3.16: Infectious Disease/Pandemic

Hazard Description[1]

According to the National Center for Biotechnology Information, pandemics are large-scale outbreaks of infectious diseases that can increase morbidity and mortality over a wide geographic area and cause significant economic, social, and political disruptions. Evidence suggests that the likelihood of pandemics has increased in the modern era due to increased global travel and population integration, urbanization, changes in land use, and greater exploitation of the natural environment. It is anticipated that these trends will continue and intensify. The most recent pandemic impacting Mississippi was the COVID-19 pandemic. The following sections will discuss risks, impacts, mitigation, and knowledge gaps generally, as well as a general timeline of the COVID-19 pandemic and its impacts on the State of Mississippi.

Risks

- Pandemics have occurred throughout history and appear to be increasing in frequency, particularly because of the increasing emergence of viral diseases from animals.
- Pandemic risk is driven by the combined effects of spark risk (where a pandemic is likely to arise) and spread risk (how likely it is to diffuse broadly through human populations).
- Some geographic regions with high spark risk, including Central and West Africa, lag behind the rest of the globe in pandemic preparedness.
- Probabilistic modeling and analytical tools such as exceedance probability (EP) curves are valuable for assessing pandemic risk and estimating the potential burden of pandemics.
- Influenza is the most likely pathogen to cause a severe pandemic. EP analysis indicates that in any given year, a 1 percent probability exists of an influenza pandemic that causes nearly 6 million pneumonia and influenza deaths or more globally.

Impacts

- Pandemics can cause significant, widespread increases in morbidity and mortality and have disproportionately higher mortality impacts on low to moderate-income regions.
- Pandemics can cause economic damage through multiple channels, including short-term fiscal shocks and longer-term negative shocks to economic growth.
- Individual behavioral changes, such as fear-induced aversion to workplaces and other public gathering places, are a primary cause of negative shocks to economic growth during pandemics.
- Some pandemic mitigation measures can cause significant social and economic disruption.

[1] National Center for Biotechnology Information: Disease Control Priorities: Improving Public Health and Reducing Poverty: 3rd Edition: https://www.ncbi.nlm.nih.gov/books/NBK525302/

Mitigation

- Pathogens with pandemic potential vary widely in the resources, capacities, and strategies required for mitigation. However, there are also common prerequisites for effective preparedness and response.
- The most cost-effective strategies for increasing pandemic preparedness, especially in resource-constrained settings, consist of investing to strengthen core public health infrastructure, including water and sanitation systems; increasing situational awareness; and rapidly extinguishing sparks that could lead to pandemics.
- Once a pandemic has started, a coordinated response should be implemented focusing on the maintenance of situational awareness, public health messaging, reduction of transmission, and care for and treatment of the ill.
- Successful contingency planning and response require surge capacity—the ability to scale up the delivery of health interventions proportionately for the severity of the event, the pathogen, and the population at risk.
- For many poorly prepared countries, surge capacity likely will be delivered by foreign aid providers. This is a tenable strategy during localized outbreaks, but global surge capacity has limits that likely will be reached during a full-scale global pandemic as higher-capacity states focus on their populations.
- Risk transfer mechanisms, such as risk pooling and sovereign-level catastrophe insurance, provide a viable option for managing pandemic risk.

Knowledge Gaps

- Spending and costs specifically associated with pandemic preparedness and response efforts are poorly tracked.
- There is no widely accepted, consistent methodology for estimating the economic impacts of pandemics.
- Most data regarding the impacts of pandemics and the benefits and costs of mitigation measures come from high-income countries (HICs), leading to biases and potential blind spots regarding the risks, consequences, and optimal interventions specific to low to moderate-income regions.

Mississippi Covid-19 Timeline[2]

The following table provides an overview of the COVID-19 events specific to Mississippi through the availability of the first vaccinations in the State:

Date	Event
1/21/2020	U.S. confirms first COVID-19 case
3/4/2020	MS creates the MS Coronavirus Preparedness and Response Committee
3/11/2020	MS confirms first COVID-19 case
3/11/2020	WHO declares a global pandemic
3/14/2020	MS declares a state of emergency
3/17/2020	MS Legislative session suspended

[2] Mississippi Free Press: https://www.mississippifreepress.org/9913/mississippcovid-19-timeline

3/18/2020	Jackson suspends in-house dining in restaurants
3/19/2020	Public schools close in Mississippi
3/19/2020	MS confirms first death
3/24/2020	Hospital & nursing home visits suspended
4/1/2020	MS confirmed cases surpass 1,000
4/1/2020	MS issues shelter-in-place order
4/3/2020	Shelter-in-place begins
4/27/2020	Shelter-in-place ends, Safter At Home order begins
5/7/2020	Restaurants/bars reopen
5/12/2020	MS begins County-specific orders for high-risk counties
6/24/2020	MSDH reports the 1,000th death
7/13/2020	Mask mandates take effect, elective surgeries end
8/5/2020	Statewide mask mandate goes into effect
11/12/2020	Jackson runs out of ICU beds
12/15/2020	First Mississippi vaccinations made available

Table 3.16.1
Mississippi COVID-19 Impacts
Cases and Deaths by County[3]

County	Cases	Deaths
Adams County	8,703	153
Alcorn County	12,937	177
Amite County	3,907	71
Attala County	6,893	126
Benton County	2,851	51
Bolivar County	11,810	194
Calhoun County	5,626	79
Carroll County	3,101	59
Chickasaw County	7,070	105
Choctaw County	2,932	37
Claiborne County	2,594	50
Clarke County	4,913	112
Clay County	6,279	104
Coahoma County	8,302	139
Copiah County	9,350	131
Covington County	8,790	124
DeSoto County	62,050	595

[3] USAfacts.org

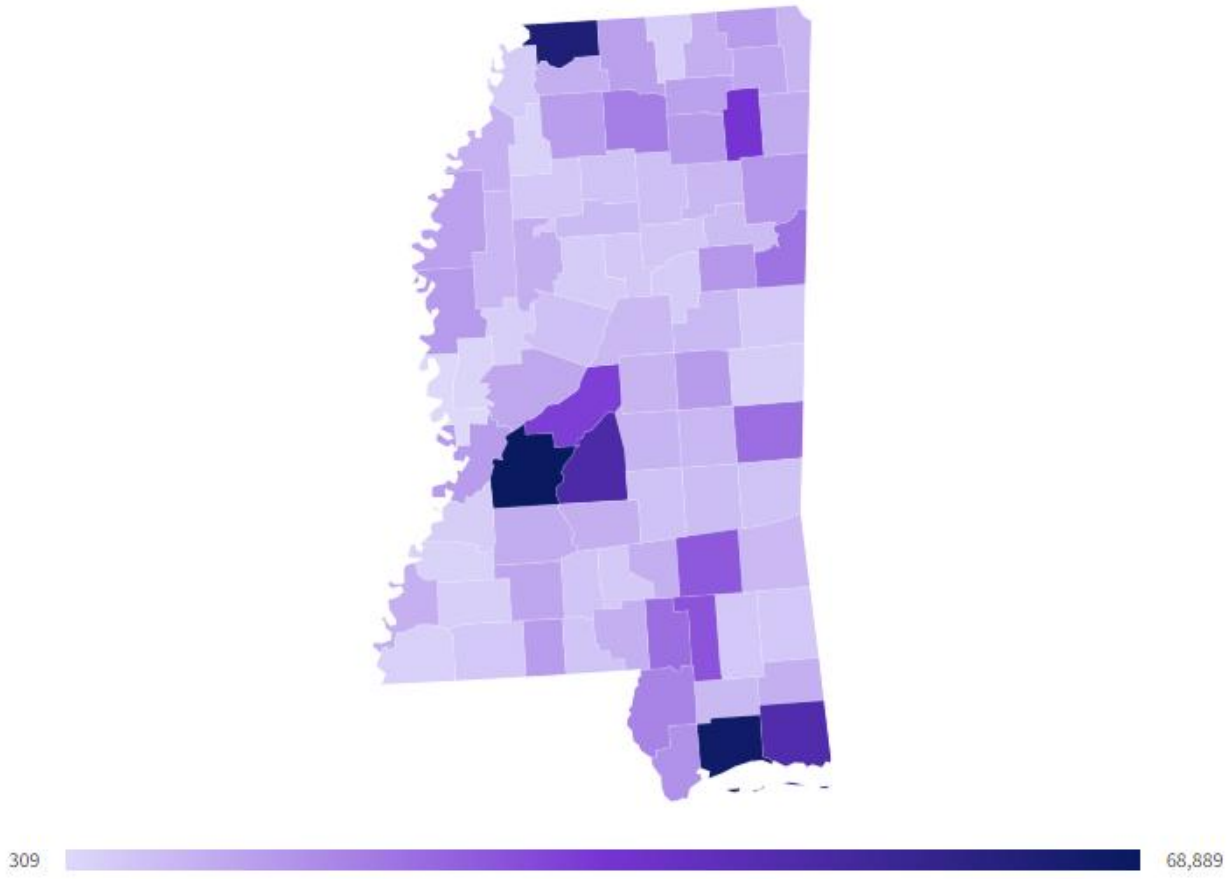
County	Cases	Deaths
Forrest County	27,776	331
Franklin County	2,383	40
George County	8,828	92
Greene County	3,927	61
Grenada County	6,500	142
Hancock County	15,056	164
Harrison County	66,683	720
Hinds County	68,889	868
Holmes County	5,285	108
Humphreys County	2,440	51
Issaquena County	309	9
Itawamba County	9,554	153
Jackson County	46,292	505
Jasper County	6,208	86
Jefferson County	1,807	40
Jefferson Davis County	3,709	57
Jones County	26,729	316
Kemper County	2,676	53
Lafayette County	19,058	192
Lamar County	22,343	173
Lauderdale County	22,295	393
Lawrence County	4,587	62
Leake County	7,755	128
Lee County	34,499	336
Leflore County	8,725	184
Lincoln County	10,578	166
Lowndes County	21,511	259
Madison County	32,279	357
Marion County	8,872	155
Marshall County	12,159	196
Monroe County	13,989	233
Montgomery County	3,730	85
Neshoba County	12,943	248
Newton County	7,156	108

County	Cases	Deaths
Noxubee County	3,651	52
Oktibbeha County	13,885	173
Panola County	12,540	183
Pearl River County	17,966	290
Perry County	3,807	66
Pike County	12,917	197
Pontotoc County	12,987	161
Prentiss County	10,393	119
Quitman County	1,843	35
Rankin County	47,543	533
Scott County	7,956	123
Sharkey County	1,179	28
Simpson County	8,750	164
Smith County	5,104	72
Stone County	6,769	82
Sunflower County	7,188	138
Tallahatchie County	3,912	72
Tate County	8,772	161
Tippah County	9,010	118
Tishomingo County	7,816	123
Tunica County	3,078	50
Union County	11,785	136
Walthall County	4,739	85
Warren County	12,897	219
Washington County	13,169	215
Wayne County	7,031	92
Webster County	4,102	76
Wilkinson County	1,947	47
Winston County	6,825	105
Yalobusha County	4,856	63
Yazoo County	10,360	118
	1,000,415	13,474

Figure 3.16.1 below illustrates the cumulative distribution of cases in Mississippi by county. An analysis of the map indicates the heavier distribution of cases in regions of the State with the greatest population

densities including the coastal region, the Pine Belt, the Jackson Metro area, and the DeSoto County Metro area. The five counties with the highest reported number of cases include (in order): Hinds, Harrison, DeSoto, Rankin, and Jackson Counties. These same counties also reported the highest death rates.

Figure 3.16.1
Mississippi COVID-19 Impacts
Cumulative Cases by County[4]



Mississippi COVID-19 Economic Impacts

Many of us know anecdotally that COVID-19 had a significant economic impact on Mississippi. Companies went out of business, jobs were lost, and, people were not engaging in the economy as they would under normal circumstances. The following provides some highlights of the economic impacts:

- Mississippi's economy contracted 1.8% in 2020 as measured by real gross domestic product (GDP). That percentage change in real GDP ranked 10th among all states but was considerably less than the decrease in the U.S. real GDP in 2020 of 3.4%.

[4] USAfacts.org

- Payroll employment in Mississippi decreased by 4.3% in 2020, similar to the decrease experienced in employment during the Great Recession of 2009.
- The State's Accommodation and Food Services sector employment dropped 13.1% in 2020, the largest decrease among all major employment sectors.
- The total number of people in the labor force in Mississippi decreased 1.6% in 2020 and the labor force participation rate fell to 55.1%, down from 56% in 2019.[5]

Likelihood of Occurrence and Vulnerability

As indicated in the opening paragraph of this section, increases in global travel and population integration, urbanization, changes in land use, and greater exploitation of the natural environment are all variables at least partially responsible for the increasing likelihood of the recurrence of a global pandemic similar to what we experienced with COVID-19. During COVID, we experienced the tendency of the virus to mutate and adapt to our collective attempts at control and eradication. This phenomenon indicates that the next pandemic we experience may be vastly different from COVID. It may transmit differently and affect different population groups, leaving little in the way of mitigation options. The most cost-effective strategies for increasing pandemic preparedness consist of investing to strengthen core public health infrastructure, including water and sanitation systems; increasing situational awareness, public health messaging, and rapidly extinguishing sparks that could lead to pandemics. Successful contingency planning and response require surge capacity – the ability to scale up the delivery of health interventions proportionately for the severity of the event, the pathogen, and the population at risk.[6]

[5] What has the COVID-19 pandemic done to Mississippi's Economy?: J. Corey Miller, State Economist; February 28, 2022

[6] National Center for Biotechnology Information: Disease Control Priorities: Improving Public Health and Reducing Poverty: 3rd Edition: https://www.ncbi.nlm.nih.gov/books/NBK525302/