

UNITED STATES DISTRICT COURT  
WESTERN DISTRICT OF MICHIGAN  
SOUTHERN DIVISION

---

PAUL MITCHELL, III,

Civil No.

Plaintiff,

HON.

v.

GRETCHEN E. WHITMER, and

ROBERT GORDON,

Defendants.

**COMPLAINT FOR DECLARATORY  
AND INJUNCTIVE RELIEF**

---

BUTZEL LONG, P.C.

Daniel J. McCarthy (P59457)

Joseph E. Richotte (P70902)

150 West Jefferson Avenue, Suite 100

Detroit, Michigan 48226

(313) 225-7000

[mccarthyd@butzel.com](mailto:mccarthyd@butzel.com)

[richotte@butzel.com](mailto:richotte@butzel.com)

*Counsel for Plaintiffs*

---

Plaintiff Paul Mitchell, III, alleges as follows:

**INTRODUCTION**

1. On March 11, 2020, Governor Whitmer issued Executive Order 2020-04, which declared a “state of emergency” based upon two presumptive diagnoses of coronavirus disease (“**COVID-19**”), a respiratory illness caused by the severe acute respiratory syndrome coronavirus two (the “**coronavirus**”). Shortly thereafter, the Governor began issuing orders that required Michiganders to remain at home and closed most businesses with limited exception, under pain of criminal penalties.

2. The Governor stated that the initial orders were premised on the perceived emergency need to “flatten the curve” so as to avoid overwhelming the State’s hospitals

and healthcare centers, not to eradicate the virus. Objective data and reporting shows that the curve was flattened during the first week of April 2020. Exhibit 1, Anderson Economic Group Report. Yet the Governor has nonetheless continued to issue stricter and unclear executive orders that unreasonably and unnecessarily interfere with constitutional rights under the rubric of a continuing “emergency.”

3. Emergencies, by definition, are temporary. They are not permanent states of affairs. The Governor’s orders lack objective criteria by which to measure when the “emergency” is over. In this regard, the Governor has stated that she alone will decide when the emergency will end.

4. There is no question that infectious diseases are, unfortunately, a part of everyday life. Some are more susceptible to certain illnesses than others. But Michiganders can and do take reasonable, private action to protect themselves from infection without the need to shut down civil society. Given that the projected surge has not occurred, there is no basis, either legally or factually, to continue any further mandatory lockdown orders under criminal penalty.

5. Mitchell seeks a judicial declaration that the executive orders—and all other orders, rules, and enforcement activity related to them—are unconstitutional under the Guarantee Clause, the Privileges or Immunities Clause, the Due Process Clause, the Equal Protection Clause, and State law. Such a declaration, and a corresponding injunction, will yield a more rational, pragmatic response to the virus that saves lives, saves livelihoods, and preserves constitutional norms all at the same time.

6. In short, Mitchell brings this lawsuit to define the limits of a State’s police power. The issues raised in this Complaint are novel, and they will not be rendered moot if the executive order is lifted before the Court issues judgment. Indeed, the Governor has described her emergency powers as a “dial” that can be turned up or down at will. Thus, the issues presented are capable of repetition and are of such importance that they cannot evade judicial review.

## **PARTIES**

7. Plaintiff Paul Mitchell, III, is a citizen of the United States, a citizen of the State of Michigan, and domiciled in Lapeer County, Michigan.

8. Defendant Gretchen E. Whitmer is the Governor of the State of Michigan. Mitchell sues her in her official capacity only.

9. Defendant Robert Gordon is the Director of the Michigan Department of Health and Human Services. Mitchell sues him in his official capacity only.

## **JURISDICTION**

10. This action arises under 42 U.S.C. § 1983 and challenges Governor Whitmer's Executive Orders 2020-42, 2020-59, 2020-67, 2020-68, 2020-69, and 2020-70 (and their predecessors and future iterations of these orders) (the "**EOs**") and Director Gordon's Emergency Order and Emergency Rule (all collectively, the "**Lockdown Orders**"), which violates the following clauses of the U.S. Constitution:

- (a) the Guarantee Clause of Article IV, Section 4;
- (b) the Privileges or Immunities Clause of the Fourteenth Amendment;
- (c) the Due Process Clause of the Fourteenth Amendment; and
- (d) the Equal Protection Clause of the Fourteenth Amendment.

The Court therefore has federal-question jurisdiction under Article III of the U.S. Constitution and 28 U.S.C. § 1331.

11. Mitchell seeks declaratory relief and a preliminary and permanent injunction against the Lockdown Orders and similarly crafted orders and rules issued in the future. Accordingly, he also brings this action under the Declaratory Judgment Act, 28 U.S.C. §§ 2201-2202, and the All Writs Act, 28 U.S.C. § 1651.

12. Mitchell also challenges the EOs as exceeding the Governor's authority under the separation-of-powers doctrine enshrined in Article III, Section 2 of the Michigan Constitution of 1963; the Emergency Powers of the Governor Act ("**Emergency Powers Act**"), Mich. Comp. Laws §§ 10.31-10.33; and the Emergency Management Act,

Mich. Comp. Laws §§ 30.401–30.421. Accordingly, Mitchell also invokes the Court’s supplemental jurisdiction under 28 U.S.C. § 1367.

## **VENUE**

13. Governor Whitmer is a resident of, and the principal office of the Governor is located in, Lansing, Michigan.

14. Director Gordon’s principal office is located in Lansing, Michigan.

15. A substantial part of the events giving rise to the claims in this Complaint occurred in Lansing, Michigan.

16. The city of Lansing is the seat of government for the State of Michigan. Michigan Const. art. III, § 1 (1963). It is located within Ingham County, which is within the territorial jurisdiction of the Western District of Michigan. 28 U.S.C. § 102(b)(1). This Court is therefore a proper venue for this action under 28 U.S.C. § 1391(b)(1)–(2).

## **EXECUTIVE ACTION**

### ***Executive Orders***

17. The Emergency Powers Act permits a governor, “during times of great public crisis, disaster, rioting, catastrophe, or similar public emergency within the State, or reasonable apprehension of immediate danger of a public emergency of that kind, when public safety is imperiled, ... [to] proclaim a state of emergency and designate the area involved ... [and to] promulgate ***reasonable*** orders, rules, and regulations as he or she considers necessary to protect life or property or to bring the emergency situation within the affected area under control.” Mich. Comp. Laws § 10.31(1) (emphasis added). Executive orders issued under this Act have the force of law.

18. The Emergency Management Act permits a governor, upon the declaration of an emergency or a disaster, to compel evacuation, to control entry to, exit from, and the occupancy of premises within, the affected area, among other things. Mich. Comp. Laws § 30.405(1). Executive orders issued under this Act have the force of law.



19. On March 20, 2020, the Governor issued Executive Order 2020-17 under both Acts. This order required hospitals, freestanding surgical outpatient facilities, and dental facilities to postpone “nonessential” medical procedures until after the Governor declares the “state of emergency” to be over. A willful violation of EO 2020-17 is a misdemeanor for which a person can be imprisoned for up to 90 days and fined up to \$500. Mich. Comp. Laws §§ 10.33, 30.405(3), and 750.504; EO 2020-17(7).

20. On March 22, 2020, the Governor issued Executive Order 2020-20 under both Acts. This order closed to the public a wide range of public accommodations, including all restaurants, food courts, cafes, coffeehouses, and other places of public accommodation offering food or beverages for on-site consumption. A willful violation of EO 2020-20 is a misdemeanor for which a person can be imprisoned for up to 90 days and fined up to \$500. Mich. Comp. Laws §§ 10.33, 30.405(3), and 750.504; EO 2020-20(6).

21. On March 23, 2020, the Governor issued Executive Order 2020-21 under both Acts. This order prohibits all in-person work that the Governor deems “not necessary to sustain or protect life.” A willful violation of EO 2020-21 is a misdemeanor for which a person can be imprisoned for up to 90 days and fined up to \$500. Mich. Comp. Laws §§ 10.33, 30.405(3), and 750.504; EO 2020-20(6).

22. On April 9, 2020, the Governor issued Executive Order 2020-42 under both Acts. This order extends EO 2020-21 through April 30, 2020, while imposing even greater restrictions on the general public than before. A willful violation of EO 2020-42 is a misdemeanor for which a person can be imprisoned for up to 90 days and fined up to \$500. Mich. Comp. Laws §§ 10.33, 30.405(3), and 750.504; EO 2020-42(17).

23. On April 13, 2020, the Governor issued Executive Order 2020-43 under both Acts. This order extends EO 2020-20 through April 30, 2020. A willful violation of EO 2020-43 is a misdemeanor for which a person can be imprisoned for up to 90 days and fined up to \$500. Mich. Comp. Laws §§ 10.33, 30.405(3), and 750.504; EO 2020-42(7).

24. On April 24, 2020, the Governor issued Executive Order 2020-59 under both Acts. This order extends EO 2020-42 through May 15, 2020. It purports to loosen some restrictions imposed under EO 2020-42 as part of a phased reopening of the economy. A willful violation of EO 2020-59 is a misdemeanor for which a person can be imprisoned for up to 90 days and fined up to \$500. Mich. Comp. Laws §§ 10.33, 30.405(3), and 750.504; EO 2020-59(20).

25. On April 30, 2020, the Governor issued Executive Order 2020-67 under the Emergency Powers Act. This order extends the original declaration of a state of emergency under the Act through May 28, 2020. Mich. Comp. Laws § 10.33; EO 2020-67(1).

26. The same day, the Governor issued Executive Orders 2020-66 and 2020-68 under the Emergency Management Act. EO 2020-66 declared an end to the state of emergency and the state of disaster declared under the Emergency Management Act because the Legislature declined to grant an extension of those declarations, as is its right under the Act. EO 2020-68 purports to declare a “new” state of emergency and a “new” state of disaster, citing the same public-health grounds as before.

27. The same day, the Governor also issued Executive Order 2020-69 under both Acts. This order effectively extends EO 2020-43, but under the authority of the “new” declared emergencies under EO 2020-67 and 2020-68. A willful violation of EO 2020-69 is a misdemeanor for which a person can be imprisoned for up to 90 days and fined up to \$500. Mich. Comp. Laws §§ 10.33, 30.405(3), and 750.504; EO 2020-69(7).

28. On May 1, 2020, the Governor issued Executive Order 2020-70 under both Acts. This order effectively extends EO 2020-59, while purporting to loosen some additional restrictions as part of a phased reopening of the economy. A willful violation of EO 2020-59 is a misdemeanor for which a person can be imprisoned for up to 90 days and fined up to \$500. Mich. Comp. Laws §§ 10.33, 30.405(3), and 750.504; EO 2020-70(20).

***Action by MDHHS***

29. On April 2, 2020, Director Gordon issued an Emergency Order under the Michigan Public Health Code. Mich. Comp. Laws § 333.2253(1). This order requires every person in Michigan to comply with EO 2020-20, EO 2020-21, and the answers to frequently asked questions (“**FAQs**”) on the State’s coronavirus webpage. <https://perma.cc/K6ZH-HS6N>. This order also applies to EOs 2020-42, 2020-43, 2020-59, and 2020-69.

30. At the same time, Director Gordon issued an Emergency Rule establishing a \$1,000 civil penalty for violations of the Emergency Order. <https://perma.cc/8W5C-E98N>.

31. A violation of an MDHHS order or rule is a misdemeanor punishable by imprisonment for up to six months and a fine of \$200, or both. Mich. Comp. Laws § 333.2261. Thus, the Emergency Order and the Emergency Rule effectively double the period of incarceration authorized under the Governor’s executive orders.

32. So, since April 2, 2020, any person who violates the EOs (and thereby violates the Emergency Order and the Emergency Rule) can now be imprisoned for up to six months, assessed a penal fine of up to \$500, and assessed a civil fine of up to \$1,000.

33. Mitchell incorporates all of the paragraphs in this Complaint into each of the following causes of action.

**COUNT I**  
**DECLARATORY JUDGMENT**  
**GUARANTEE CLAUSE**

34. There is an actual and present controversy between the parties.

35. Under the Guarantee Clause of Article IV, Section 4 of the U.S. Constitution, “[t]he United States shall guarantee to every State in this Union a Republican Form of Government.” The essence of a republican form of government is self-government through elected representatives.

36. The people of Michigan adopted a republican form of government with the adoption of the Michigan Constitution of 1963, which vested all legislative powers in the Legislature. Through the Legislature, the people of Michigan engage in self-government by their elected representatives. Mich. Const. art. III, § 2 (1963); Mich. Const. art. IV, § 1 (1963).

37. As the Governor has interpreted and applied the Emergency Powers Act and the Emergency Management Act through the EOs, she has full and unchecked power to govern by executive fiat. No governor has the power to keep the entire State on lockdown indefinitely and suspend self-government merely by declaring a “new” emergency or a “new” disaster every 28 days. Government by one person with absolute power is not a republican form of government, it is an autocracy. It is, in all material respects, the same kind of government from which we declared our independence 244 years ago.

38. Invoking the State’s “police powers,” a legal term of art, is not license to slide, even temporarily, from a republican form of government. Police powers flow from a State’s constitution and the common law, but those powers remain at all times subject to the constitutional limits imposed on government, including its permissible form. Police powers never trump a State’s constitution or the U.S. Constitution.

39. Mitchell contends that the EOs violate the Guarantee Clause of Article IV, Section 4 of the U.S. Constitution because they deprive him, and the people of Michigan, of a republican form of government.

40. On information and belief, Governor Whitmer denies these contentions.

41. Mitchell seeks a declaration that the EOs violate the Guarantee Clause, and an injunction against enforcement or adoption of these and similar EOs in the future as described in the Prayer for Relief.

**COUNT II**  
**PRIVILEGES OR IMMUNITIES CLAUSE**  
**42 U.S.C. § 1983**

42. The Privileges or Immunities Clause of the Fourteenth Amendment to the U.S. Constitution provides that “[n]o State [can] make or enforce any law [that] abridge[s] the privileges or immunities of citizens of the United States.” U.S. Const. am. XIV, § 1, cl. 2.

43. The right to live under a republican form of State government is a privilege of federal citizenship established by the Guarantee Clause of Article IV, Section 4 of the U.S. Constitution.

44. The right to engage in interstate travel is a privilege of federal citizenship under the Privileges and Immunities Clause of Article IV, Section 2 of the U.S. Constitution.

45. The right to travel to another state to obtain medical care is a privilege of federal citizenship under the Privileges and Immunities Clause of Article IV, Section 2 of the U.S. Constitution.

46. Governor Whitmer acted under color of State law in an official capacity and within the scope of her official duties when issuing the EO.

47. The EOs deprive Mitchell of these privileges of federal citizenship:

(a) ***Guarantee Clause.*** For the reasons stated in Count I, the EOs deprive Mitchell of the right to live under a republican form of government.

(b) ***Right to Obtain Medical Care.*** The right to obtain medical care is a protected liberty interest. Mitchell has been diagnosed with osteoarthritis, a condition resulting in painful bone-on-bone contact in his knee. The Lockdown Orders have prevented, and are preventing, Mitchell from seeking medical treatment for this painful condition in another state.

48. Mitchell seeks an injunction against further infringements of his rights under the Privileges or Immunities Clause as described in the Prayer for Relief.

**COUNT III**  
**PROCEDURAL DUE PROCESS**  
**42 U.S.C. § 1983**

49. The Due Process Clause of the Fourteenth Amendment to the U.S. Constitution provides that no State can “deprive any person of life, liberty, or property, without due process of law.” U.S. Const. amend. XIV, § 1, cl. 3.

50. The procedural component of the Due Process Clause prohibits government from depriving Plaintiffs of liberty and property interests without providing any process before or after the deprivations occurred.

51. To establish a procedural due process claim under 42 U.S.C. § 1983, a plaintiff must show that (1) it had a life, liberty, or property interest protected by the Due Process Clause; (2) it was deprived of this protected interest; and (3) the state did not afford it adequate procedural rights. See *Daily Servs., LLC v. Valentino*, 756 F.3d 893, 904 (CA6 2014).

52. Mitchell had and has a protected liberty interest in the right to live without arbitrary governmental interference with his liberty and property interests. *County of Sacramento v. Lewis*, 523 U.S. 833, 845 (1988).

53. Liberty “denotes not merely freedom from bodily restraint but also the right of the individual to contract, to engage in any of the common occupations of life, to acquire useful knowledge, to marry, establish a home and bring up children, to worship God according to the dictates of his own conscience, and generally to enjoy those privileges long recognized ... as essential to the orderly pursuit of happiness by free men.” *Board of Regents of State Colleges v. Roth*, 408 U.S. 564, 572 (1972) (emphases added).

54. The Lockdown Orders infringed, and continue to infringe upon, Mitchell’s liberty and property interests in the following ways:

(a) ***Intrastate Travel.*** The right to engage in intrastate travel is a protected liberty interest. *Johnson v. City of Cincinnati*, 310 F.3d 484, 495 (CA6 2002). The Lockdown Orders prohibited Mitchell from traveling within Michigan to visit family and

friends, and from traveling to a second home in Emmet County, Michigan.

(b) ***Political Association.*** The right of association is a protected liberty interest under the Due Process Clause of the Fourteenth Amendment to the U.S. Constitution. *NAACP v. Alabama*, 357 U.S. 449 (1958). Over the course of many years, Mitchell has developed relationships with neighbors, business leaders, and others, and associates with them through lawful group political activities. The Lockdown Orders have prevented and are preventing planned events from occurring, depriving Mitchell of his right of association.

(c) ***Political Speech.*** The right to freely engage in political speech is a protected liberty interest under the Speech Clause of the First Amendment to the U.S. Constitution and the Due Process Clause of the Fourteenth Amendment to the U.S. Constitution. Both in conjunction with the associational activities just described and separately from them, Mitchell regularly engages in political speech, in person, with his neighbors, business leaders, and others to share his political views on matters of public policy and to support candidates for public office. The Lockdown Orders have prevented and are preventing Mitchell from in-person political speech. Because of limitations imposed by cost and accessibility, technology does not and cannot supplant direct and group interaction when communicating about matters of political concern. There are national, state, and local races for public office this fall, making in-person communication crucial to meaningful participation in free and fair elections.

(d) ***Right to Obtain Medical Care.*** The right to obtain medical care is a protected liberty interest. Mitchell has been diagnosed with osteoarthritis, a condition resulting in painful bone-on-bone contact in his knee. The Lockdown Orders have prevented, and are preventing, Mitchell from obtaining medical treatment for this painful condition in Michigan or in another state.

(e) ***Right to Engage in Commerce.*** Mitchell lives on a farm in Dryden, Michigan, with his family. Before the Lockdown Orders, Mitchell obtained permits to demolish an

old structure on the farm to make way for a new barn and other improvements in preparation for the launch of a private wool business. The barn is necessary to house farming equipment needed for the planned business and for other activities that support the family farm. Mitchell cannot build the barn without skilled labor, lumber, and other supplies. The Lockdown Orders have prevented him from securing the supplies and hiring the labor necessary to build a suitable structure. They have also precluded him from undertaking other efforts to support the development of this business. The Lockdown Orders therefore infringed, and continue to infringe, upon his mixed liberty and property interests in starting a lawful business, acquiring livestock, and making physical improvements to his land.

(f) ***Deprivation of Property Interest.*** Mitchell owns a second home in Emmet County, Michigan. Before the Lockdown Orders, he had contracted for improvements to that residence, including exterior repairs necessary to keep rain, snow, and other elements out of the home. Those improvements and repairs were underway when Governor Whitmer and Director Gordon issued the Lockdown Orders. On information and belief, based on those orders, the Emmet County Sheriff's Department pulled work permits and started visiting worksites around the county to inform workers that their work was prohibited under the Lockdown Orders and that they would be fined if work continued. Once they became aware of the Lockdown Orders and the Emmet County Sheriff's interpretation of those orders, those working at Mitchell's Emmet County residence stopped working. The work remains unfinished, exposing the residence to damage from the elements.

55. Neither Governor Whitmer nor Director Gordon provided any procedural due process before issuing the Lockdown Orders. Nor do the Lockdown Orders provide any mechanism for post-deprivation review.

56. Governor Whitmer and Director Gordon acted under color of State law in an official capacity and within the scope of their official duties when issuing the Lockdown



Orders.

57. As a direct and proximate cause of the failure to provide any pre- or post-deprivation process, Mitchell has suffered and is suffering prejudice from the aforementioned infringements on his liberty and property interests under threat of criminal and civil sanctions.

58. Mitchell seeks an injunction against further infringements of his rights under this Clause as described in the Prayer for Relief.

**COUNT IV**  
**SUBSTANTIVE DUE PROCESS**  
**42 U.S.C. § 1983**

59. The Due Process Clause of the Fourteenth Amendment to the U.S. Constitution provides that no State can “deprive any person of life, liberty, or property, without due process of law.” U.S. Const. amend. XIV, § 1, cl. 3.

60. The substantive component of the Due Process Clause prohibits government from taking action that “shocks the conscience” or “interferes with rights implicit in the concept of ordered liberty.” *United States v. Salerno*, 481 U.S. 739, 746 (1987) (cleaned up).

61. Mitchell has a protected liberty interest in the right to live without arbitrary governmental interference with his liberty and property interests. *County of Sacramento v. Lewis*, 523 U.S. 833, 845 (1988).

62. Liberty “denotes not merely freedom from bodily restraint but also the right of the individual to contract, to engage in any of the common occupations of life, to acquire useful knowledge, to marry, establish a home and bring up children, to worship God according to the dictates of his own conscience, and generally to enjoy those privileges long recognized . . . as essential to the orderly pursuit of happiness by free men.” *Board of Regents of State Colleges v. Roth*, 408 U.S. 564, 572 (1972) (emphases added).

63. The Lockdown Orders shock the conscience, and they have interfered, and continue to interfere, with the deeply-rooted liberty and property rights described in Counts II and III.

64. The Lockdown Orders are not narrowly tailored to achieve a compelling governmental interest. In the alternative, they are not reasonably related to a legitimate governmental interest.

65. Governor Whitmer and Director Gordon acted under color of State law in an official capacity and within the scope of their official duties when issuing the Lockdown Orders.

66. Mitchell seeks a declaration that the Lockdown Orders violate the substantive component of the Due Process Clause, and an injunction against further infringements of his rights under this Clause as described in the Prayer for Relief.

**COUNT V**  
**DECLARATORY JUDGMENT**  
**VOID FOR VAGUENESS**

67. There is an actual and present controversy between the parties.

68. Plaintiffs contend that the Lockdown Orders are unconstitutionally vague under the void-for-vagueness doctrine under the U.S. and Michigan constitutions.

69. The void-for-vagueness doctrine requires penal laws to define criminal conduct with sufficient precision that ordinary people can understand what conduct is prohibited, and in a manner that does not encourage arbitrary and discriminatory enforcement. *Kolender v. Lawson*, 461 U.S. 352, 357-358 (1983). This doctrine flows from the Due Process Clause. *Michigan Dep't of State Compliance & Rules Div. v. Michigan Educ. Ass'n*, 251 Mich. App. 110, 116 (2002); U.S Const., am. XIV; Mich. Const. (1963), art. I, § 17.

70. The Lockdown Orders purport to carry the force of law and (with the exception of Director Gordon's Emergency Rule) makes any willful violation of their

terms a misdemeanor punishable by imprisonment or a fine. It is therefore subject to the void-for-vagueness doctrine.

71. The very fact that the Governor needs a webpage to answer “frequently asked questions” about the scope of the order shows that it’s vague. Michiganders are smart people. If “ordinary people” could understand the Lockdown Order, then there would be no need for **125+ FAQs** on these orders on the State’s coronavirus webpage.

72. EO 2020-17 prohibits hospitals and other covered facilities from performing nonessential medical procedures during the declared state of emergency. The order vaguely defines nonessential procedures to be any medical or dental procedure that is not necessary to address a medical emergency or to preserve the health and safety of a patient, as determined by a licensed provider. EO 2020-17(1). Later in the order, however, it specifies certain procedures that must be postponed, including joint replacement, except on an emergency basis where postponement would significantly impact the health, safety, and welfare of the patient. EO 2020-17(2). The order does not define what constitutes an “emergency” or a “significant impact.”

73. On May 1, 2020, Dr. Joneigh S. Khaldun, the State’s chief medical executive, signaled at a press conference that those who think they need to be seen for important and time sensitive medical care should contact their physician for treatment. At the same press conference, Governor Whitmer signaled that, in fact, the restrictions in EO 2020-17 have been informally loosened: “We are encouraging anyone who has been holding off on surgery that really needs to be done to get that scheduled and proceed.”

74. Yet, it remains a crime for a physician to provide treatment that a law enforcement official may deem nonessential under EO 2020-17. See EO 2020-17(7). It also remains a crime for patients to leave their homes and travel for nonessential medical treatment under EO 2020-70 and previous iterations of that order. See EO 2020-70(2), (7)(a)(6), and (20).

75. Because Mitchell cannot travel out of state for medical procedures as alleged in Counts II and III, he desires to seek medical treatment for his medical condition at an in-state medical facility.

76. No Michigander, including Mitchell, should be forced to choose between risking criminal prosecution and economic sanctions under the Lockdown Orders on the one hand, or seeking medical treatment on the other.

77. On information and belief, Governor Whitmer and Director Gordon deny these contentions.

78. Plaintiffs seek a judicial declaration that the Lockdown Orders are void for vagueness, and an injunction against enforcement or adoption of these and similar orders and rules in the future as described in the Prayer for Relief.

**COUNT VI**  
**DECLARATORY JUDGMENT**  
**SEPARATION OF POWERS**

79. There is an actual and present controversy between the parties.

80. Since the Lockdown Orders have been in place, Mitchell desired and still desires to engage in the following activity:

(a) to gather in-person with others to exercise his right to political speech and his right of association;

(b) to engage in the commerce necessary to obtain the labor and supplies necessary to build a suitable structure for livestock in support of his lawful business venture;

(c) to engage in the commerce necessary to protect the value of his property in Emmet County; and

(d) to obtain so-called “nonessential” medical treatment for his painful medical condition.

81. The Lockdown Orders prohibited Mitchell from engaging in these activities under threat of civil and criminal penalty. Several of these activities are still prohibited or severely curtailed under the versions of the Lockdown Orders in effect as of the date of this Complaint. But for the Lockdown Orders, he would have been and would be free to engage in these activities.

82. Mitchell contends that the Lockdown Orders are invalid because they violate the Separation of Powers Clause in Article III, Section 2 of the Michigan Constitution.

83. The Separation of Powers Clause provides that “[t]he powers of government are divided into three branches: legislative, executive, and judicial. No person exercising powers of one branch shall exercise powers properly belonging to another branch except as expressly provided in this constitution.” Mich. Const. (1963) art. III, § 2.

84. The Emergency Powers Act violates the Separation of Powers Clause because it vests governors with total legislative power whenever a governor asserts the existence of an emergency.

85. The Emergency Management Act does not violate the Separation of Powers Clause on its face, but it does as Governor Whitmer has applied it. As the Governor appears to construe it, the Emergency Management Act gives her limitless powers equal in scope to the Emergency Powers Act. The language of the Act does not confer such unlimited powers on the Governor.

86. The Public Health Code does not violate the Separation of Powers on its face, but it does as Director Gordon has applied it. As Director Gordon appears to construe it, the Public Health Code gives him limitless power to place the entire State under house arrest, the power to define “critical” or “essential” businesses, and the power to shutter “noncritical” and “nonessential” businesses indefinitely. The Public Health Code does not confer such power on the Director.

87. On information and belief, Governor Whitmer and Director Gordon deny these contentions.

88. Mitchell seeks a declaration that the Lockdown Orders violate the Separation of Powers Clause, and an injunction against enforcement or adoption of these and similar orders and rules in the future as described in the Prayer for Relief.

**COUNT VII**  
**DECLARATORY JUDGMENT**  
**UNLAWFUL EXERCISE OF EMERGENCY POWERS ACT**

89. There is an actual and present controversy between the parties.

90. Since the Lockdown Orders have been in place, Mitchell desired and still desires to engage in the following activity:

(a) to gather in-person with others to exercise his right to political speech and his right of association;

(b) to engage in the commerce necessary to obtain the labor and supplies necessary to build a suitable structure for livestock in support of his lawful business venture;

(c) to engage in the commerce necessary to protect the value of his property in Emmet County; and

(d) to obtain so-called “nonessential” medical treatment for his painful medical condition.

91. The Lockdown Orders prohibited Mitchell from engaging in these activities under threat of civil and criminal penalty. Several of these activities are still prohibited or severely curtailed under the versions of the Lockdown Orders in effect as of the date of this Complaint.

92. If the EOs pass constitutional muster, Mitchell contends in the alternative that they violated and still violate the Emergency Powers Act.

93. Viruses, like SARS-CoV-2, and the diseases they can cause, like COVID-19, are not the kind of emergencies contemplated under the Emergency Powers Act, which applies “[d]uring times of great public crisis, disaster, rioting, catastrophe, or similar public emergency within the state, or reasonable apprehension of immediate danger of a public emergency of that kind, **when public safety is imperiled....**” Mich. Comp. Laws § 10.31.

94. Public health and public safety are distinct legal concepts. Governor Whitmer has not identified a public **safety** emergency in any of the EOs. Instead, she has only selectively quoted from the portion of the Act that allows her to issue orders necessary to protect life or property or to bring the emergency under control. EO 2020-42, Preamble ¶ 4. Absent a public safety emergency, the Governor has no power to issue orders under the Emergency Powers Act at all. Neither SARS-CoV-2 nor COVID-19 have presented a public safety emergency.

95. Alternatively, even if SARS-CoV-2 or COVID-19 qualify as a public safety emergency, the Emergency Powers Act does not authorize the *de facto* statewide house arrest imposed under the EOs. The Act says a governor may “designat[e] **specific zones** within the area in which occupancy and use of buildings and ingress and egress of persons and vehicles may be prohibited or regulated.” Mich. Comp. Laws § 10.31(1). Governor Whitmer, however, has regulated occupancy and use of buildings statewide. The EOs violate the Act because it is not limited to specific zones within Michigan.

96. Alternatively, the Emergency Powers Act only authorizes a governor to issue **reasonable** orders that are considered necessary to protect life or property or to bring the emergency under control. Mich. Comp. Laws § 10.31(1).

97. The EOs are objectively unreasonable. Michigan has 83 counties. As of May 1, 2020, four counties in Michigan had no confirmed cases, and 33 counties had fewer than 25 cases. As of that same date, of the counties with confirmed cases, 21 counties had no deaths. Of the 62 counties with reported deaths, 37 counties had less

than 10 deaths. In other words, 70% of Michigan counties have less than 10 deaths. There can be nothing more unreasonable than keeping 10 million people under house arrest because 0.42% of the population has contracted a disease that has killed less than 0.04% of the population.

98. It is also unreasonable to institute and maintain executive orders under the Emergency Powers Act that cause nearly 1.2 million men and women to lose their jobs virtually overnight, to cripple businesses, or to cause businesses to permanently close, especially when many of these people reside in counties with less than 25 cases and far fewer (or even no) deaths. Michigan is among the top five worst states for unemployment. Exhibit 1, AEG Report. According to Jeff Donofrio, Director of the Michigan Department of Labor and Economic Opportunity, this means more than 25% of Michigan's workforce filed for unemployment in the span of four weeks because of the Lockdown Orders. For context, the national average unemployment rate during the Great Depression of 1929 was 26%.

99. On information and belief, Governor Whitmer denies these contentions.

100. Mitchell seeks a declaration that the EOs violate the Emergency Powers Act, an injunction against enforcement or adoption of these and any similar EOs in the future as described in the Prayer for Relief.

**COUNT VIII**  
**DECLARATORY JUDGMENT**  
**UNLAWFUL EXERCISE OF EMERGENCY MANAGEMENT ACT**

101. There is an actual and present controversy between the parties.

102. Since the Lockdown Orders have been in place, Mitchell desired and still desires to engage in the following activity:

(a) to gather in-person with others to exercise his right to political speech and his right of association;



(b) to engage in the commerce necessary to obtain the labor and supplies necessary to build a suitable structure for livestock in support of his lawful business venture;

(c) to engage in the commerce necessary to protect the value of his property in Emmet County; and

(d) to obtain so-called “nonessential” medical treatment for his painful medical condition.

103. The Lockdown Orders prohibited Mitchell from engaging in these activities under threat of criminal penalty. Several of these activities are still prohibited or severely curtailed under the versions of the Lockdown Orders in effect as of the date of this Complaint.

104. If the EOs pass constitutional muster, Mitchell contends in the alternative that they violated and still violate the Emergency Management Act.

105. The Emergency Management Act permits a governor to declare a disaster in response to the occurrence of threat of widespread loss of life resulting from natural causes, including an epidemic. See Mich. Comp. Laws § 30.402(e) (including epidemics in the list of causes of disasters). Thus, infectious diseases by themselves are not a permissible reason to invoke the Act—the disease must reach or threaten to reach epidemic status.

106. Although the World Health Organization has classified SARS-CoV-2 as a pandemic, that is not controlling under Michigan law. The existence of an epidemic must be determined solely from the perspective of the facts as they exist on the ground *in Michigan*.

107. With confirmed infections affecting only 0.42% of the State as of the date of this Complaint, no epidemic actually exists throughout all of Michigan. While a regional epidemic *likely* exists in a few densely populated areas, one does not exist in all 83

counties in Michigan, as demonstrated by persistently low numbers of infections and deaths in the majority of Michigan's counties.

108. In addition, the Emergency Management Act does not contemplate declaring the entire State a disaster area. Among other things, the Act allows a governor to issue orders affecting a "stricken" or "threatened" area, including mandatory evacuation orders, controlling ingress and egress from that area, and the occupancy of premises within that area. Mich. Comp. Laws § 30.405(1)(e)-(g).

109. For example, approximately 87,600 people live in Lapeer County, where Mitchell lives. As of May 1, 2020, there were 171 confirmed cases of COVID-19 and 25 deaths since the Governor declared an emergency. In other words, confirmed cases represent 0.195% of the population in Lapeer County. The death toll represents 0.028% of Lapeer County's population. These small numbers of cases and deaths did not and do not qualify as an epidemic in Lapeer County.

110. Moreover, even when grounds exist to declare a disaster, the executive order must indicate, among other things, the nature of the conditions permitting the termination of the state of disaster. Mich. Comp. Laws § 30.403(3). None of Governor Whitmer's executive orders have articulated objective conditions that, when satisfied, would permit the termination of the state of disaster.

111. Furthermore, under the Emergency Management Act, a declared emergency or disaster automatically expires after 28 days or after such additional time as the Legislature may authorize. Mich. Comp. Laws § 30.403(3)-(4). The Act does not allow a governor to declare "new" emergencies and "new" disasters based on the same underlying circumstances that gave rise to the original declaration when the Legislature has declined to extend the declaration. Nor is it a valid exercise of power under the Emergency Management Act to justify a "new" emergency or disaster by purporting to respond to the consequences of executive orders issued during the original declaration. The Legislature granted one extension of the declared emergency and disaster under the

Act, and it was fully aware of the effects of the coronavirus, the rate of COVID-19 cases and deaths, and the economic fallout from the virus and the Lockdown Orders, when it declined to grant an additional extension. A governor cannot ignore or end-run the Legislature's decision just because he or she disagrees with it, as has happened here.

112. On information and belief, Governor Whitmer denies these contentions.

113. Mitchell seeks a declaration that the EOs violate the Emergency Management Act, an injunction against enforcement and adoption of these and any similar EOs in the future as described in the Prayer for Relief.

**COUNT IX**  
**DECLARATORY JUDGMENT**  
**UNLAWFUL EXERCISE OF PUBLIC HEALTH CODE**

114. There is an actual and present controversy between the parties.

115. Since the Lockdown Orders have been in place, Mitchell desired and still desires to engage in the following activity:

(a) to gather in-person with others to exercise his right to political speech and his right of association;

(b) to engage in the commerce necessary to obtain the labor and supplies necessary to build a suitable structure for livestock in support of his lawful business venture;

(c) to engage in the commerce necessary to protect the value of his property in Emmet County; and

(d) to obtain so-called "nonessential" medical treatment for his painful medical condition.

116. The Emergency Order and Emergency Rule prohibited Mitchell from engaging in these activities under threat of civil and criminal penalty. Several of these activities are still prohibited or severely curtailed under the Emergency Order and Emergency Rule as of the date of this Complaint.

117. If the Lockdown Orders pass constitutional muster, Mitchell contends in the alternative that the Emergency Order and Emergency Rule violated and still violate the Public Health Code.

118. The Public Health Code permits the director of the Michigan Department of Health and Human Services to issue an emergency order prohibiting the gathering of people for any purpose and may establish procedures to be followed during an epidemic to “ensure the continuation of essential public health services and enforcement of health laws.” Mich. Comp. Laws § 333.2255(1). Thus, infectious diseases by themselves are not a permissible reason to issue such orders under the Public Health Code—the disease must actually reach epidemic status before the director has the power to issue an emergency order.

119. Although the World Health Organization has classified SARS-CoV-2 as a pandemic, that is not controlling under Michigan law. The existence of an epidemic must be determined solely from the perspective of the facts as they exist on the ground *in Michigan*.

120. With confirmed infections affecting only 0.42% of the State as of the date of this Complaint, no epidemic actually exists throughout all of Michigan. While a regional epidemic *likely* exists in a few densely populated areas, one does not exist in all 83 counties in Michigan, as demonstrated by persistently low numbers of infections and deaths in the majority of Michigan’s counties.

121. For example, approximately 87,600 people live in Lapeer County, where Mitchell lives. As of May 1, 2020, there were 171 confirmed cases of COVID-19 and 25 deaths since the Governor declared an emergency. In other words, confirmed cases represent 0.195% of the population in Lapeer County. The death toll represents 0.028% of Lapeer County’s population. These small numbers of cases and deaths did not and do not qualify as an epidemic in Lapeer County. Accordingly, Director Gordon lacked and lacks the authority to issue an emergency order under the Public Health Code with respect to

Lapeer County.

122. The Emergency Rule is unenforceable because it purports to enforce the Emergency Order, which is unenforceable.

123. On information and belief, Director Gordon denies these contentions.

124. Mitchell seeks a declaration that the Emergency Order and Emergency Rule violate the Public Health Code, and an injunction against enforcement and adoption of the Emergency Order, the Emergency Rule, and any similar orders and rules in the future as described in the Prayer for Relief.

### **PRAYER FOR RELIEF**

WHEREFORE, Plaintiff Paul Mitchell, III, respectfully asks the Court to grant him the following relief:

1. A declaratory judgment that the Lockdown Orders:
  - (a) Violate his constitutional rights as set forth in this Complaint;
  - (b) are void for vagueness; and/or
  - (c) violate the Separation of Powers Clause of the Michigan Constitution, the Emergency Powers Act, the Emergency Management Act, and/or the Public Health Code;
2. Enjoin Governor Whitmer and Director Gordon from enforcing the Lockdown Orders and from issuing any future orders or rules similar to the invalid ones described in this action;
3. Award him reasonable attorneys' fees, costs, and expenses under 42 U.S.C. § 1988 and any other applicable law; and
4. Any other such further relief to which he may be entitled as a matter of law or equity, or which the Court determines to be just and proper.

**JURY DEMAND**

Under the Seventh Amendment to the U.S Constitution and Rule 38(b) of the Federal Rules of Civil Procedure, Mitchell demands trial by jury on all issues so triable.

Respectfully submitted,

BUTZEL LONG, P.C.

**DANIEL J. MCCARTHY** P59457

Dated: May 4, 2020

---

DANIEL J. MCCARTHY (P59457)

JOSEPH E. RICHOTTE (P70902)

150 West Jefferson Avenue, Suite 100

Detroit, Michigan 48226

(313) 225-7000

[mccarthyd@butzel.com](mailto:mccarthyd@butzel.com)

[richotte@butzel.com](mailto:richotte@butzel.com)

*Counsel for Plaintiffs*

BH2896777.11

UNITED STATES DISTRICT COURT  
WESTERN DISTRICT OF MICHIGAN  
SOUTHERN DIVISION

---

PAUL MITCHELL, III,

Civil No.

Plaintiff,

HON.

v.

GRETCHEN E. WHITMER, and

ROBERT GORDON,

**COMPLAINT FOR DECLARATORY  
AND INJUNCTIVE RELIEF**

Defendants.

---

BUTZEL LONG, P.C.

Daniel J. McCarthy (P59457)

Joseph E. Richotte (P70902)

150 West Jefferson Avenue, Suite 100

Detroit, Michigan 48226

(313) 225-7000

[mccarthyd@butzel.com](mailto:mccarthyd@butzel.com)

[richotte@butzel.com](mailto:richotte@butzel.com)

*Counsel for Plaintiffs*

---

**EXHIBIT 1**

**ANDERSON ECONOMIC GROUP  
REPORT**



# Memorandum

Date: April 13, 2020

To: Daniel McCarthy, Shareholder, Butzel Long

From: Patrick Anderson, Principal  
Brian Peterson, Consultant

Re: COVID-19 Progression and Effects of Business Closures on Michigan's Workers

---

## *Purpose of this Memorandum*

The COVID-19 pandemic has created unprecedented public health and economic disturbances across the globe. Michigan has been one of the most affected states in America, with over 22,600 cases reported as of Friday, April 10. Michigan's response (including the first Executive Order issued on March 10), the dramatic efforts of many health care workers, and the extraordinary actions of many employers and volunteers have also been significant.

We all recognize two serious problems: First, we face a severe public health crisis, with tremendous human costs to its victims as well as to the many people who care for them. Second, we are enduring unprecedented costs of travel and gathering restrictions, business closures, prohibitions on work, and cancellations of both private and public events.

Given these twin threats, it is critical that the State's leaders have the best information available to project spread of the virus; to consider the impact of preventative measures such as social distancing and "stay at home" orders; and to understand the scale of the effect of the prohibitions on work and other restrictions on Michigan's workers and our ability to produce the goods and services we need.

Anderson Economic Group has been retained to summarize the best information now available on both the course of the COVID-19 epidemic and its effects on the Michigan economy. In this memorandum, we provide a summary of COVID-19's progression, discuss the impact of the virus and stay at home orders on Michigan's economy, and identify large variances between the identification of "critical" and "essential" workers during this emergency.



### *Approach*

**Epidemiology Model.** Modeling the spread of COVID-19 is a challenging endeavor. Data on the virus are nearly always incomplete, and our ability to test and diagnose people is inconsistent. However, we now have several weeks of consistent, daily data on cases from independent sources. These provide a solid basis for an assessment of the current situation.

We provide below a modeling of the epidemic in the State of Michigan, using daily data and the widely-used SIR epidemiological model. Subject to the limitations of this and every model, we present the evidence on the current situation in Michigan and do so in a manner that provides a superior level of transparency and credibility.

We also identify comparisons from the small number of similar analyses that are now available, including the IHME projections widely presented in the United States. We note that the most recent IHME projections for Michigan are very close to the results we present here.

We provide additional information about the data, the SIR model, and our methodology in “Appendix B: Methodology and Data” on page 17.

**Employment Effects Analysis.** In order to estimate the economic impacts of COVID-19 and stay at home orders, we created a custom model that predicts the economy-wide impacts of the virus and emergency orders, done on a state-by-state basis. Our model estimates not only the impact on job losses, but also the impact on workers across each state who are at risk of losing income—a much larger group than just those who file for unemployment.

This analysis is based on a review of stay at home orders for each state, as well as data from the U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, and U.S. Department of Labor. Consistent with our intention to provide credible, transparent information, we also reference projections of the impact of these restrictions that were released in mid-March, as well as the unemployment claims figures released in the subsequent weeks, which corroborate these projections.

**State Executive Orders and Federal Homeland Security Classifications.** We review the Department of Homeland Security’s memo and subsequent guidance on critical workers during this emergency and compare it with a similar classification of workers in two Michigan executive orders. We note the significant differences between these two that affect Michigan workers and the residents.

## *Findings*

Our analysis and review led to the following findings.

### *1. Epidemiological models and current data suggest that COVID-19 infections have peaked in Michigan.*

Epidemiological evidence strongly suggests that Michigan has reached its peak COVID-19 infection rate for the current wave of the epidemic. This evidence includes both our own assessment—using an industry-standard SIR model and U.S.-only data—and the IHME assessment of April 8, which utilizes both U.S. and China data and a unique model IHME developed for this purpose.

**Michigan Results, Standard SIR Model.** The daily Michigan case data used in our analysis was collected by the *New York Times* from State sources and selected because of its consistency and reliability across multiple states.<sup>1</sup> We estimated a standard SIR model using these data, using an iterative re-estimating procedure to reveal both the current projection of the path of the outbreak and the changes in the estimated parameters over time.

For approximately one week now, the data have consistently indicated that the infection rate began slowly, accelerated, and then reached a peak rate in the past week. If this pattern continues, we can expect the number of new cases to slowly drop over time during the current wave of the epidemic.

This pattern—which produces the distinctive “S” curve—is consistent with both theory, and decades of experience across the globe with numerous epidemics. These data strongly indicate the path of the epidemic has begun to slow down, suggesting that social distancing and other mitigation efforts have been effective. The peak number of people infected, shown in the Anderson Economic Group analysis, and the peak hospital utilization, shown in the IHME analysis, both appear to have passed in the week that began April 5, 2020.

See Figure 1 on page 5.

Note that these analyses pre-date the reports from the Easter weekend, which may have been incomplete but which also show a declining number of cases. Furthermore, these analyses focus on the current wave of the epidemic, which is the only wave for which any data are available.

**Comparison with Other Epidemiological Models.** This result is consistent with that of other entities that have modeled Michigan's epidemiology, including those of IHME (as reported April 8) and others. In particular, the most recent IHME results show a nearly identical pattern.<sup>2</sup>

---

1. There are minor discrepancies between the NYT compilation, and the daily-reported numbers from the Michigan DHS. These discrepancies are usually under 1%.

**Variation Across Michigan Counties; Results in Detroit Metro Area.** There is significant variation in the intensity of the outbreak across the state. In particular, many counties have reported total cases of less than a dozen. At the same time, Wayne, Oakland, and Macomb Counties have intensive epidemics. Corroborating our results for the State as a whole, each of these three counties, all with large number of cases, demonstrates a similar pattern of acceleration in the number of cases in February and March, and then an apparent peak in the first half of April.

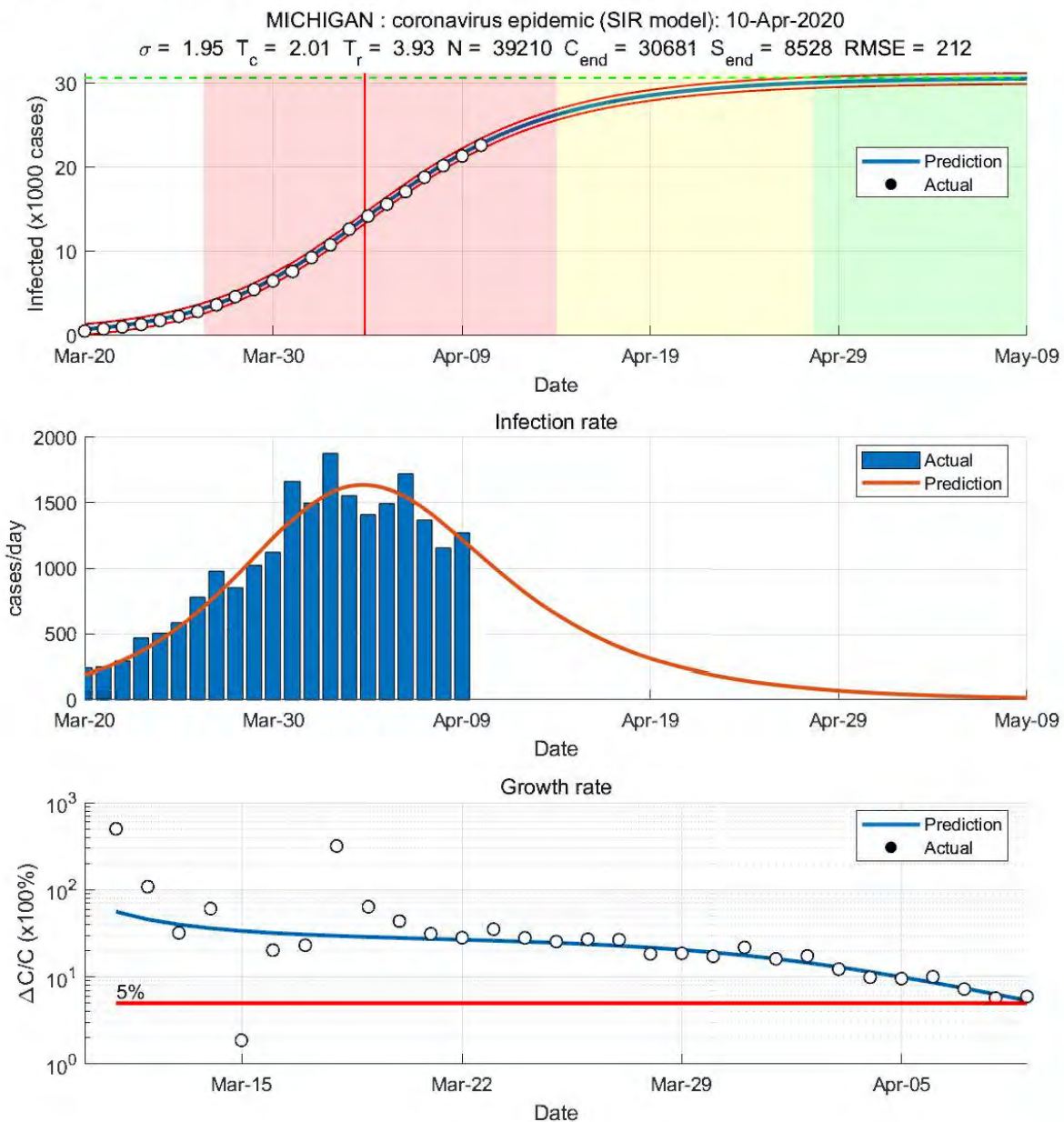
We show similar analyses for these counties in case counts in “Appendix A: Additional Figures” on page 13. See in particular Figure 6 on page 16.

**Limitations of these Data and Epidemiological Models.** We also note the limitations of these data and every epidemiological model in “Appendix B: Methodology and Data” on page 17.

Among these limitations, please note that, for many counties in Michigan, the number of case counts is so small that we do not have enough data to model the course of an epidemic at this point. We, of course, hope the numbers remain small in many such counties. However, we do expect that case numbers in some counties will grow enough to allow later estimation in these counties as well.

- 
2. As noted in the appendix, the IHME model uses a mixture of U.S. and China-reported data, and a unique model that focuses on hospital usage rather than cases. Furthermore, the IHME results have varied significantly over time. This comparison is with the most recently-released results.

**FIGURE 1. COVID-19 Total Infections, Infection Rate, and Growth Rate in Michigan**



2. Michigan’s “stay at home” order, along with decisions made by private citizens and employers, has resulted in a severe contraction in the State’s economy.

*We now have Depression-level unemployment in Michigan, with over 16% of our work-force becoming unemployed in just three weeks. This will grow more severe as time passes and likely affect the incomes of 1.4 million Michigan workers and their families.*

**Executive Orders Restricting Work and Travel.** On March 23, Michigan Governor Gretchen Whitmer issued a “stay at home” order requiring all nonessential workers to stay home and not go their workplace. At the time, Michigan had more reported COVID-19 cases than any other state save for New York and New Jersey. This order—already the second on the epidemic—became effective March 24 and was effective through April 13.<sup>3</sup> The purpose of this order was to suppress the spread of COVID-19, prevent the state’s healthcare system from being overwhelmed, and allow time for the state to procure necessary medical equipment needed to “prevent needless deaths.” On April 9, the governor extended the stay at home order until April 30, strengthened some of the restrictions, and noted that the original stay at home order was effective, but that COVID-19 was still “aggressive and persistent.”<sup>4</sup>

On March 17, Anderson Economic Group estimated that, as a result of COVID-19 and the stay at home orders in this and other states, an unprecedented number of Americans would lose income due to layoffs, furloughs, pay cuts, and mandatory sick leave. We estimated that 1.5 million Michiganders could lose two or more days worth of income, along with 2.0 million workers in Illinois and 3.3 million workers in New York. These estimates are shown in Table 1 below.<sup>5</sup>

**TABLE 1. Projection of Workers Losing Significant Income due to COVID-19 and Stay-at-home Orders, March-April 2020**

State	Estimated Number of Workers Losing Significant Income
Michigan	1,468,720
Illinois	1,958,468
New York	3,327,870

*Source: Anderson Economic Group estimates, March 19, 2020.*

3. Michigan Governor Executive Order 2020-21, “Temporary requirements to suspend activities that are not necessary to sustain or protect life.” See [https://www.michigan.gov/whitmer/0,9309,7-387-90499\\_90705-522626--,00.html](https://www.michigan.gov/whitmer/0,9309,7-387-90499_90705-522626--,00.html).

As noted above, the first executive order (No. 2020-4, March 10, 2020) declared a state of emergency and noted that the first case had just been identified in the State.

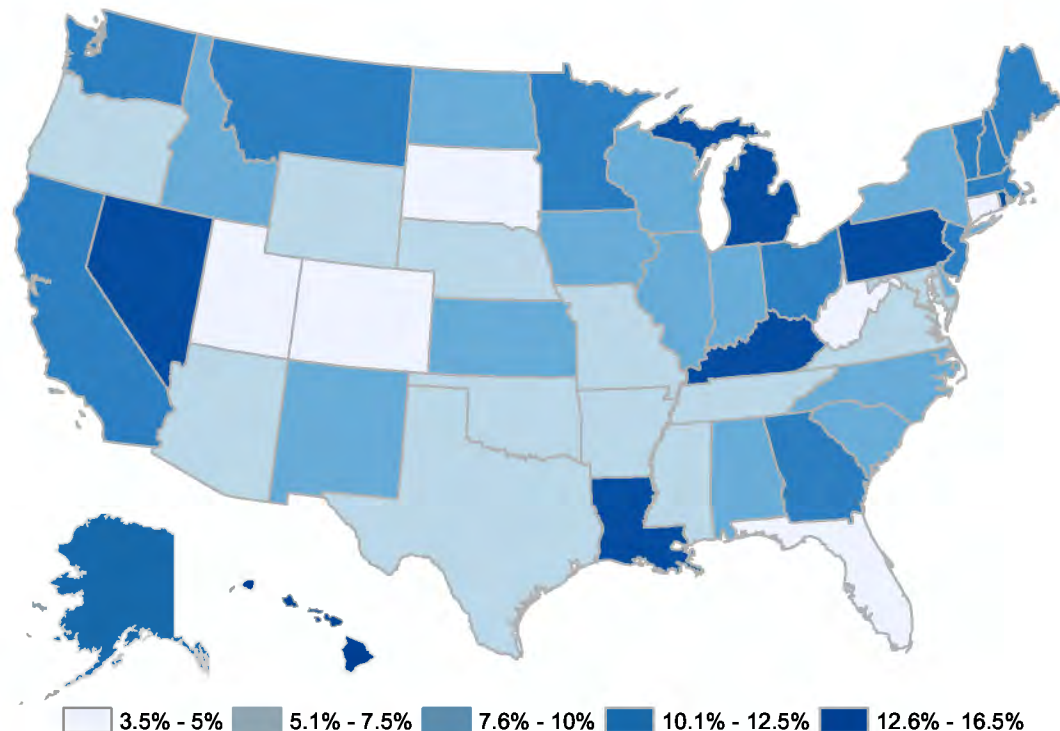
4. Michigan Governor Executive Order 2020-42, “Temporary requirement to suspend activities that are not necessary to sustain or protect life, Rescission of Executive order 2020-21.” See [https://www.michigan.gov/whitmer/0,9309,7-387-90499\\_90705-525182--,00.html](https://www.michigan.gov/whitmer/0,9309,7-387-90499_90705-525182--,00.html).

**Immediate and Large Loss of Employment.** Over the past three weeks, the impact of the stay at home order on the state's economy has become apparent. Unfortunately, the most recent data in Michigan and other states indicate that our mid-March estimates were probably conservative.

Since March 28, Michigan has recorded over 815,000 unemployment claims. The number of jobless workers has overwhelmed the State's unemployment offices, underlining the scale of the job loss and suggesting that many more are unemployed than have been able to claim benefits. Even counting only those that filed indicates that approximately 16.5% of the state's labor force has filed for unemployment in less than three weeks—an unprecedented occurrence. Counting those already filed as of last week, and those already attempting to file this week, Michigan now has depression-level unemployment.

Nationwide, Michigan has been one of the hardest hit states, as shown in Figure 2 below.

**FIGURE 2. Three-Week Initial Unemployment Claims as a Percentage of Total Workforce Size as of April 4, 2020**



Source: Anderson Economic Group analysis of base data from the U.S. Department of Labor, U.S. Bureau of Labor Statistics.

5. See the Anderson Economic Group's website for most recent estimates of affected workers. <https://www.AndersonEconomicGroup.com/>.



**Impact Throughout Multiple Industries.** While the unemployment claims numbers provide some insight into the current state of the Michigan economy, the impact of COVID-19 extends well beyond just those who were able to file for unemployment in the last three weeks.

Across the Midwest, workers in nearly all industries outside of government are being furloughed, asked to take a pay cut, or are taking mandatory paid time off. The U.S. Department of Labor's three most recent unemployment insurance claims press releases note that, in Michigan, significant increases in unemployment claims are coming from nearly every industry in the state, including food service; manufacturing; construction; retail trade; administrative, support, waste management, and remediation services; health care and social assistance; arts, entertainment and recreation; transportation and warehousing; real estate; professional services; and educational services.<sup>6</sup>

The impact has been especially severe on small business, with many owners struggling to keep their doors open. Although Congress authorized a number of small business lending programs aimed at helping small businesses make it through the epidemic, very few funds have actually been dispersed even though Michigan businesses have been shut down for nearly one month. Small business owners who have applied for relief have encountered a plethora of challenges, including technical glitches, overwhelmed banks, and slow processing times, adding to the already high level of anxiety that small business owners were facing as policymakers ordered all nonessential businesses shut down.

A recent forecast from the University of Michigan Research Seminar in Quantitative Economics predicts that Michigan's unemployment rate in the second quarter of 2020 will average 23 percent—even higher than the forecasted U.S. quarterly peak of 14 percent.<sup>7</sup>

---

6. U.S. Department of Labor Unemployment Insurance Weekly Claims report for April 9, 2020, April 2, 2020, and March 26, 2020. See <https://www.dol.gov/>. The comments on individual states are attributed to the state unemployment agencies.

7. Gabriel Ehrlich, George Fulton, and Saul Hymans, "Update April 9: The U.S. and Michigan Economic Outlook for 2020-2022," University of Michigan Ann Arbor Research Seminar in Quantitative Economics." See: <https://lsa.umich.edu/econ/rsqe/forecasts.html>.

*3. The U.S. Department of Homeland Security's memorandum on "essential" workers during the COVID-19 pandemic explicitly recognizes many workers that are not recognized in Michigan's Executive Order.*

On March 19, the Department Homeland Security (DHS) issued a memorandum on the identification of "essential infrastructure workers" during the COVID-19 response.<sup>8</sup> The following guidance from the memorandum is of particular importance:

- The memorandum states that those who work in critical infrastructure industries "have a special responsibility to maintain [their] normal work schedule."
- The memorandum lists a range of "operations and services that are essential to continued critical infrastructure viability." These include management, call centers, construction, telecommunications, information technology, food, agriculture, transportation, energy, wastewater, manufacturing and logistics, and health care workers.
- The memorandum states that "all organizations should implement business continuity plans," and that in the "modern economy, reliance on technology and just-in-time supply chains means that certain workers must be able to access certain sites, facilities, and assets to continue continuity of functions."

On March 28, DHS released a revised memorandum identifying a larger set of essential industries and workers.<sup>9</sup> The occupations and industries identified in this revised document include workers in some of Michigan's most important economic sectors. For example, Trade, Transportation, and Utilities is Michigan's largest sector by employment, with over 800,000 workers, and the State's Manufacturing sector employs 625,000 workers.<sup>10</sup>

These memos note the following items that are especially germane to key industries in Michigan:

- The DHS memo explicitly notes the importance of transportation, logistics, and automotive repair and maintenance.
- The DHS memo classifies "central office personnel" who "maintain and operate central office, data centers, and other network office facilities" as essential employees.
- The DHS memo also notes the essential nature of "workers necessary for the manufacturing of materials and products needed for medical supply chains, transportation, energy, communications, food and agriculture..." and many other products.
- The March 28 DHS memo expands its definition of essential workers to a variety of industries, including some that are particularly important to Michigan's economy, such as transportation and manufacturing.

**Need to Recognize True Extent of Critical and Essential Workers.** As was apparent at the onset of this emergency, and consistent with the guidance from the U.S. government that was cited in Michigan Executive Order 2020-42 and prior orders, it is critical to support

---

8. Christopher Krebs, "Memorandum on Identification of Essential Critical Infrastructure Workers During COVID-19 Response," March 19, 2020.

9. Christopher Krebs, "Advisory Memorandum on Identification of Essential Critical Infrastructure Workers During COVID-19 Response," March 28, 2020.

10. U.S. Bureau of Labor Statistics, "Economy At a Glance: Michigan," <https://www.bls.gov/>.



“essential” workers in a range of industries. The purpose of the DHS memo was to highlight the importance of these workers and “help State and local officials ensure continuity of functions critical to public health and safety.” However, Michigan Executive Order 2020-42 explicitly states that it does *not* adopt any of the guidance issued by DHS subsequent to the March 19 memorandum, meaning that the Governor’s order excludes those additional industries and workers identified as essential by the DHS as of March 28.<sup>11</sup>

The March 19 DHS memo was issued at a time when stay at home orders were anticipated to be short-term affairs. Since then, stay at home orders across the country have been extended. It is important to recognize that the longer these stay at home orders are in effect, the more workers must be classified as essential in order to maintain supply chains and perform essential services.

The DHS memorandum fully anticipates that changes in conditions over time and differences in the intensity of the outbreak will be taken into account by State and local governments, as well as private sector organizations. Consistent with this explicit guidance, Michigan and other states should take notice of differing infection rates within our state; as well as how changes in the course of the epidemic impact which workers and industries should be classified as essential.

---

11. Paragraph 8 of Michigan’s Executive Order 2020-42 states:

“For purposes of this order, critical infrastructure workers are those workers described by the Director of the U.S. Cybersecurity and Infrastructure Security Agency in his guidance of March 19, 2020 on the CO-VID-19 response (available here). This order does *not* adopt any subsequent guidance document released by this same agency.” [Emphasis in original.]

*About the Authors*

**Patrick L. Anderson.** Mr. Patrick L. Anderson founded Anderson Economic Group in 1996, and serves as the company's principal and CEO. A nationally-recognized expert in business economics and a sought-after speaker, Mr. Anderson has led several major public policy initiatives in his home state. He was awarded both the Michigan Chamber of Commerce's Leadership Michigan award and the University of Michigan's Neal Staebler award for civic leadership. His writing has earned five prestigious national awards from the National Association of Business Economics.

**Brian R Peterson.** Mr. Peterson is a consultant and director of public policy and economic analysis with Anderson Economic Group. His work focuses on economic and fiscal impact modeling, actuarial analysis, and environmental economics. Prior to joining AEG, Mr. Peterson worked as a policy analyst in regional economic development and transportation planning in the Chicago region.

*Contributors*

The authors wish to recognize the contribution of the following individuals:

- Andrew Miller, Senior Analyst, Anderson Economic Group
- Sarp Mertdogan, Analyst, Supported Intelligence LLC
- Milan Batista, Professor at the University of Ljubljana, Slovenia

The conclusions in this memorandum are, of course, those of the authors.

*About Anderson Economic Group LLC*

Founded in 1996, Anderson Economic Group is a boutique research and consulting firm, with offices in East Lansing, Michigan, and Chicago, Illinois. The experts at AEG have extensive experience in public policy and economic analysis. Clients of Anderson Economic Group include nearly every major institution in the State of Michigan, including colleges, manufacturers, labor unions, state and local governments, and trade associations. Relevant publications from our firm include:

- Annual State Business Tax Burden Rankings, published since 2007.
- "Economic and Fiscal Impacts of the United Auto Works GM Strike," published in 2019.
- "Economic and Fiscal Impacts of a 1332 Affordable Care Act Waiver in Georgia," published in 2019.
- "Michigan Economic Competitiveness Benchmarking Report," published since 2012.
- "Anderson Economic Group Amazon HQ2 Index," published in 2017.
- "AndCan® Index Estimates of National and State-level Cannabis Demand," updated regularly since 2017.
- Numerous benchmarking, comparison, and economic update analyses.

For more information about Anderson Economic Group, please visit our website at <https://www.AndersonEconomicGroup.com>.

*About Supported Intelligence LLC*

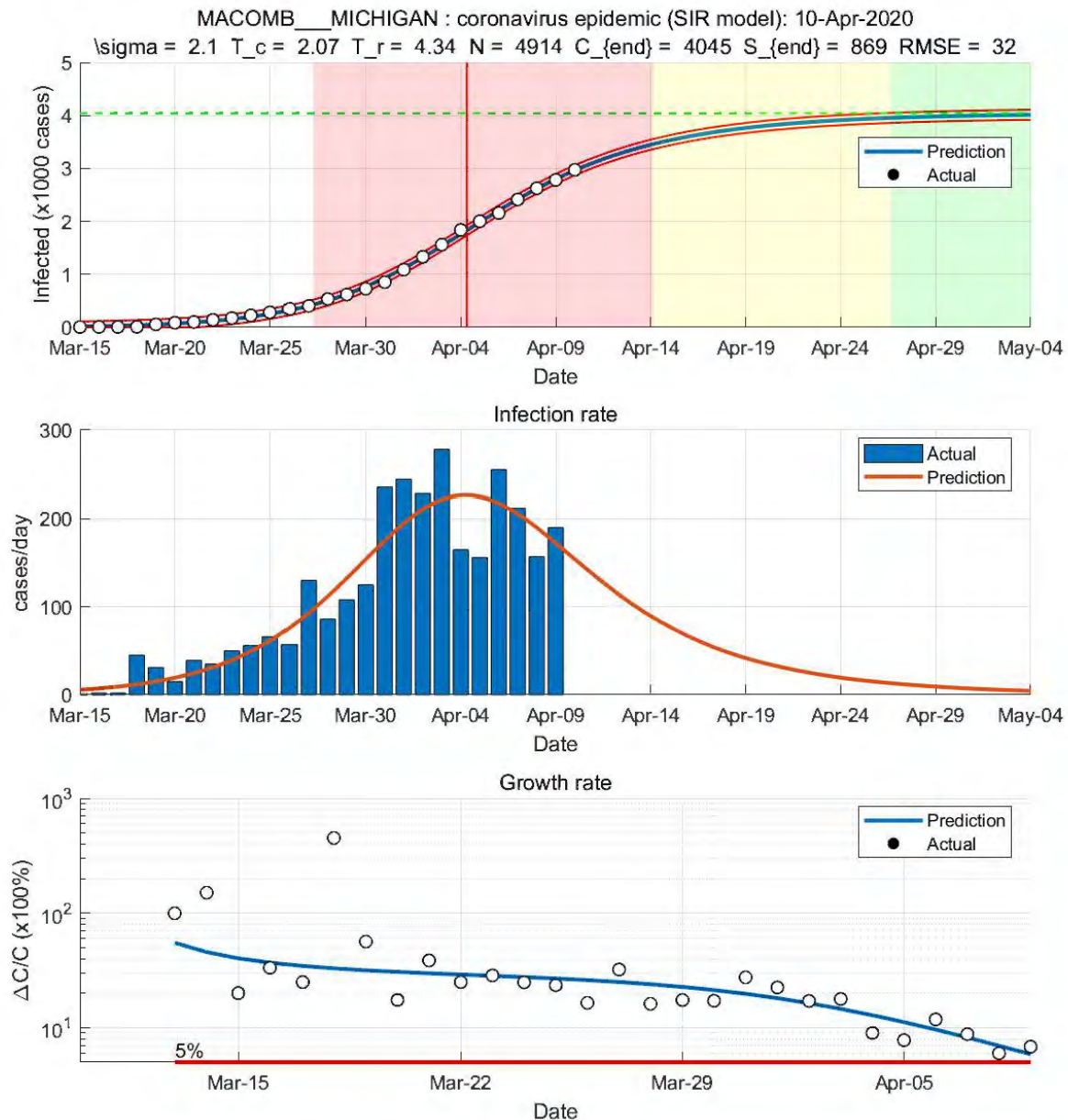
Supported Intelligence, LLC is a decision intelligence and data analytics company founded in 2012. Supported Intelligence pioneered a innovative class of decision intelligence technology, which is covered by three U.S. patents as well as patents pending in the U.S. and other countries.

Consultants at Supported Intelligence assembled the data and created the analytics facility to bring in daily reports from numerous sources, including at the state and county level in the United States; analyze the data using the methods identified in this document; and generate the decision intelligence reports highlighted here.

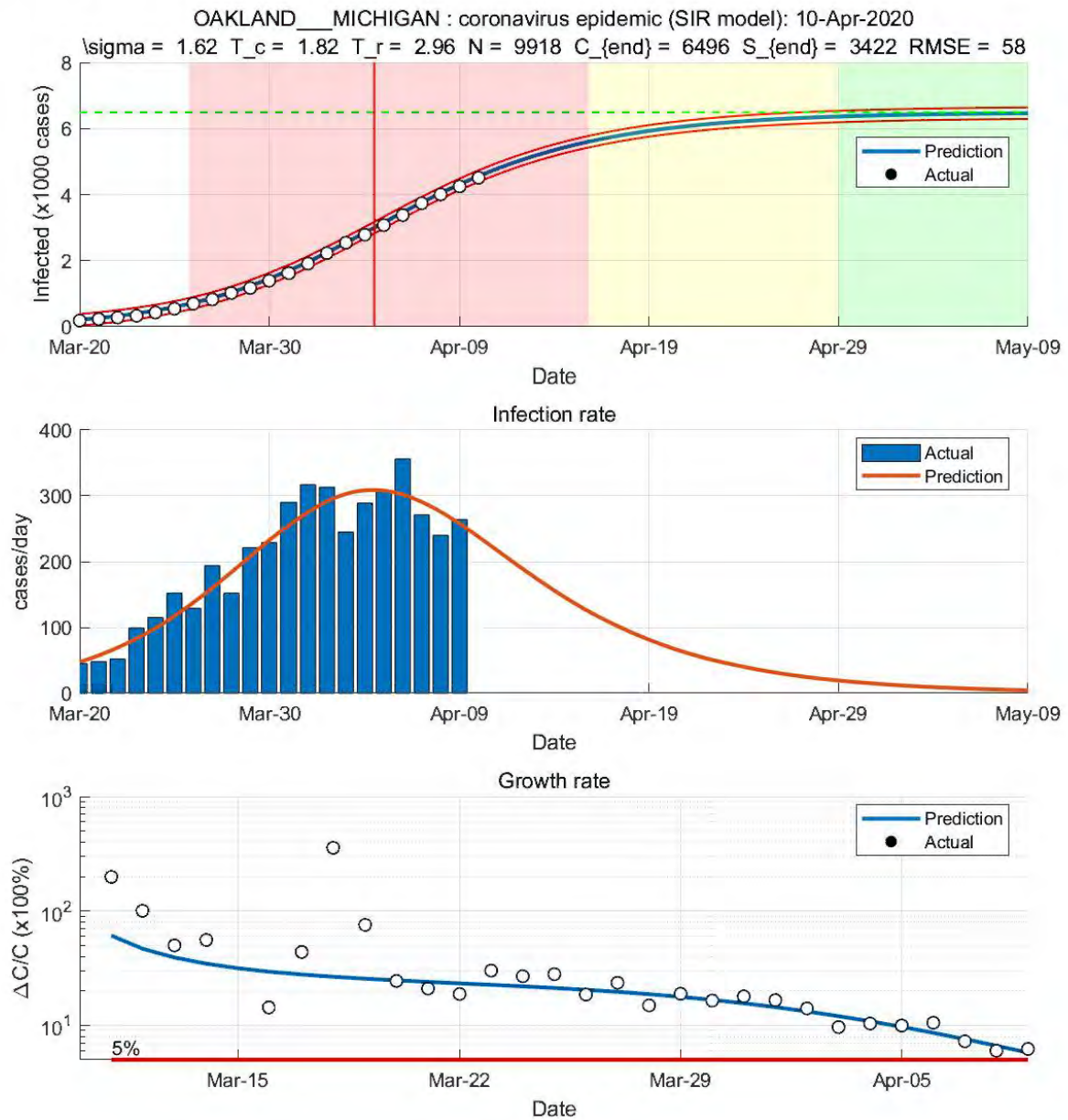
Please visit <https://www.SupportedIntelligence.com> for more information.

Appendix A: Additional Figures

**FIGURE 3. COVID-19 Total Infections, Infection Rate, and Growth Rate in Macomb County, Michigan**

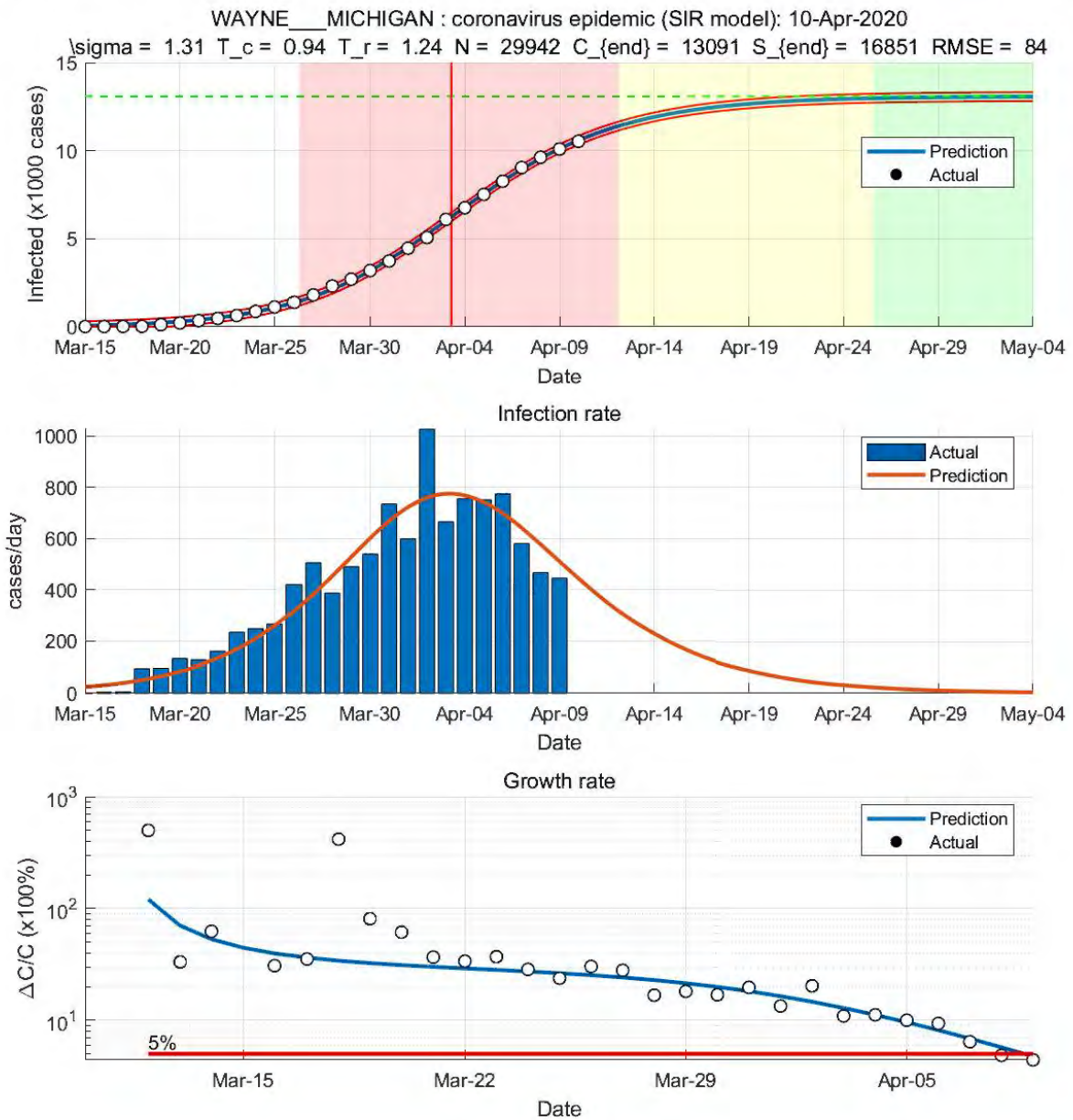


**FIGURE 4. COVID-19 Total Infections, Infection Rate, and Growth Rate in Oakland County, Michigan**

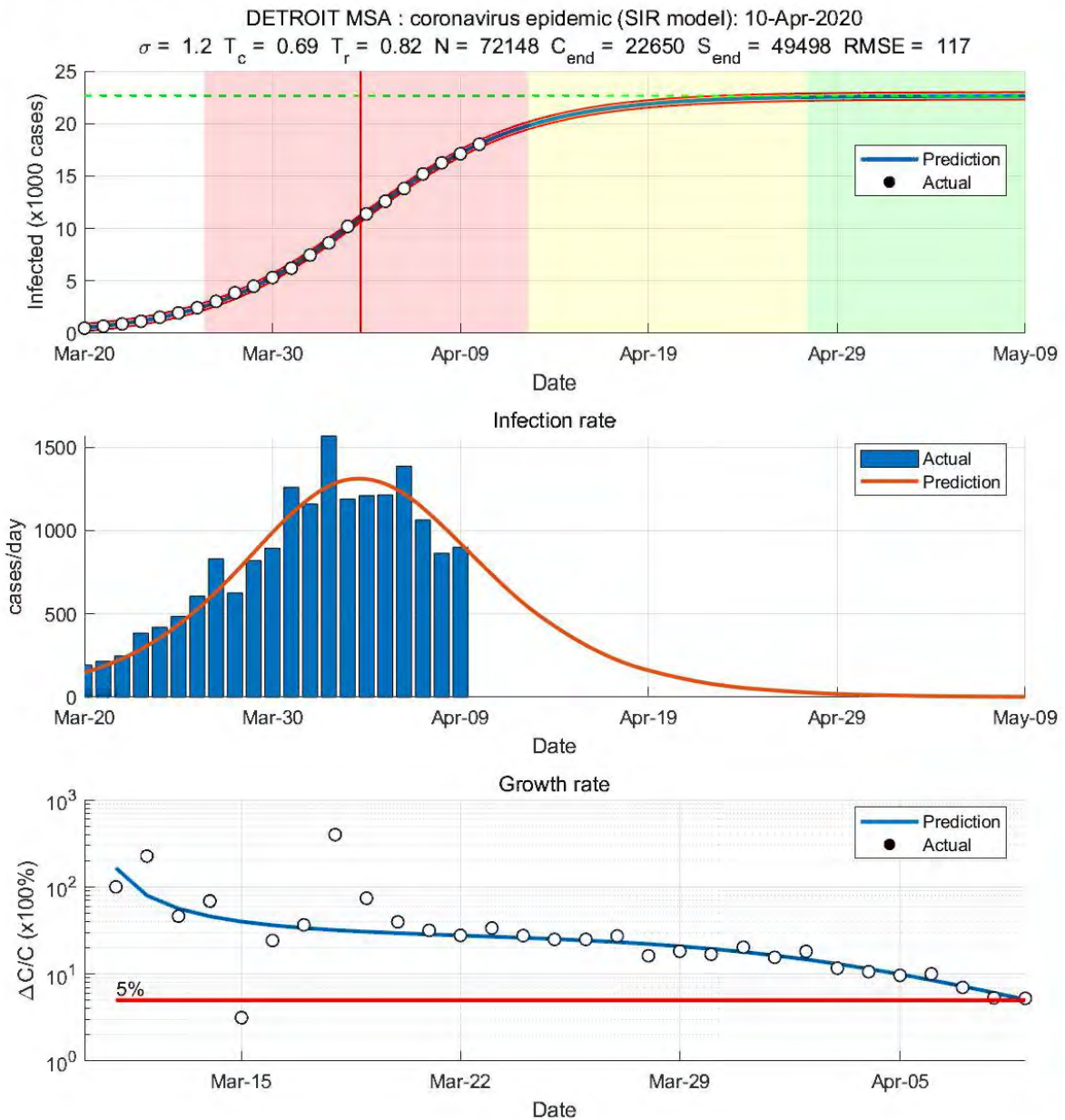




**FIGURE 5. COVID-19 Total Infections, Infection Rate, and Growth Rate in Wayne County, Michigan**



**FIGURE 6. COVID-19 Total Infections, Infection Rate, and Growth Rate in the Detroit Metropolitan Statistical Area**



## *Appendix B: Methodology and Data*

**Data.** The state-level data we used in this analysis were collected by the *New York Times* organization from state and local sources. We selected this data source after reviewing multiple alternatives, and recognizing the benefits of the consistency and data checking this organization brought to the effort.

The NYT website for these data is: <https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html>.

The NYT data repository on GitHub is: <https://github.com/nytimes/covid-19-data>.

**Model.** We used a SIR model to forecast the impacts of COVID-19 on states across the U.S. We chose this model after conducting an extensive review of available epidemiological models.

Our review confirmed that the standard SIR model, when consistent daily data are available, often provides the most reliable and understandable assessments. This judgement is based partially on the decades of experience across a wide number of countries and epidemics. The SIR model has been recognized and used as a basis for the diffusion of ideas and other transmissions, as well as for epidemiological studies, since at least 1964.<sup>12</sup> It is also widely described in academic and professional settings, including having many easily-accessible resources, such as an online teaching version provided by the Mathematics Association of America.<sup>13</sup>

---

12. An influential article in this development was Goffman W, Newill V. "Generalization of epidemic theory." *Nature*. 1964;204(4955):225–228. doi: 10.1038/204225a0. This article outlined the now standard nomenclature of "susceptible-infected-removed" subgroups of a population, and stated the standard assumptions such as a homogenous population and regular "mixing" of it. (The "R" portion is now commonly called "recovered.")

The intellectual roots of this model date back to the early 1900s, in which the first "compartmented" mathematical models, separating population cohorts, were developed. See, e.g. Sooknanan, J., Comissiong, D.M.G. "When behaviour turns contagious: the use of deterministic epidemiological models in modeling social contagion phenomena." *Int. J. Dynam. Control* 5, 1046–1050 (2017). <https://doi.org/10.1007/s40435-016-0271-9>.

A 1927 article by W.O. Kermack and A.G. McKendrick, "A Contribution to the Mathematical Theory of Epidemics," *Proceedings of the Royal Society A*, vol. 115 no. 772, is often credited as the first to identify the underlying mathematics of the path of an epidemic. In this 1927 article, they plot the deaths from an epidemic in "the island of Bombay" from December 1905 to July 1906. It followed a bell-shaped curve of the shape shown in SIR and other models a century later.

13. The MAA teaching version, authored by David Smith and Lang Moore, is available at: <https://www.maa.org/press/periodicals/loci/joma/the-sir-model-for-spread-of-disease-the-differential-equation-model>. An overview of this and many variants is presented in H.W. Hethcote, "The Mathematics of Infectious Diseases," *SIAM Review* 42 (4) (2000).



It is also based on our assessment of how this model and the available data had performed in assessing the COVID-19 outbreak in Italy, Germany, Lombardy (a province in Italy), the United States, New York City, Ohio, Michigan, Illinois, the Detroit metropolitan area and counties, and other areas.

We use the data from various states and a specific implementation of the SIR model to fit the data, and estimate parameters such as  $R_0$  (discussed further below). We use these parameters to estimate a future curve, which represents the prediction based on past data and the assumptions of the model. As noted below, our implementation of the SIR model provides for iterative re-estimating of  $R_0$  values and estimates of the epidemic size and susceptible population.

**Inclusion of Diagnostic Information.** Our implementation of the standard SIR model includes a number of features that allow for inspection of the results, and for a better understanding of the reliability of the model's estimated parameters. These include:

- Our complete results allow for the inspection of prediction errors, allowing readers to compare our historical estimates against historical data.
- Using innovations developed by researchers cited below, we also iteratively re-estimate the model over time, capturing the evolution of model parameters as more data become available.
- We fully disclose the model data and parameters, allowing the results to be replicated by other researchers.
- We explicitly note the known limitations of the model and data.

**Elements of the SIR Model.** The typical curve generated by an SIR model that estimates the number of people infected per day is an "S" shaped curve in which the number of new infections per day begins slowly, then grow exponentially larger before reaching a "peak" point. Following the peak, number of cases per day decrease and slowly reach zero, or the neutral level.

**Parameters.** A key element of the model is known as " $R_0$ ," (sometimes called "R nought") or the reproduction rate of the infection. In the SIR model, if  $R_0$  equals 2, that means for each time period of the outbreak, 1 infected person is expected to infect 2 others.

In actual epidemics, we expect the reproduction rate to be a dynamic value that changes over time. In its initial stages, the  $R_0$  value of the epidemic is small, but grows quickly. As the epidemic slows, the  $R_0$  value declines and ultimately decreases to near zero.

**Known Limitations and Common Assumptions in Epidemiological Models.** There are known limitations of this and other epidemiological models. We state the most important ones here:

1. This and other epidemiological models presume that, after some time, the population acquires "herd immunity" that limits further spread of the disease. Users of these models also recognize the likelihood of subsequent waves of the same disease, though of lesser magnitude. For example, numerous variations of influenza cause illness and deaths each year, and are related to similar prior outbreaks.

2. “Comorbidity” causes difficulty in assigning properly both cases and the number recovering and perishing from a disease. In particular, the number of deaths due to influenza each year is very large, and this cannot always be distinguished (especially in the early stages of the epidemic) from the specific disease being studied.
3. In general, these models assume a certain amount of “mixing” of the population. The mathematical treatment of this interaction is never accurate in small settings or specific short time periods, and usable models require significant data and enough time to allow for patterns across entire societies to develop. The amount of mixing also varies by age, and varies across social groups and among areas within a country.
4. In addition, all models rely upon data that are collected with reporting and measurement errors. In this epidemic, differences in testing, and in some countries pressure to mis-report or fail to report results, have clearly caused some difficulties in obtaining accurate data.
5. All statistical models involve uncertainty, and all projections resulting from these models carry with them this uncertainty.
6. This is a new disease. It will react in unpredictable ways with different populations.
7. The population itself changes its behavior over time. This is perhaps the largest unknown at the early stage of a severe epidemic in which a strong change in behavior, and new forms of treatment, occur.

Because of these inherent limitations, we present the model and data along with the available diagnostic and related information, to allow an informed decision. We urge policymakers to consider this information, and additional information, before making their decisions.

**Implementation of Model.** Supported Intelligence adapted an SIR model authored by Milan Batista, Professor at the University of Ljubljana in Slovenia. Mr. Batista and his colleagues describe this model, provide a public file exchange for the code, and apply it to the Coronavirus outbreak in the following publication and websites:

- Batista, Milan. (2020). *Estimation of the final size of the coronavirus epidemic by the SIR model*. Monograph found at ResearchGate.
- A file exchange version is maintained for review by other researchers; it is here: <https://www.mathworks.com/matlabcentral/fileexchange/74658-fitviruscovid19>.
- Related work using this same model for other countries and with different data sources is available here: <https://www.fpp.uni-lj.si/en/research/research-laboratories-and-the-programme-team/research-programme-team/>  
As of the date of this memo, a comparison analysis of the United States (using an April 10 dataset, from a different source than we use in our analysis) is presented. It is consistent with the results we obtain using our data for the United States.

The version used by Supported Intelligence is modified to include the following improvements for the purposes of our work:

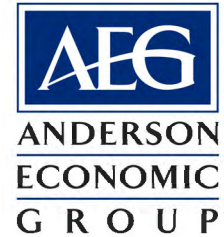
1. Supported Intelligence built a data assembly routine that gathers live data on cases reported per day from the *New York Times*.
2. We provide additional diagnostic information, and have created different data visualizations for the purpose of presenting the results.
3. We clarify a number of terms, and adjust the presentation to date formats common in the United States, to avoid ambiguity and misunderstanding.

To: Daniel McCarthy, Shareholder, Butzel Long

From: Patrick Anderson, Principal  
Brian Peterson, Consultant

Re: COVID-19 Progression & Effects of Business Closures on  
Michigan's Workers (Revised with data through mid-  
April)

Date: April 22, 2020



---

*Purpose of this Memorandum*

The COVID-19 pandemic has created unprecedented public health and economic disturbances across the globe. Michigan has been one of the most affected states in America, with over 22,600 cases reported as of Friday, April 10. Michigan's response (including the first Executive Order issued on March 10), the dramatic efforts of many health care workers, and the extraordinary actions of many employers and volunteers have also been significant.

We all recognize two serious problems: First, we face a severe public health crisis, with tremendous human costs to its victims as well as to the many people who care for them. Second, we are enduring unprecedented costs of travel and gathering restrictions, business closures, prohibitions on work, and cancellations of both private and public events.

Given these twin threats, it is critical that the State's leaders have the best information available to project spread of the virus; to consider the impact of preventative measures such as social distancing and "stay at home" orders; and to understand the scale of the effect of the prohibitions on work and other restrictions on Michigan's workers and our ability to produce the goods and services we need.

Anderson Economic Group has been retained to summarize the best information now available on both the course of the COVID-19 epidemic and its effects on the Michigan economy. In this memorandum, we provide a summary of COVID-19's progression, discuss the impact of the virus and stay at home orders on Michigan's economy, and identify large variances between the identification of "critical" and "essential" workers during this emergency.

*Approach*

**Epidemiology Model.** Modeling the spread of COVID-19 is a challenging endeavor. Data on the virus are nearly always incomplete, and our ability to test and diagnose people is inconsistent. However, we now have several weeks of consistent, daily data on cases from independent sources. These provide a solid basis for an assessment of the current situation.

We provide below a modeling of the epidemic in the State of Michigan, using daily data and the widely-used SIR epidemiological model. Subject to the limitations of this and every model, we present the evidence on the current situation in Michigan and do so in a manner that provides a superior level of transparency and credibility.

We also identify comparisons from the small number of similar analyses that are now available, including the IHME projections widely presented in the United States. We note that the most recent IHME projections for Michigan are very close to the results we present here.

We provide additional information about the data, the SIR model, and our methodology in “Appendix B: Data, Methodology, and Limitations” on page 18.

**Employment Effects Analysis.** In order to estimate the economic impacts of COVID-19 and stay at home orders, we created a custom model that predicts the economy-wide impacts of the virus and emergency orders, done on a state-by-state basis. Our model estimates not only the impact on job losses, but also the impact on workers across each state who are at risk of losing income—a much larger group than just those who file for unemployment.

This analysis is based on a review of stay at home orders for each state, as well as data from the U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, and U.S. Department of Labor. Consistent with our intention to provide credible, transparent information, we also reference projections of the impact of these restrictions that were released in mid-March, as well as the unemployment claims figures released in the subsequent weeks, which corroborate these projections.

**State Executive Orders and Federal Homeland Security Classifications.** We review the Department of Homeland Security’s memo and subsequent guidance on critical workers during this emergency and compare it with a similar classification of workers in two Michigan executive orders. We note the significant differences between these two that affect Michigan workers and the residents.

## *Findings*

Our analysis and review led to the following findings.

### *1. Epidemiological models and current data suggest that COVID-19 infections have peaked in Michigan.*

Epidemiological evidence strongly suggests that Michigan has reached its peak COVID-19 infection rate for the current wave of the epidemic. This evidence includes both our own assessment—using an industry-standard SIR model and U.S.-only data—and the IHME assessment of April 8, which utilizes both U.S. and China data and a unique model IHME developed for this purpose.

**Update:** This was our conclusion in the original memo dated April 13. With over a week of additional data, this conclusion is now buttressed by results from both Metro Detroit, the State of Michigan, and a number of other counties that we have analyzed.

**Michigan Results, Standard SIR Model.** The daily Michigan case data used in our analysis was collected by the *New York Times* from State sources and selected because of its consistency and reliability across multiple states.<sup>1</sup> We estimated a standard SIR model using these data, using an iterative re-estimating procedure to reveal both the current projection of the path of the outbreak and the changes in the estimated parameters over time.

For approximately one week now, the data have consistently indicated that the infection rate began slowly, accelerated, and then reached a peak rate in the past week. If this pattern continues, we can expect the number of new cases to slowly drop over time during the current wave of the epidemic.

This pattern—which produces the distinctive “S” curve—is consistent with both theory, and decades of experience across the globe with numerous epidemics. These data strongly indicate the path of the epidemic has begun to slow down, suggesting that social distancing and other mitigation efforts have been effective. The peak number of people infected, shown in the Anderson Economic Group analysis, and the peak hospital utilization, shown in the IHME analysis, both appear to have passed in the week that began April 5, 2020.

See Figure 1 on page 6.

Note that these analyses pre-date the reports from the Easter weekend, which may have been incomplete but which also show a declining number of cases. Furthermore, these analyses focus on the current wave of the epidemic, which is the only wave for which any data are available.

---

1. There are minor discrepancies between the NYT compilation, and the daily-reported numbers from the Michigan DHS. These discrepancies are usually under 1%.

**Comparison with Other Epidemiological Models.** This result is consistent with that of other entities that have modeled Michigan's epidemiology, including those of IHME (as reported April 8) and others. In particular, the most recent IHME results show a nearly identical pattern.<sup>2</sup>

**Variation Across Michigan Counties; Results in Detroit Metro Area.** There is significant variation in the intensity of the outbreak across the state. In particular, many counties have reported total cases of less than a dozen. At the same time, Wayne, Oakland, and Macomb Counties have intensive epidemics. Corroborating our results for the State as a whole, each of these three counties, all with large number of cases, demonstrates a similar pattern of acceleration in the number of cases in February and March, and then an apparent peak in the first half of April.

We show similar analyses for these counties in case counts in “Appendix A: Additional Figures” on page 12. See in particular Figure 1 on page 13.

**Limitations of these Data and Epidemiological Models.** We also note the limitations of these data and every epidemiological model in “Appendix B: Data, Methodology, and Limitations” on page 18.

Among these limitations, please note that, for many counties in Michigan, the number of case counts is so small that we do not have enough data to model the course of an epidemic at this point. We, of course, hope the numbers remain small in many such counties. However, we do expect that case numbers in some counties will grow enough to allow later estimation in these counties as well.

---

2. As noted in the appendix, the IHME model uses a mixture of U.S. and China-reported data, and a unique model that focuses on hospital usage rather than cases. Furthermore, the IHME results have varied significantly over time. This comparison is with the most recently-released results.

2. Michigan’s “stay at home” order, along with decisions made by private citizens and employers, has resulted in a severe contraction in the State’s economy.

*We now have Depression-level unemployment in Michigan, with over 16% of our work-force becoming unemployed in just three weeks. This will grow more severe as time passes and likely affect the incomes of 1.4 million Michigan workers and their families.*

**Executive Orders Restricting Work and Travel.** On March 23, Michigan Governor Gretchen Whitmer issued a “stay at home” order requiring all nonessential workers to stay home and not go their workplace. At the time, Michigan had more reported COVID-19 cases than any other state save for New York and New Jersey. This order—already the second on the epidemic—became effective March 24 and was effective through April 13.<sup>3</sup> The purpose of this order was to suppress the spread of COVID-19, prevent the state’s healthcare system from being overwhelmed, and allow time for the state to procure necessary medical equipment needed to “prevent needless deaths.” On April 9, the governor extended the stay at home order until April 30, strengthened some of the restrictions, and noted that the original stay at home order was effective, but that COVID-19 was still “aggressive and persistent.”<sup>4</sup>

On March 17, Anderson Economic Group estimated that, as a result of COVID-19 and the stay at home orders in this and other states, an unprecedented number of Americans would lose income due to layoffs, furloughs, pay cuts, and mandatory sick leave. We estimated that 1.5 million Michiganders could lose two or more days worth of income, along with 2.0 million workers in Illinois and 3.3 million workers in New York. These estimates are shown in Table 1 below.<sup>5</sup>

**TABLE 1. Projection of Workers Losing Significant Income due to COVID-19 and Stay-at-home Orders, March-April 2020**

State	Estimated Number of Workers Losing Significant Income
Michigan	1,468,720
Illinois	1,958,468
New York	3,327,870

*Source: Anderson Economic Group estimates, March 19, 2020.*

3. Michigan Governor Executive Order 2020-21, “Temporary requirements to suspend activities that are not necessary to sustain or protect life.” See [https://www.michigan.gov/whitmer/0,9309,7-387-90499\\_90705-522626--,00.html](https://www.michigan.gov/whitmer/0,9309,7-387-90499_90705-522626--,00.html).

As noted above, the first executive order (No. 2020-4, March 10, 2020) declared a state of emergency and noted that the first case had just been identified in the State.

4. Michigan Governor Executive Order 2020-42, “Temporary requirement to suspend activities that are not necessary to sustain or protect life, Rescission of Executive order 2020-21.” See [https://www.michigan.gov/whitmer/0,9309,7-387-90499\\_90705-525182--,00.html](https://www.michigan.gov/whitmer/0,9309,7-387-90499_90705-525182--,00.html).



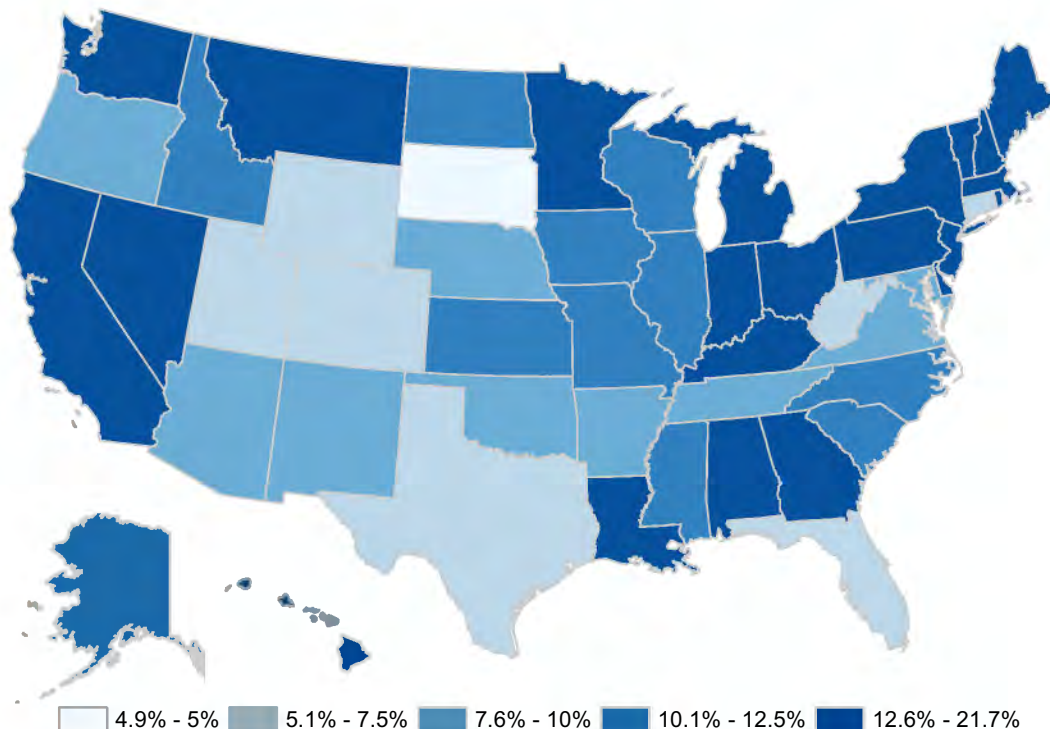
**Immediate and Large Loss of Employment.** Over the past three weeks, the impact of the stay at home order on the state's economy has become apparent. Unfortunately, the most recent data in Michigan and other states indicate that our mid-March estimates were probably conservative.

Since March 28, Michigan has recorded over 815,000 unemployment claims.

**Update.** Since the April 13 memo was released, Michigan recorded another 219,000 initial unemployment claims. After accounting for recent revisions by the Department of Labor, Michigan now has experienced over 910,000 unemployment claims since March 28, and now has over 1 million unemployed workers. The share of Michigan workers now unemployed is 21.2%. As previously noted, Michigan now has depression-level unemployment rates.

Nationwide, Michigan has been one of the hardest hit states, as shown in Figure 1 below.

**FIGURE 1. Three-Week Initial Unemployment Claims as a Percentage of Total Workforce Size as of April 4, 2020**



Source: Anderson Economic Group analysis of base data from the U.S. Department of Labor; U.S. Bureau of Labor Statistics.

5. See the Anderson Economic Group's website for most recent estimates of affected workers.  
<https://www.AndersonEconomicGroup.com/>.

**Impact Throughout Multiple Industries.** While the unemployment claims numbers provide some insight into the current state of the Michigan economy, the impact of COVID-19 extends well beyond just those who were able to file for unemployment in the last three weeks.

Across the Midwest, workers in nearly all industries outside of government are being furloughed, asked to take a pay cut, or are taking mandatory paid time off. The U.S. Department of Labor's three most recent unemployment insurance claims press releases note that, in Michigan, significant increases in unemployment claims are coming from nearly every industry in the state, including food service; manufacturing; construction; retail trade; administrative, support, waste management, and remediation services; health care and social assistance; arts, entertainment and recreation; transportation and warehousing; real estate; professional services; and educational services.<sup>6</sup>

The impact has been especially severe on small business, with many owners struggling to keep their doors open. Although Congress authorized a number of small business lending programs aimed at helping small businesses make it through the epidemic, very few funds have actually been dispersed even though Michigan businesses have been shut down for nearly one month. Small business owners who have applied for relief have encountered a plethora of challenges, including technical glitches, overwhelmed banks, and slow processing times, adding to the already high level of anxiety that small business owners were facing as policymakers ordered all nonessential businesses shut down.

A recent forecast from the University of Michigan Research Seminar in Quantitative Economics predicts that Michigan's unemployment rate in the second quarter of 2020 will average 23 percent—even higher than the forecasted U.S. quarterly peak of 14 percent.<sup>7</sup>

---

6. U.S. Department of Labor Unemployment Insurance Weekly Claims report for April 9, 2020, April 2, 2020, and March 26, 2020. See <https://www.dol.gov/>. The comments on individual states are attributed to the state unemployment agencies.

7. Gabriel Ehrlich, George Fulton, and Saul Hymans, "Update April 9: The U.S. and Michigan Economic Outlook for 2020-2022," University of Michigan Ann Arbor Research Seminar in Quantitative Economics." See: <https://lsa.umich.edu/econ/rsqe/forecasts.html>.

*3. The U.S. Department of Homeland Security's memorandum on "essential" workers during the COVID-19 pandemic explicitly recognizes many workers that are not recognized in Michigan's Executive Order.*

On March 19, the Department Homeland Security (DHS) issued a memorandum on the identification of "essential infrastructure workers" during the COVID-19 response.<sup>8</sup> The following guidance from the memorandum is of particular importance:

- The memorandum states that those who work in critical infrastructure industries "have a special responsibility to maintain [their] normal work schedule."
- The memorandum lists a range of "operations and services that are essential to continued critical infrastructure viability." These include management, call centers, construction, telecommunications, information technology, food, agriculture, transportation, energy, wastewater, manufacturing and logistics, and health care workers.
- The memorandum states that "all organizations should implement business continuity plans," and that in the "modern economy, reliance on technology and just-in-time supply chains means that certain workers must be able to access certain sites, facilities, and assets to continue continuity of functions."

On March 28, DHS released a revised memorandum identifying a larger set of essential industries and workers.<sup>9</sup> The occupations and industries identified in this revised document include workers in some of Michigan's most important economic sectors. For example, Trade, Transportation, and Utilities is Michigan's largest sector by employment, with over 800,000 workers, and the State's Manufacturing sector employs 625,000 workers.<sup>10</sup>

These memos note the following items that are especially germane to key industries in Michigan:

- The DHS memo explicitly notes the importance of transportation, logistics, and automotive repair and maintenance.
- The DHS memo classifies "central office personnel" who "maintain and operate central office, data centers, and other network office facilities" as essential employees.
- The DHS memo also notes the essential nature of "workers necessary for the manufacturing of materials and products needed for medical supply chains, transportation, energy, communications, food and agriculture..." and many other products.
- The March 28 DHS memo expands its definition of essential workers to a variety of industries, including some that are particularly important to Michigan's economy, such as transportation and manufacturing.

**Need to Recognize True Extent of Critical and Essential Workers.** As was apparent at the onset of this emergency, and consistent with the guidance from the U.S. government that

---

8. Christopher Krebs, "Memorandum on Identification of Essential Critical Infrastructure Workers During COVID-19 Response," March 19, 2020.

9. Christopher Krebs, "Advisory Memorandum on Identification of Essential Critical Infrastructure Workers During COVID-19 Response," March 28, 2020.

10. U.S. Bureau of Labor Statistics, "Economy At a Glance: Michigan," <https://www.bls.gov/>.

was cited in Michigan Executive Order 2020-42 and prior orders, it is critical to support “essential” workers in a range of industries. The purpose of the DHS memo was to highlight the importance of these workers and “help State and local officials ensure continuity of functions critical to public health and safety.” However, Michigan Executive Order 2020-42 explicitly states that it does *not* adopt any of the guidance issued by DHS subsequent to the March 19 memorandum, meaning that the Governor’s order excludes those additional industries and workers identified as essential by the DHS as of March 28.<sup>11</sup>

The March 19 DHS memo was issued at a time when stay at home orders were anticipated to be short-term affairs. Since then, stay at home orders across the country have been extended. It is important to recognize that the longer these stay at home orders are in effect, the more workers must be classified as essential in order to maintain supply chains and perform essential services.

The DHS memorandum fully anticipates that changes in conditions over time and differences in the intensity of the outbreak will be taken into account by State and local governments, as well as private sector organizations. Consistent with this explicit guidance, Michigan and other states should take notice of differing infection rates within our state; as well as how changes in the course of the epidemic impact which workers and industries should be classified as essential.

---

11. Paragraph 8 of Michigan’s Executive Order 2020-42 states:

“For purposes of this order, critical infrastructure workers are those workers described by the Director of the U.S. Cybersecurity and Infrastructure Security Agency in his guidance of March 19, 2020 on the COVID-19 response (available [here](#)). This order does *not* adopt any subsequent guidance document released by this same agency.” [Emphasis in original.]

### *About the Authors*

**Patrick L. Anderson.** Mr. Patrick L. Anderson founded Anderson Economic Group in 1996, and serves as the company's principal and CEO. A nationally-recognized expert in business economics and a sought-after speaker, Mr. Anderson has led several major public policy initiatives in his home state. He was awarded both the Michigan Chamber of Commerce's Leadership Michigan award and the University of Michigan's Neal Staebler award for civic leadership. His writing has earned five prestigious national awards from the National Association of Business Economics.

**Brian R Peterson.** Mr. Peterson is a consultant and director of public policy and economic analysis with Anderson Economic Group. His work focuses on economic and fiscal impact modeling, actuarial analysis, and environmental economics. Prior to joining AEG, Mr. Peterson worked as a policy analyst in regional economic development and transportation planning in the Chicago region.

### *Contributors*

The authors wish to recognize the contribution of the following individuals:

- Andrew Miller, Senior Analyst, Anderson Economic Group
- Sarp Mertdogan, Analyst, Supported Intelligence LLC
- Milan Batista, Professor at the University of Ljubljana, Slovenia

The conclusions in this memorandum are, of course, those of the authors.

### *About Anderson Economic Group LLC*

Founded in 1996, Anderson Economic Group is a boutique research and consulting firm, with offices in East Lansing, Michigan, and Chicago, Illinois. The experts at AEG have extensive experience in public policy and economic analysis. Clients of Anderson Economic Group include nearly every major institution in the State of Michigan, including colleges, manufacturers, labor unions, state and local governments, and trade associations. Relevant publications from our firm include:

- Annual State Business Tax Burden Rankings, published since 2007.
- "Economic and Fiscal Impacts of the United Auto Works GM Strike," published in 2019.
- "Economic and Fiscal Impacts of a 1332 Affordable Care Act Waiver in Georgia," published in 2019.
- "Michigan Economic Competitiveness Benchmarking Report," published since 2012.
- "Anderson Economic Group Amazon HQ2 Index," published in 2017.
- "AndCan® Index Estimates of National and State-level Cannabis Demand," updated regularly since 2017.
- Numerous benchmarking, comparison, and economic update analyses.

For more information about Anderson Economic Group, please visit our website at <https://www.AndersonEconomicGroup.com>.

*About Supported Intelligence LLC*

Supported Intelligence, LLC is a decision intelligence and data analytics company founded in 2012. Supported Intelligence pioneered a innovative class of decision intelligence technology, which is covered by three U.S. patents as well as patents pending in the U.S. and other countries.

Consultants at Supported Intelligence assembled the data and created the analytics facility to bring in daily reports from numerous sources, including at the state and county level in the United States; analyze the data using the methods identified in this document; and generate the decision intelligence reports highlighted here.

Please visit <https://www.SupportedIntelligence.com> for more information.

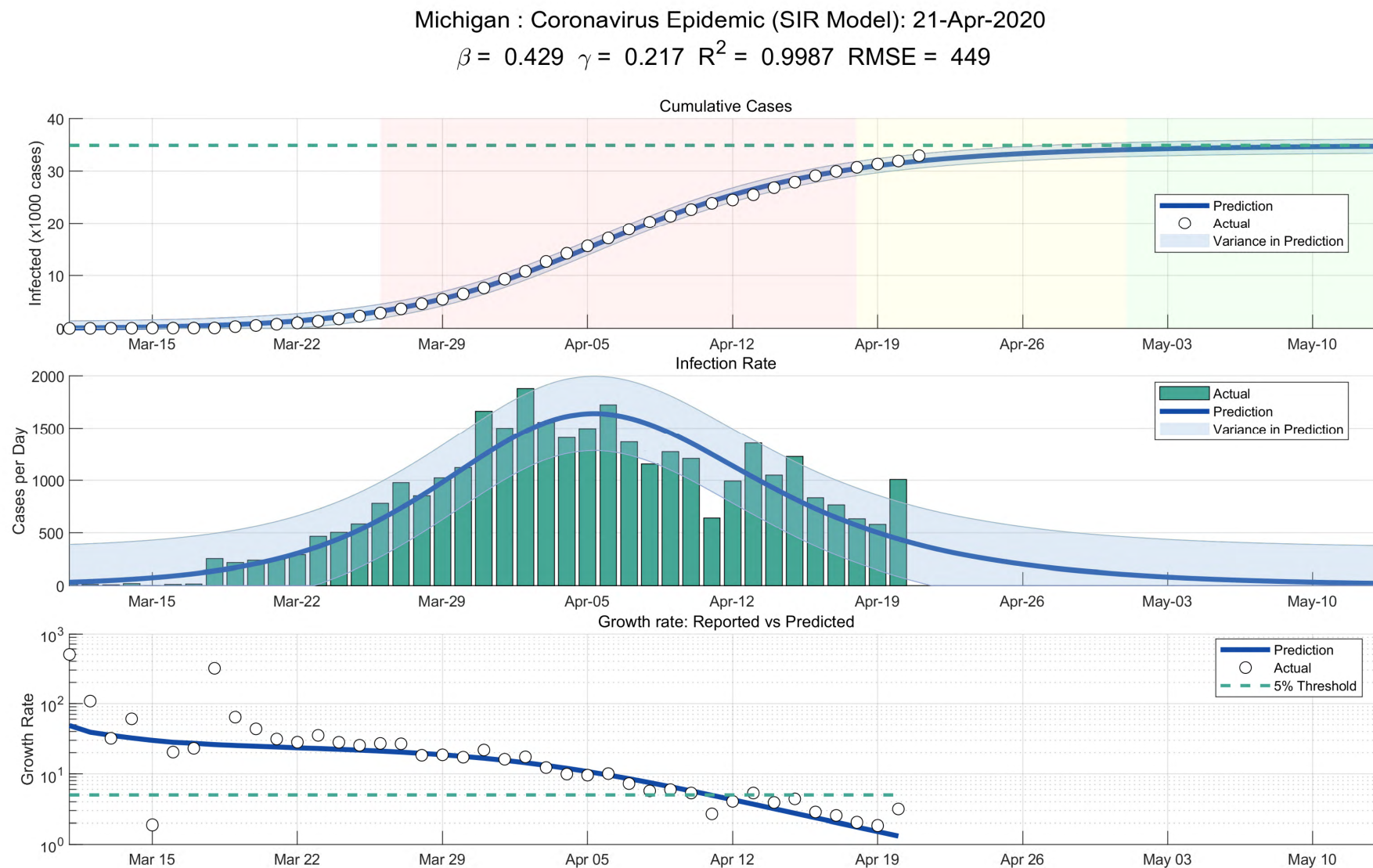
**Appendix A: Additional Figures**

- “COVID-19 Total Infections, Infection Rate, and Growth Rate in Michigan” on page 13
- “COVID-19 Total Infections, Infection Rate, and Growth Rate in Macomb County, Michigan” on page 14
- “COVID-19 Total Infections, Infection Rate, and Growth Rate in Oakland County, Michigan” on page 15
- “COVID-19 Total Infections, Infection Rate, and Growth Rate in Wayne County, Michigan” on page 16
- “COVID-19 Total Infections, Infection Rate, and Growth Rate in the 3-County Detroit Metropolitan Area (Wayne, Oakland, Macomb)” on page 17



*Daniel McCarthy, Shareholder, Butzel Long, Appendix A: Additional Figures*

**FIGURE 1. COVID-19 Total Infections, Infection Rate, and Growth Rate in Michigan**

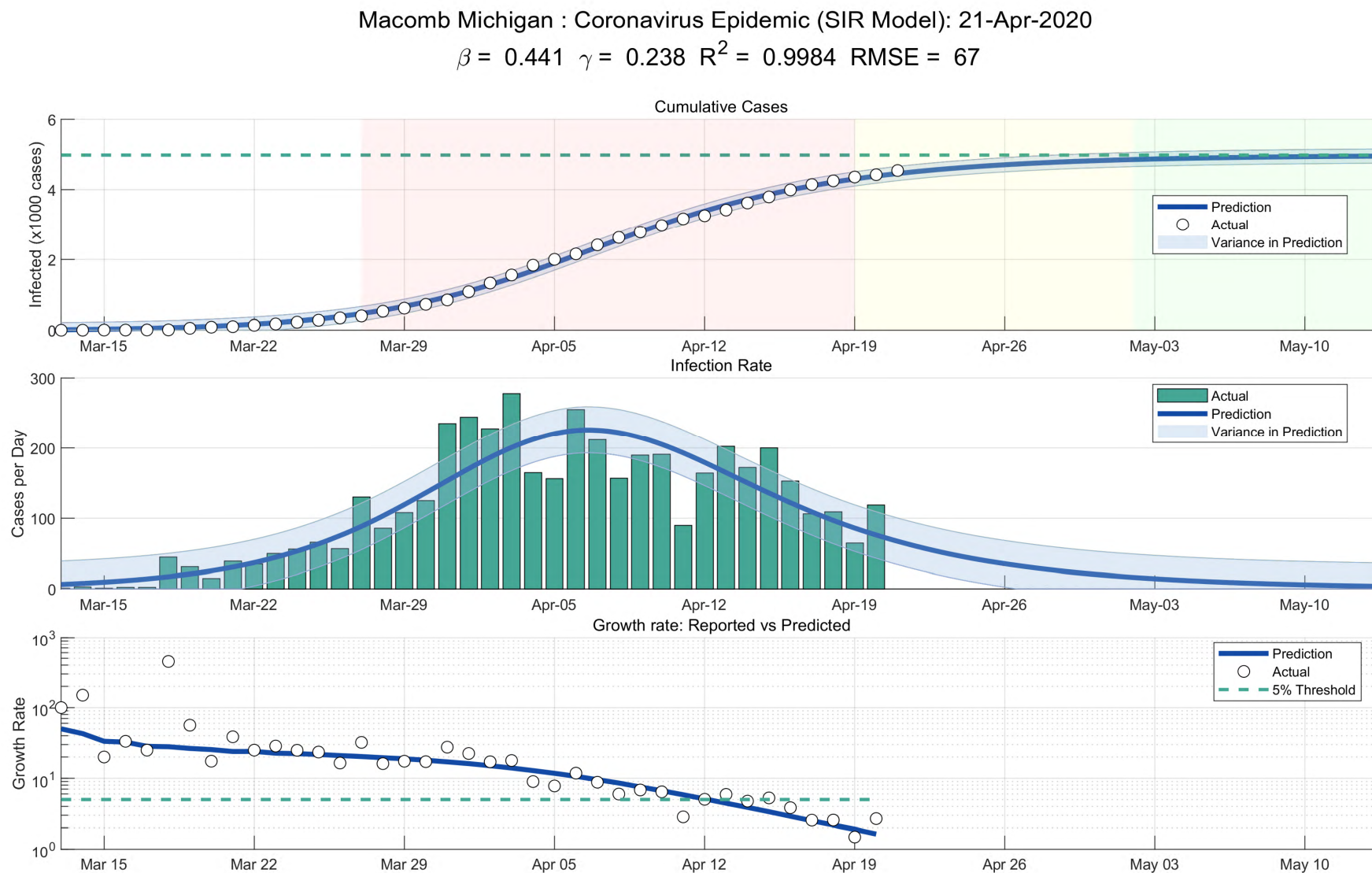


Analysis by Anderson Economic Group LLC using data compiled from state reports and methods described in memorandum.  
 These data will be revised regularly and are subject to reporting and other errors.



*Daniel McCarthy, Shareholder, Butzel Long, Appendix A: Additional Figures*

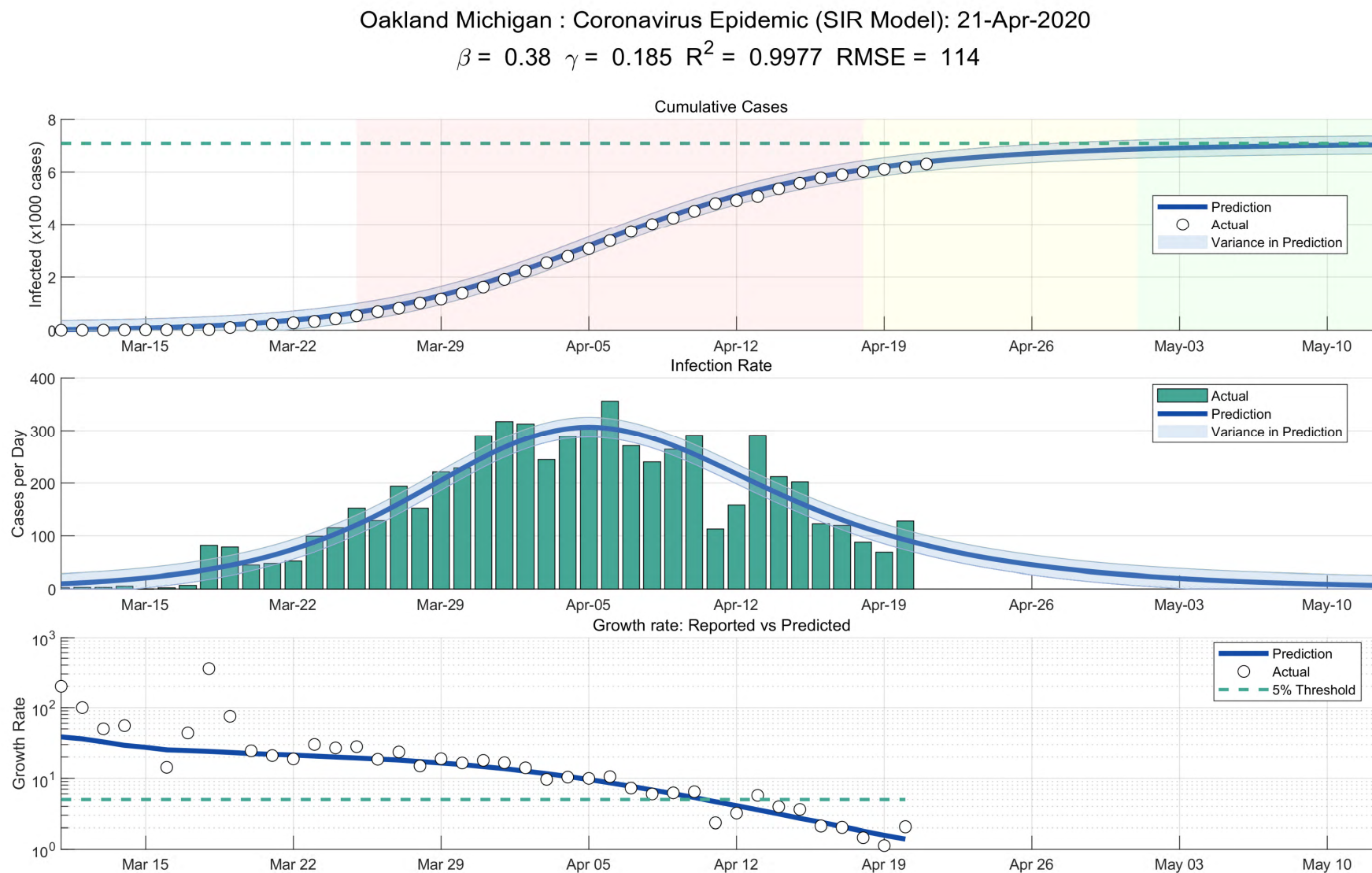
**FIGURE 2. COVID-19 Total Infections, Infection Rate, and Growth Rate in Macomb County, Michigan**



Analysis by Anderson Economic Group LLC using data compiled from state reports and methods described in memorandum.  
 These data will be revised regularly and are subject to reporting and other errors.

*Daniel McCarthy, Shareholder, Butzel Long, Appendix A: Additional Figures*

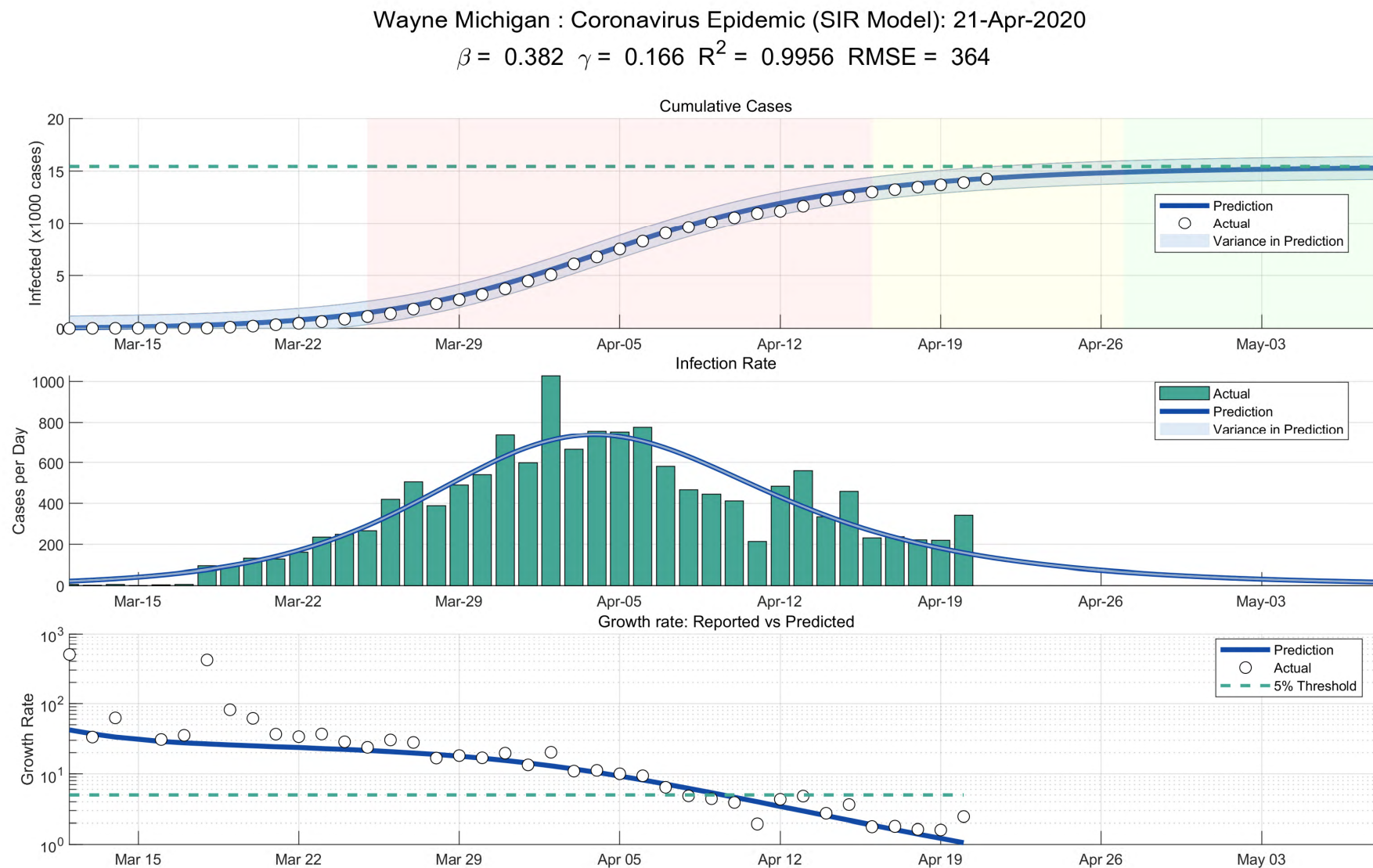
**FIGURE 3. COVID-19 Total Infections, Infection Rate, and Growth Rate in Oakland County, Michigan**



Analysis by Anderson Economic Group LLC using data compiled from state reports and methods described in memorandum.  
 These data will be revised regularly and are subject to reporting and other errors.

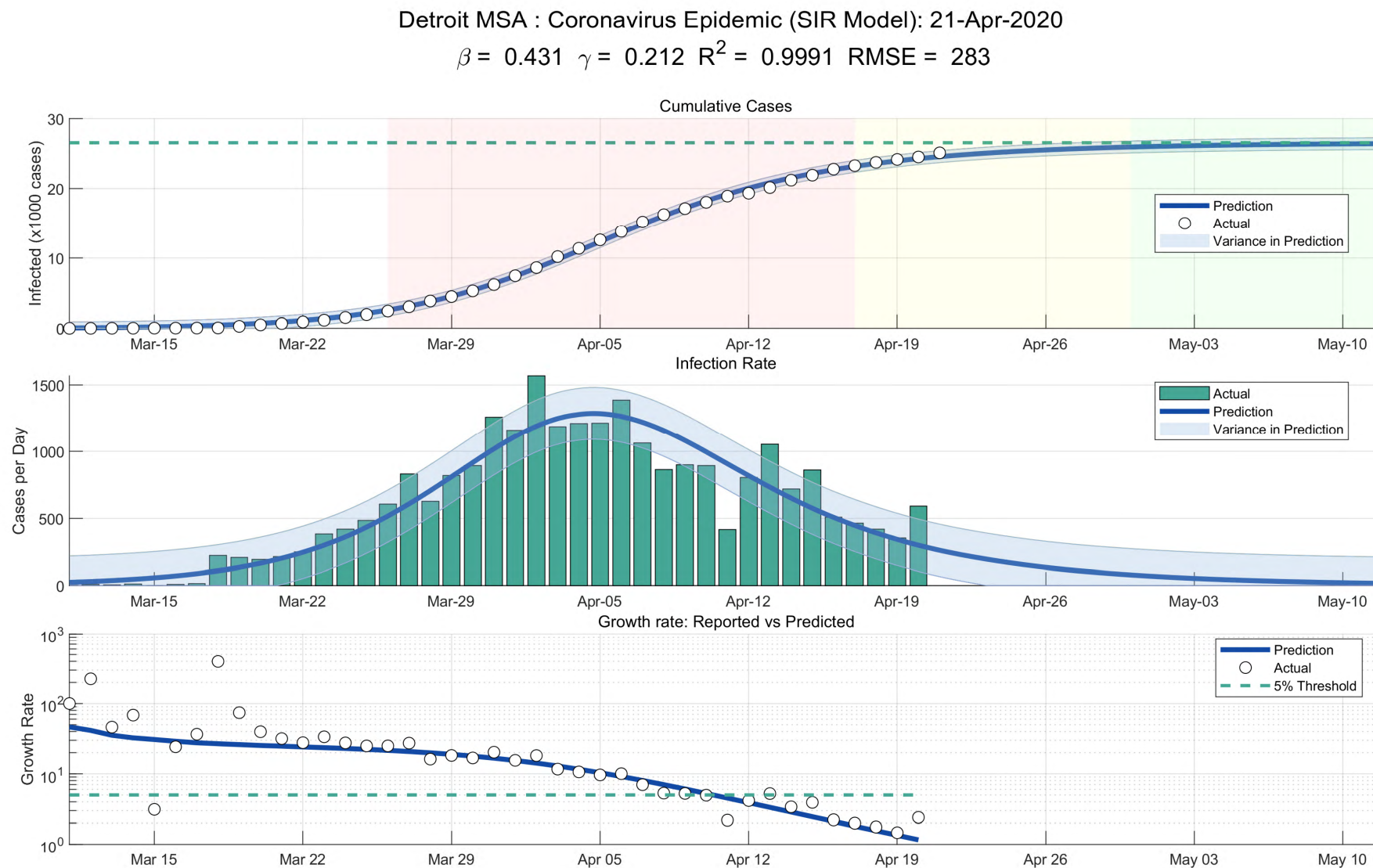
Daniel McCarthy, Shareholder, Butzel Long, Appendix A: Additional Figures

**FIGURE 4. COVID-19 Total Infections, Infection Rate, and Growth Rate in Wayne County, Michigan**



Analysis by Anderson Economic Group LLC using data compiled from state reports and methods described in memorandum.  
 These data will be revised regularly and are subject to reporting and other errors.



**FIGURE 5. COVID-19 Total Infections, Infection Rate, and Growth Rate in the 3-County Detroit Metropolitan Area (Wayne, Oakland, Macomb)**

Analysis by Anderson Economic Group LLC using data compiled from state reports and methods described in memorandum.  
 These data will be revised regularly and are subject to reporting and other errors.

## Appendix B: Data, Methodology, and Limitations

April 22, 2020

---

### Terms of Use

*All users of this information must acknowledge the purpose, limitations, and lack of warranty for this analysis and the related data, and accept the requirement to disclose these terms to any person to whom they provide this information:*

**1. Purpose.** Our purpose is to provide information useful to others who may face a decision regarding their activities in the coming months. The purpose is not to diagnose or treat any disease; provide health advice; provide legal advice; or even to make unconditional forecasts of the number of cases or patients.

**2. Known Limitations and Errors in Data.** This analysis relies upon data that have known errors, omissions, and limitations. These include:

- The diagnosis and classification of those afflicted with Covid-19 has been inconsistent across jurisdictions, and across time.
- Daily case counts are subject to reporting and compilation errors.
- The proper location for a case is often unclear, particularly with travelers and people who live near borders.
- In some situations, governments have retroactively re-classified cases.
- In some areas of the world, governments have censored, suppressed, or otherwise failed to report accurately the relevant data.
- Given the volume of data and the frequency with which it is revised, some inadvertent errors are certain to arise.
- The underlying data, and therefore the estimated parameters and the estimated and projected paths, will change over time.

**3. Known Limitations of Epidemiological Models.** Every model is an approximation of reality. Like every other model, the one used here will never completely represent the underlying behavior, and will often distort some portion of it.

**4. No Warranty on Information.** There is NO WARRANTY provided for any of this information, including no warranty of merchantability or fitness.

**5. Requirement to Disclose these Terms.** If you provide this information to any other person, you must disclose to them these terms and provide a copy of this statement.

*If you do not acknowledge and accept these terms, then you should not read, share, or rely upon this information.*

---

### *Data*

**Data.** The state-level data we used in this analysis were collected by the *New York Times* organization from state and local sources. We selected this data source after reviewing multiple alternatives, and recognizing the benefits of the consistency and data checking this organization brought to the effort.

- The NYT website for these data is: <https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html>.
- The NYT data repository on GitHub is: <https://github.com/nytimes/covid-19-data>.

**Discrepancies in Data Sources; Revisions over Time.** There are discrepancies among sources for data, even for the same areas. These discrepancies arise for a number of reasons, including lapses in reporting; differences in classification; and ambiguities regarding the location of the persons. Furthermore, government entities routinely revise these data, and in many cases have retroactively reclassified patients. For these reasons, users of these data should expect that analyses prepared on different dates will often show different historical data, as well as different projected data.

### *Comparison and Alternative Sources of Data and Analysis*

There are multiple other sources of data, as well as alternative sources of analysis. These have widely-varying quality, and some are sponsored by organizations that advocate for specific policies as well as report data.

We urge readers of our analyses to compare the information they have obtained from us with information from other sources. Here are an example of comparison sources of information, for the State of Michigan in the United States:

- <https://covid19.healthdata.org/united-states-of-america/michigan>
- <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html#epi-curve>
- <https://www.uofmhealth.org/covid-19-update>
- <https://www.michigan.gov/coronavirus>

### *Model*

We used a SIR model to forecast the impacts of COVID-19 on states across the U.S. We chose this model after conducting an extensive review of available epidemiological models.

Our review confirmed that the standard SIR model, when consistent daily data are available, often provides a reliable and understandable assessment. This judgement is based partially on the decades of experience across a wide number of countries and epidemics.

It is also based on our assessment of how this model and the available data had performed in assessing the COVID-19 outbreak in Italy, Germany, Lombardy (a province in Italy), the United States, New York City, Ohio, Michigan, Illinois, the Detroit metropolitan area and counties, and other areas.

The SIR model is a “compartmentalized” model, meaning that it presumes the population can be classified as if they are in different “compartments,” and can move among them when they become infected with a disease and when they recover or perish from it. The acronym comes from “Susceptible-Infected-Removed.”

We use the data from various states and a specific implementation of the SIR model to fit the data, and estimate parameters such as  $R_0$  (discussed further below). We use these parameters to estimate a future curve, which represents the prediction based on past data and the assumptions of the model. As noted below, our implementation of the SIR model provides for iterative re-estimating of  $R_0$  values and estimates of the epidemic size and susceptible population.

**History of the Use of the SIR Model.** The SIR model has been recognized and used as a basis for the diffusion of ideas and other transmissions, as well as for epidemiological studies, since at least 1964.<sup>1</sup> The model was originally published in 1927, in an article that helped establish the basis for modern studies of epidemiology.<sup>2</sup>

It is also widely described in academic and professional settings, including having many easily-accessible resources, such as an online teaching version provided by the Mathematics Association of America.<sup>3</sup>

---

1. An influential article in this development was Goffman W, Newill V. “Generalization of epidemic theory.” *Nature*. 1964;204(4955):225–228. doi: 10.1038/204225a0. This article outlined the now standard nomenclature of “susceptible-infected-removed” subgroups of a population, and stated the standard assumptions such as a homogenous population and regular “mixing” of it. (The “R” portion is now commonly called “recovered.”)

The intellectual roots of this model date back to the early 1900s, in which the first “compartmented” mathematical models, separating population cohorts, were developed. See, e.g. Sooknanan, J., Comissiong, D.M.G. “When behaviour turns contagious: the use of deterministic epidemiological models in modeling social contagion phenomena.” *Int. J. Dynam. Control* 5, 1046–1050 (2017). <https://doi.org/10.1007/s40435-016-0271-9>.

2. The 1927 article by W.O. Kermack and A.G. McKendrick, “A Contribution to the Mathematical Theory of Epidemics,” *Proceedings of the Royal Society A*, vol. 115 no. 772, outlined the SIR model, is often credited as the first to identify the underlying mathematics of the path of an epidemic. In this 1927 article, they plot the deaths from an epidemic in “the island of Bombay” from December 1905 to July 1906. It followed a bell-shaped curve of the shape shown in SIR and other models a century later.

3. The MAA teaching version, authored by David Smith and Lang Moore, is available at: <https://www.maa.org/press/periodicals/loci/joma/the-sir-model-for-spread-of-disease-the-differential-equation-model>. An overview of this and many variants is presented in H.W. Hethcote, “The Mathematics of Infectious Diseases,” *SIAM Review* 42 (4) (2000).

**Alternatives and Limitations of the SIR Model.** Every model is an approximation to reality, and all have limitations. In the case of the SIR model, known limitations include:

- The model only focuses on one wave of an epidemic.
- The model assumes that “removed” individuals attain immunity from the disease. For some novel diseases, this has not been demonstrated.
- The model relies on certain assumptions (such as homogenous population and consistent mixing of the population) that are rarely accurate.

Furthermore, all models rely upon data—and the available data are never perfect in epidemiological studies.

There are alternatives to this model, many of which are variations on it. As with alternative sources of data, readers should consider whether an alternative model should be also be considered.

**Inclusion of Diagnostic Information.** Our implementation of the standard SIR model includes a number of features that allow for inspection of the results, and for a better understanding of the reliability of the model’s estimated parameters. These include:

- Our complete results allow for the inspection of prediction errors, allowing readers to compare our historical estimates against historical data.
- Using innovations developed by researchers cited below, we also iteratively re-estimate the model over time, capturing the evolution of model parameters as more data become available.
- We fully disclose the model data and parameters, allowing the results to be replicated by other researchers.
- We explicitly note the known limitations of the model and data.

**Elements of the SIR Model.** The typical curve generated by an SIR model that estimates the number of people infected per day is an “S” shaped curve in which the number of new infections per day begins slowly, then grow exponentially larger before reaching a “peak” point. Following the peak, number of cases per day decrease and slowly reach zero, or the neutral level.

**Parameters.** A key element of the model is known as “R0,” (sometimes called “R nought”) or the reproduction rate of the infection. In the SIR model, if R0 equals 2, that means for each time period of the outbreak, 1 infected person is expected to infect 2 others.

In actual epidemics, we expect the reproduction rate to be a dynamic value that changes over time. In its initial stages, the R0 value can grow quickly. As the epidemic slows, the R0 value declines and ultimately decreases to near zero.

- See “Exhibit: Key Variables in SIR Model ” on page 22.



---

*Exhibit: Key Variables in SIR Model*

Reproduction Rate

- $R$  = Reproduction number, number of people infected by each infected person
- $R_0$  = Basic reproduction number (“R nought”) calculated by Beta/Gamma (with scale factors)
- Beta = Average contact frequency
- Gamma = Average removal frequency

Population and Epidemic Size

- $N$  = Population size (approximate initial size of susceptible population)
- $C_{\text{end}}$  = Epidemic size (total recovered population)
- $S_{\text{end}}$  = Final number of susceptible individuals left

Implied Timing

- Day = epidemic day number
- date0 = start day

Errors, Uncertainty, and Model Fit

- RMSE = Root mean square error
- AdjR2 -- adjusted R2 (“R squared”) statistic

Data

- $C$  = reported case data
  - $C_e$  = projected case data, given the model, data, and parameters
  - Diff = difference between reported and projected cases
-

*Known Limitations and Common Assumptions in Epidemiological Models*

There are known limitations of this and other epidemiological models. We state the most important ones here:

1. This and other epidemiological models presume that, after some time, the population acquires “herd immunity” that limits further spread of the same strain of the disease.
2. There is a likelihood of subsequent waves of the same disease. These are typically of lesser magnitude. For example, numerous variations of influenza cause illness and deaths each year, and are related to similar prior outbreaks. In general, only one wave is represented by this type of model.
3. “Comorbidity” causes difficulty in assigning properly both cases and the number recovering and perishing from a disease. In particular, the number of deaths due to influenza each year is very large, and this cannot always be distinguished (especially in the early stages of the epidemic) from the specific disease being studied.
4. In general, these models assume a certain amount of “mixing” of the population. The mathematical treatment of this interaction is never accurate in small settings or specific short time periods, and usable models require significant data and enough time to allow for patterns across entire societies to develop. The amount of mixing also varies by age, and varies across social groups and among areas within a country.
5. In addition, all models rely upon data that are collected with reporting and measurement errors. In this epidemic, differences in testing, and in some countries pressure to mis-report or fail to report results, have clearly caused some difficulties in obtaining accurate data.
6. All statistical models involve uncertainty, and all projections resulting from these models carry with them this uncertainty.
7. This is a new disease. It will react in unpredictable ways with different populations.
8. The population itself changes its behavior over time. This is perhaps the largest unknown at the early stage of a severe epidemic in which a strong change in behavior, and new forms of treatment, occur.

Because of these inherent limitations, we present the model and data along with the available diagnostic and related information, to allow an informed decision. We urge policymakers to consider this information, and additional information, before making their decisions.

### *Implementation of Model*

Supported Intelligence adapted an SIR model authored by Milan Batista, Professor at the University of Ljubljana in Slovenia. Mr. Batista and his colleagues describe this model, provide a public file exchange for the code, and apply it to the Coronavirus outbreak in the following publication and websites:

- Batista, Milan. (2020). *Estimation of the final size of the coronavirus epidemic by the SIR model*. Monograph found at ResearchGate.
- A file exchange version is maintained for review by other researchers; it is here: <https://www.mathworks.com/matlabcentral/fileexchange/74658-fitviruscovid19>.
- Related work using this same model for other countries and with different data sources is available here: <https://www.fpp.uni-lj.si/en/research/research-laboratories-and-the-programme-team/research-programme-team/>  
As of the date of this memo, a comparison analysis of the United States (using an April 10 dataset, from a different source than we use in our analysis) is presented. It is consistent with the results we obtain using our data for the United States.

The version used by Supported Intelligence is modified to include the following improvements for the purposes of our work:

1. Supported Intelligence built a data assembly routine that gathers live data on cases reported per day from the *New York Times*.
2. We provide additional diagnostic information, and have created different data visualizations for the purpose of presenting the results.
3. We clarify a number of terms, and adjust the presentation to date formats common in the United States, to avoid ambiguity and misunderstanding.

## CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. (SEE INSTRUCTIONS ON NEXT PAGE OF THIS FORM.)

**I. (a) PLAINTIFFS**

Paul Mitchell, III

(b) County of Residence of First Listed Plaintiff Lapeer  
(EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorneys (Firm Name, Address, and Telephone Number)  
Butzel Long, P.C.  
150 West Jefferson Avenue, Suite 100  
Detroit, MI 48226 (313) 225-7000

**DEFENDANTS**Gretchen E. Whitmer and  
Robert Gordon

County of Residence of First Listed Defendant Ingham  
(IN U.S. PLAINTIFF CASES ONLY)

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF  
THE TRACT OF LAND INVOLVED.

Attorneys (If Known)

**II. BASIS OF JURISDICTION** (Place an "X" in One Box Only)

- ☐ 1 U.S. Government Plaintiff
- ☒ 3 Federal Question  
(U.S. Government Not a Party)
- ☐ 2 U.S. Government Defendant
- ☐ 4 Diversity  
(Indicate Citizenship of Parties in Item III)

**III. CITIZENSHIP OF PRINCIPAL PARTIES** (Place an "X" in One Box for Plaintiff and One Box for Defendant)

- |   | PTF                        | DEF                        |   | PTF                        | DEF                        |
|---|----------------------------|----------------------------|---|----------------------------|----------------------------|
| Citizen of This State                   | <input type="checkbox"/> 1 | <input type="checkbox"/> 1 | Incorporated or Principal Place of Business In This State     | <input type="checkbox"/> 4 | <input type="checkbox"/> 4 |
| Citizen of Another State                | <input type="checkbox"/> 2 | <input type="checkbox"/> 2 | Incorporated and Principal Place of Business In Another State | <input type="checkbox"/> 5 | <input type="checkbox"/> 5 |
| Citizen or Subject of a Foreign Country | <input type="checkbox"/> 3 | <input type="checkbox"/> 3 | Foreign Nation  | <input type="checkbox"/> 6 | <input type="checkbox"/> 6 |

**IV. NATURE OF SUIT** (Place an "X" in One Box Only)Click here for: [Nature of Suit Code Descriptions.](#)

CONTRACT	TORTS	FORFEITURE/PENALTY	BANKRUPTCY	OTHER STATUTES
<input type="checkbox"/> 110 Insurance <input type="checkbox"/> 120 Marine <input type="checkbox"/> 130 Miller Act <input type="checkbox"/> 140 Negotiable Instrument <input type="checkbox"/> 150 Recovery of Overpayment & Enforcement of Judgment <input type="checkbox"/> 151 Medicare Act <input type="checkbox"/> 152 Recovery of Defaulted Student Loans (Excludes Veterans) <input type="checkbox"/> 153 Recovery of Overpayment of Veteran's Benefits <input type="checkbox"/> 160 Stockholders' Suits <input type="checkbox"/> 190 Other Contract <input type="checkbox"/> 195 Contract Product Liability <input type="checkbox"/> 196 Franchise	<b>PERSONAL INJURY</b> <input type="checkbox"/> 310 Airplane <input type="checkbox"/> 315 Airplane Product Liability <input type="checkbox"/> 320 Assault, Libel & Slander <input type="checkbox"/> 330 Federal Employers' Liability <input type="checkbox"/> 340 Marine <input type="checkbox"/> 345 Marine Product Liability <input type="checkbox"/> 350 Motor Vehicle <input type="checkbox"/> 355 Motor Vehicle Product Liability <input type="checkbox"/> 360 Other Personal Injury <input type="checkbox"/> 362 Personal Injury - Medical Malpractice <b>PERSONAL INJURY</b> <input type="checkbox"/> 365 Personal Injury - Product Liability <input type="checkbox"/> 367 Health Care/Pharmaceutical Personal Injury Product Liability <input type="checkbox"/> 368 Asbestos Personal Injury Product Liability <b>PERSONAL PROPERTY</b> <input type="checkbox"/> 370 Other Fraud <input type="checkbox"/> 371 Truth in Lending <input type="checkbox"/> 380 Other Personal Property Damage <input type="checkbox"/> 385 Property Damage Product Liability	<input type="checkbox"/> 625 Drug Related Seizure of Property 21 USC 881 <input type="checkbox"/> 690 Other <b>LABOR</b> <input type="checkbox"/> 710 Fair Labor Standards Act <input type="checkbox"/> 720 Labor/Management Relations <input type="checkbox"/> 740 Railway Labor Act <input type="checkbox"/> 751 Family and Medical Leave Act <input type="checkbox"/> 790 Other Labor Litigation <input type="checkbox"/> 791 Employee Retirement Income Security Act <b>IMMIGRATION</b> <input type="checkbox"/> 462 Naturalization Application <input type="checkbox"/> 465 Other Immigration Actions	<input type="checkbox"/> 422 Appeal 28 USC 158 <input type="checkbox"/> 423 Withdrawal 28 USC 157 <b>PROPERTY RIGHTS</b> <input type="checkbox"/> 820 Copyrights <input type="checkbox"/> 830 Patent <input type="checkbox"/> 835 Patent - Abbreviated New Drug Application <input type="checkbox"/> 840 Trademark <b>SOCIAL SECURITY</b> <input type="checkbox"/> 861 HIA (1395ff) <input type="checkbox"/> 862 Black Lung (923) <input type="checkbox"/> 863 DIWC/DIWW (405(g)) <input type="checkbox"/> 864 SSID Title XVI <input type="checkbox"/> 865 RSI (405(g)) <b>FEDERAL TAX SUITS</b> <input type="checkbox"/> 870 Taxes (U.S. Plaintiff or Defendant) <input type="checkbox"/> 871 IRS—Third Party 26 USC 7609	<input type="checkbox"/> 375 False Claims Act <input type="checkbox"/> 376 Qui Tam (31 USC 3729(a)) <input type="checkbox"/> 400 State Reapportionment <input type="checkbox"/> 410 Antitrust <input type="checkbox"/> 430 Banks and Banking <input type="checkbox"/> 450 Commerce <input type="checkbox"/> 460 Deportation <input type="checkbox"/> 470 Racketeer Influenced and Corrupt Organizations <input type="checkbox"/> 480 Consumer Credit (15 USC 1681 or 1692) <input type="checkbox"/> 485 Telephone Consumer Protection Act <input type="checkbox"/> 490 Cable/Sat TV <input type="checkbox"/> 850 Securities/Commodities/Exchange <input type="checkbox"/> 890 Other Statutory Actions <input type="checkbox"/> 891 Agricultural Acts <input type="checkbox"/> 893 Environmental Matters <input type="checkbox"/> 895 Freedom of Information Act <input type="checkbox"/> 896 Arbitration <input type="checkbox"/> 899 Administrative Procedure Act/Review or Appeal of Agency Decision <input type="checkbox"/> 950 Constitutionality of State Statutes
<b>REAL PROPERTY</b> <input type="checkbox"/> 210 Land Condemnation <input type="checkbox"/> 220 Foreclosure <input type="checkbox"/> 230 Rent Lease & Ejectment <input type="checkbox"/> 240 Torts to Land <input type="checkbox"/> 245 Tort Product Liability <input type="checkbox"/> 290 All Other Real Property	<b>CIVIL RIGHTS</b> <input checked="" type="checkbox"/> 440 Other Civil Rights <input type="checkbox"/> 441 Voting <input type="checkbox"/> 442 Employment <input type="checkbox"/> 443 Housing/Accommodations <input type="checkbox"/> 445 Amer. w/Disabilities - Employment <input type="checkbox"/> 446 Amer. w/Disabilities - Other <input type="checkbox"/> 448 Education <b>PRISONER PETITIONS</b> <b>Habeas Corpus:</b> <input type="checkbox"/> 463 Alien Detainee <input type="checkbox"/> 510 Motions to Vacate Sentence <input type="checkbox"/> 530 General <input type="checkbox"/> 535 Death Penalty <b>Other:</b> <input type="checkbox"/> 540 Mandamus & Other <input type="checkbox"/> 550 Civil Rights <input type="checkbox"/> 555 Prison Condition <input type="checkbox"/> 560 Civil Detainee - Conditions of Confinement			

**V. ORIGIN** (Place an "X" in One Box Only)

- ☒ 1 Original Proceeding    ☐ 2 Removed from State Court    ☐ 3 Remanded from Appellate Court    ☐ 4 Reinstated or Reopened    ☐ 5 Transferred from Another District (specify)    ☐ 6 Multidistrict Litigation - Transfer    ☐ 8 Multidistrict Litigation - Direct File

**VI. CAUSE OF ACTION**

Cite the U.S. Civil Statute under which you are filing (Do not cite jurisdictional statutes unless diversity):  
Article III of the U.S. Constitution, 28 U.S.C. 1331; 28 U.S.C. 2201-2202; 28 U.S.C. 1651

Brief description of cause:

Action to challenge Governor Whitmer's Executive Orders 2020-43 through 2020-69

**VII. REQUESTED IN COMPLAINT:**

☐ CHECK IF THIS IS A CLASS ACTION UNDER RULE 23, F.R.Cv.P.    DEMAND \$

CHECK YES only if demanded in complaint:

JURY DEMAND: ☒ Yes    ☐ No**VIII. RELATED CASE(S) IF ANY**

(See instructions):

JUDGE Paul Maloney

DOCKET NUMBER A.O. No. 20-CA-033

DATE

05/04/2020

SIGNATURE OF ATTORNEY OF RECORD

Daniel J. McCarthy (P59457)

FOR OFFICE USE ONLY

RECEIPT #    AMOUNT    APPLYING IFP    JUDGE    MAG. JUDGE

**INSTRUCTIONS FOR ATTORNEYS COMPLETING CIVIL COVER SHEET FORM JS 44**

## Authority For Civil Cover Sheet

The JS 44 civil cover sheet and the information contained herein neither replaces nor supplements the filings and service of pleading or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. Consequently, a civil cover sheet is submitted to the Clerk of Court for each civil complaint filed. The attorney filing a case should complete the form as follows:

- I.(a) Plaintiffs-Defendants.** Enter names (last, first, middle initial) of plaintiff and defendant. If the plaintiff or defendant is a government agency, use only the full name or standard abbreviations. If the plaintiff or defendant is an official within a government agency, identify first the agency and then the official, giving both name and title.
  - (b) County of Residence.** For each civil case filed, except U.S. plaintiff cases, enter the name of the county where the first listed plaintiff resides at the time of filing. In U.S. plaintiff cases, enter the name of the county in which the first listed defendant resides at the time of filing. (NOTE: In land condemnation cases, the county of residence of the "defendant" is the location of the tract of land involved.)
  - (c) Attorneys.** Enter the firm name, address, telephone number, and attorney of record. If there are several attorneys, list them on an attachment, noting in this section "(see attachment)".
- II. Jurisdiction.** The basis of jurisdiction is set forth under Rule 8(a), F.R.Cv.P., which requires that jurisdictions be shown in pleadings. Place an "X" in one of the boxes. If there is more than one basis of jurisdiction, precedence is given in the order shown below.
- United States plaintiff. (1) Jurisdiction based on 28 U.S.C. 1345 and 1348. Suits by agencies and officers of the United States are included here.
- United States defendant. (2) When the plaintiff is suing the United States, its officers or agencies, place an "X" in this box.
- Federal question. (3) This refers to suits under 28 U.S.C. 1331, where jurisdiction arises under the Constitution of the United States, an amendment to the Constitution, an act of Congress or a treaty of the United States. In cases where the U.S. is a party, the U.S. plaintiff or defendant code takes precedence, and box 1 or 2 should be marked.
- Diversity of citizenship. (4) This refers to suits under 28 U.S.C. 1332, where parties are citizens of different states. When Box 4 is checked, the citizenship of the different parties must be checked. (See Section III below; **NOTE: federal question actions take precedence over diversity cases.**)
- III. Residence (citizenship) of Principal Parties.** This section of the JS 44 is to be completed if diversity of citizenship was indicated above. Mark this section for each principal party.
- IV. Nature of Suit.** Place an "X" in the appropriate box. If there are multiple nature of suit codes associated with the case, pick the nature of suit code that is most applicable. Click here for: [Nature of Suit Code Descriptions](#).
- V. Origin.** Place an "X" in one of the seven boxes.
- Original Proceedings. (1) Cases which originate in the United States district courts.
- Removed from State Court. (2) Proceedings initiated in state courts may be removed to the district courts under Title 28 U.S.C., Section 1441.
- Remanded from Appellate Court. (3) Check this box for cases remanded to the district court for further action. Use the date of remand as the filing date.
- Reinstated or Reopened. (4) Check this box for cases reinstated or reopened in the district court. Use the reopening date as the filing date.
- Transferred from Another District. (5) For cases transferred under Title 28 U.S.C. Section 1404(a). Do not use this for within district transfers or multidistrict litigation transfers.
- Multidistrict Litigation – Transfer. (6) Check this box when a multidistrict case is transferred into the district under authority of Title 28 U.S.C. Section 1407.
- Multidistrict Litigation – Direct File. (8) Check this box when a multidistrict case is filed in the same district as the Master MDL docket.
- PLEASE NOTE THAT THERE IS NOT AN ORIGIN CODE 7.** Origin Code 7 was used for historical records and is no longer relevant due to changes in statute.
- VI. Cause of Action.** Report the civil statute directly related to the cause of action and give a brief description of the cause. **Do not cite jurisdictional statutes unless diversity.** Example: U.S. Civil Statute: 47 USC 553 Brief Description: Unauthorized reception of cable service
- VII. Requested in Complaint.** Class Action. Place an "X" in this box if you are filing a class action under Rule 23, F.R.Cv.P.
- Demand. In this space enter the actual dollar amount being demanded or indicate other demand, such as a preliminary injunction.
- Jury Demand. Check the appropriate box to indicate whether or not a jury is being demanded.
- VIII. Related Cases.** This section of the JS 44 is used to reference related pending cases, if any. If there are related pending cases, insert the docket numbers and the corresponding judge names for such cases.

**Date and Attorney Signature.** Date and sign the civil cover sheet.