doses were administered to Africa for any of the outbreaks in central or western Africa since that time.[35] As mentioned previously, the U.S. itself owned over 20 million vaccines at one point, but by the time May 2022 arrived, this number was reduced to under 400,000 doses due to expiration of much of the stock. This is a blatant lack of concern for our brothers and sisters in Africa, and it is an extreme lack of a commitment to solidarity. Solidarity requires that in the future, the U.S. utilize its own resources to assist its more vulnerable counterparts.

The Principle of Common Good

Intimately tied to these principles is the idea of the Common Good, which the USCCB describes as the "social conditions that allow people to reach their full human potential and to realize their humanity.[34] In a sense, solidarity is one tool utilized to strive for the Common Good in the world. Thus, these principles are interconnected. In fact, without a respect for human dignity and solidarity, there is no Common Good for which to strive. Additionally, this approach contrasts explicitly with the philosophy of utilitarianism in which the greatest good for the greatest number of individuals is the goal. Utilitarianism necessarily results in a vulnerable, marginalized minority group being exploited. The Common Good principle ensures that there is no minority group and that all individuals are put in a position to reach their full potential.

An area of the mpox response that represents a failure to achieve the Common Good was the approach to potential treatments prior to this recent outbreak. Research into mpox treatment options, such as TPOXX, was minimal prior to cases emerging in richer countries because money typically only devoted to diseases affecting said countries.[35] A similar situation was observed during the Ebola outbreak in West Africa of 2014-2016.[35] When several Americans were afflicted by the disease, research into vaccination at last increased, ending a decades-long effort to develop a vaccine.[35]

This consistent approach by the U.S. to only be concerned with the diseases afflicting its citizens is not only a failure to promote the Common Good, but it is also counterintuitive. As observed during the COVID-19 pandemic, most of the more dangerous variants of the virus emerged from poorer countries who suffer from a lack of resources and support from other countries. This ends up harming American citizens even more. A danger associated with this recent mpox outbreak is that although the virus seems to have quieted in richer countries, a variant could emerge from a poorer country that is more harmful and a result of the disproportionate allocation of resources.

The Principle of Stewardship & Distributive Justice

The principle of stewardship first and foremost emphasizes the need to be managers and not owners of our natural environment.[34] The USCCB describes it aptly as the following:

"The Catholic tradition insists that we show our respect for the Creator by our stewardship of creation."[33]

This moral responsibility to protect the environment and what was created for us extends to the use of personal talents, personal health, and personal property. Intimately tied to this principle is the idea of distributive justice, which requires that all resources are allocated in such a way that is just, equitable, and promotes the Common Good. It should be clear that the U.S.'s handling of its own

resources did not satisfy the principle of stewardship. This principle requires that in future public health responses, resources are allocated to those most in need of them, regardless of any external factor, similar to the respect for human dignity and solidarity principles.

Quality of Life

Another principle important in bioethics as it pertains to the treatment of an individual patient is quality of life. According to many ethicists, including Richard McCormick, SJ, this principle is intimately tied to its counterpart principle: sanctity of life. The former analyzes the worth of a patient's life to himself or herself, while the latter recognizes that the inherent moral and religious value of a human life supersedes any consideration of its quality.

I connect quality of life to mpox because one of the reasons for the U.S. government's slowed response to mpox may have been the extremely low fatality rate. When compared to the deadly toll that COVID caused in the U.S., mpox may not have appeared to be as serious. However, this idea completely ignores the detrimental effects that mpox has on the quality of life of its patients for weeks. The physical manifestations of the disease result in pain, missed work, and oftentimes, stigmatization for the patient. These facts alone, supplemented by the rapid spread of the virus early on in 2022, should have signaled to the U.S. government well before August that swift action must be taken. I suspect if the fatality rate was higher, this response would have been quicker. In the future, I believe the quality of life must be taken into account when assessing the severity of a disease.

Another important aspect of mpox specifically is this general idea that contracting mpox is the result of personal behavior and choice as opposed to being uncontrollable. Concerning this, American psychologist Bernard Weiner examines reactions to stigmatized persons through the theory of social motivation.[36] One of Weiner's theoretical interpretations of his findings is that the way individuals are evaluated for a failure of some kind is mediated by so-called "causal dimensions" of the act, namely controllability.[36] If someone fails because they simply lacked the ability to perform well or obtain a favorable outcome, they will experience sympathy from others and not punishment.[36] However, if someone fails that had control over a situation and simply did not exert the effort to succeed, this person will be socially punished.[36] I cite Weiner here because it relates to the stimatization of mpox patients. The general public views mpox as something that can be avoided by one's control of his or her actions. The public views patients suffering from mpox as having the ability to avoid the outcome but apparently lacking the effort to succeed. Thus, there is a psychological component to the suffering of mpox patients that must be mentioned here that was not generally seen during the COVID-19 pandemic in which the public viewed contraction of the virus generally as out of one's control.

In all, quality of life must be a consideration in the future in assessment of the urgency of a public health issue. The suffering experienced by mpox patients should not have been avoided, even if it did not result in death.

VI. CONCLUSION/RECOMMENDATIONS

With the historical shortcomings now in mind and an outline of the U.S.'s ethical responsibility presented, I propose the following recommendations to not only address the current mpox situation but also the country's and world's preparedness for future public health threats.

1. Language: Early on in the pandemic, perhaps in an effort to avoid stigmatization, several reports of the first cases of mpox avoided mentioning the increased risk of transmission among gay and bisexual men.[37] While possibly well-intentioned, initial reporting prevented members of this at-risk community from taking the proper precautions to protect themselves. Once messaging was clearer regarding the increased threat faced by gay men, this community responded in the appropriate way.[37]

Thus, a general recommendation for future media coverage of any public health threat is to use clear and blunt language when describing the individuals most at-risk of harm.

2. Federal Infrastructure: At the level of federal agencies, it is abundantly clear from both the COVID-19 response and the mpox response that there are systemic issues. While the CDC should handle responses to viral outbreaks, up until now it has not been modeled as a crisis organization, instead relying on a deliberative approach to handle time-sensitive issues.[26] While the CDC had complained during the mpox response that it could not access appropriate state-level information due to bureaucratic barriers, it does have some tools and resources to be able to handle pandemic-related tasks, such as surveillance and tracking abilities.[26] Former commissioner of the Food and Drug Administration Dr. Scott Gottlieb is calling for a return to the CDC's disease control origins by transferring some of its prevention duties to other agencies.[26] I thus propose that the CDC's mission be remodeled to contain outbreaks, while restructuring other agencies to pick up other duties. This will allow future pandemic response to be centralized and focused onto a federal agency that has all of the tools ready to act.
3. Public Health: According to the National Coalition of STD Directors, federal funding for sexual health clinics decreased from $168.5 million in 2003 to $152.5 million in 2022.[38] This represents a 40% decrease when accounting for inflation.[38] This statistic represents just one symptom of an underfunded and understaffed public health system in the U.S.[39] While funding for public health responses during both of the most recent pandemics increased due to the declaration of a public health emergency, this increase does not perpetuate forever. Thus, public health funding must increase to create the infrastructure necessary to fight future pathogenic threats. While an increase in taxes would be controversial and unrealistic, a restructuring of the federal budget could signal a change in the perceived importance of public health in the U.S.
4. Vaccine Distribution: During the early days of the mpox pandemic, the WHO asked that countries with vaccine stockpiles distribute doses to countries who need them. The U.S. should follow through with this request and distribute a portion of its share of vaccines to endemic countries. This not only fulfills the ethical responsibility that the U.S. has to other countries, but also, it will be best for the U.S. in the long run to mitigate virus transmission at its source.
5. Proactive Research: While the National Institute of Allergy and Infectious Diseases (NIAID) began a TPOXX clinical trial in the Democratic Republic of the Congo in October 2022, these plans had been in motion for years prior to the trial's commencement.[40] While the WHO had called for such trials to be conducted before the most recent outbreak, the perceived need for these types of trials was not increased until the virus began affecting U.S. citizens. Thus, there must be a change in the approach to clinical research to focus upon pathogens affecting all parts of the world, especially those countries that lack sufficient resources to combat outbreaks themselves. We must continue to monitor endemic diseases globally, not only in Western countries.

With these recommendations implemented, the U.S. and the world can be better prepared to fight future epidemics that are undoubtedly destined to arise. The future of public health in the U.S. relies on a cultural shift that emphasizes the critical function of this field and a requirement to learn from past mistakes.

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