



**Center for  
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On the  
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## **Reopening Wisconsin: Current Economic & Health Indexes**

**Center for Research on the Wisconsin Economy, UW-Madison**

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### **Executive Summary**

- In our report, “Reopening Wisconsin” we provide both economic and health metrics to consider when moving toward relaxing social distancing guidelines. This brief updates the current economic and health indexes.
- We estimate that the COVID-19 pandemic in Wisconsin is costing roughly \$1.5 billion per week in lost economic activity. We estimate a 26.6% decline in output and a 16.2 percentage point increase in unemployment statewide through May 5, 2020.
- On average the counties which were in the worst economic condition prior to the pandemic have had the largest declines in economic activity.
- Menominee County, the poorest county in the state, has seen 27% of its labor force file for unemployment benefits since March 15. Through May 6, there has been one confirmed case of COVID-19 in Menominee County.
- We also analyze health factors at a regional level. At least two of the state’s Health Emergency Readiness Coalition (HERC) regions still face high health risks.
- At least three HERC regions have had very low rates of infections and positive tests for COVID-19, and may be close to satisfying the current health guidelines.
- We suggest that as policymakers consider reopening the economy, they move toward a phased-in regional relaxation of social distancing guidelines.

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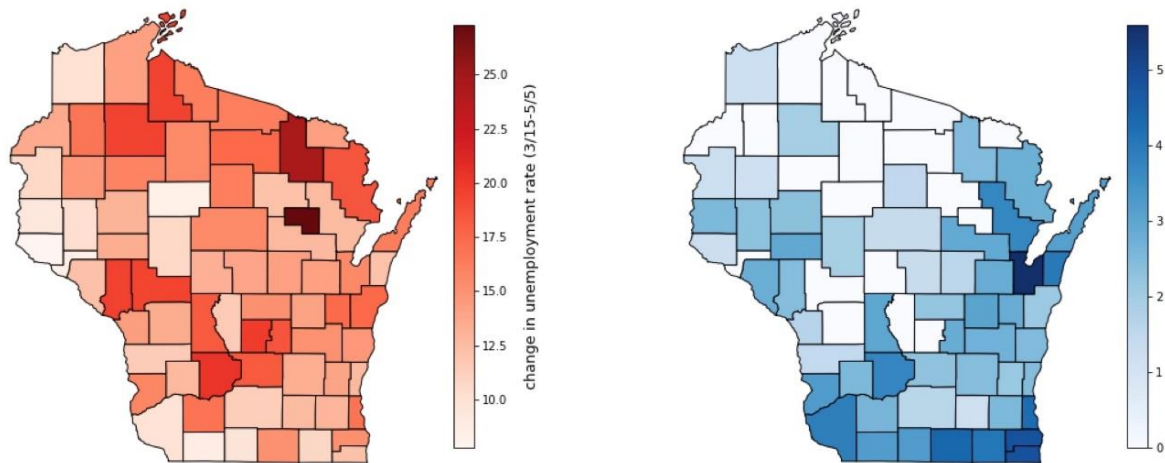


Figure 1: Left panel: Estimated increase in unemployment rate by county (3/15/20-5/5/20, percent). Right panel: cumulative confirmed COVID-19 cases by county over last 7 days (4/30/20-5/6/20, per 100,000 residents, log scale).

### Overview

This brief updates the current economic and health indexes as described in the full report, which capture how different counties and regions have been affected both by the COVID-19 pandemic. While the indexes capture a number of different measures, a directly interpretable relationship is shown in Figure 1 above. In the left panel, we plot the estimated increase in the unemployment rate in each county since March 15, which was when the pandemic effects first started being felt in the state. The largest increase came in Menominee County, where 27% of the labor force has filed for unemployment benefits since March 15. Menominee is small, so this is not a large number in absolute terms, but still most of the northern parts of the state have seen an increase in unemployment rates of 20 percentage points or more.

On the right panel we plot the increase in the number of confirmed COVID-19 cases per 100,000 residents in each county over the last week, from April 30 through May 6. To make the map easier to interpret, we plot the cases on a log scale (specifically,  $\log(1+\text{cases})$  to deal with zeros), thus darker areas represent exponentially more cases. For example, Brown County, the center of the recent outbreak, has seen an increase of roughly 266 cases per 100,000 residents over the past week, or 2.4 on this log scale. By contrast, Green County has seen an increase of 24 cases per 100,000 residents, which is 1.4 on this log scale. We see that, even with the increased testing recently, much of the north and western parts of the state have seen relatively little growth in COVID-19 cases over the past week, with many counties not seeing any cases at all.

## 1. Current Economic Index

As described in the full report, our current economic index captures, to the extent possible, how the county has been affected economically by the COVID-19 crisis. We focus on two indicators: a measure of labor market activity, from initial unemployment claims at the county level, and an estimate of the decline in total economic activity from SafeGraph foot traffic data.<sup>1</sup> We weight these factors so that they are interpretable as a percentage reduction in output.

Our first measure is the share of the labor force by county that has filed an initial unemployment claim from 3/15/20-4/25/20, the most recent data by county. State-level data released from 4/26/20-5/5/20 show that unemployment has continued to increase with an additional 58,000 initial applications filed. We allocate these statewide claims to counties based on their average shares of statewide claims over the previous four weeks. Since recent hiring of new workers has been minimal in most industries and locations, the number of initial unemployment claims as a share of the county’s labor force gives our estimate of the increase in the unemployment rate by county.

<u>Industry</u>	<u>NAICS</u>	<u>Telework</u>	<u>Activity Decline</u>	<u>Adjusted Decline</u>
All Industries	--	0.380	-52.3	-32.4
Manufacturing	31-33	0.406	-60.1	-35.7
Wholesale Trade	42	0.660	-45.8	-15.6
Retail Trade	44-45	0.569	-32.4	-13.9
Information	51	0.665	-76.8	-25.7
Finance and Insurance	52	0.758	-40.4	-9.8
Real Estate Rental and Leasing	53	0.732	-48.8	-13.1
Educational Services	61	0.805	-87.7	-17.1
Health Care and Social Assistance	62	0.359	-55.3	-35.4
Arts, Entertainment, & Recreation	71	0.377	-65.6	-40.9
Accommodation and Food Services	72	0.256	-60.0	-44.7
Other Services (except PA)	81	0.256	-48.9	-36.4

Table 3: Declines in economic activity for select sectors in Wisconsin, adjusted for telework.

Our second measure is an estimate of the reduction in output by county. For this, we use economic activity measures from cellphone foot traffic provided by SafeGraph, which we regularly update.<sup>2</sup> While the underlying data captures economic activity at over 50,000 locations around the state, the geographic coverage is too sparse to provide accurate measures by county and industry. So instead we use our statewide estimates of year-over-year declines in activity by sector, averaged over the four weeks in April, which we adjust by the share of telework by industry to compute economic losses by sector. That is,

<sup>1</sup> SafeGraph is a data company that aggregates anonymized location data from numerous applications in order to provide insights about physical places. To enhance privacy, SafeGraph excludes census block group information if fewer than five devices visited an establishment in a month from a given group.

<sup>2</sup> <https://crowe.wisc.edu/wp-content/uploads/sites/313/2020/04/activity-1.pdf>

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we presume that some of the reduced current activity at work is now being done from home. The adjusted declines are listed in Table 3. (I refer to the tables here by their number in the full report). Then, based on the sectoral concentration of GDP in each county, we compute the weighted-average GDP loss, using the 2018 GDP by county (the latest available). This measure inevitably misses regional variation in economic activity, as only the industry concentration varies by region. Nonetheless, it provides a reasonable estimate of how different parts of the state have been affected economically due to their differing industry exposure.

In Table 4, we report the current economic index and its components at the state level, as well as for the five highest and lowest counties. To calculate the index, we use the common Okun’s law approximation that a 1% increase unemployment corresponds to a 2% fall in GDP, which we then average with our direct measure. This combination likely provides an underestimate of the total economic decline, as unemployment is still increasing throughout the state, and other estimates (based on in-store sales and reduction in hourly work) point toward a larger output decline. Our estimate suggests a 29% fall in GDP statewide, which is the average of the losses due to a 16.2 percentage point increase in unemployment (approximately equal to a 32.4% GDP decline) and a directly-estimated 26.6% decline in GDP. Moreover there are substantial losses across all counties, ranging from a low of 21.2% in Pierce County to a high of 40.1% in Menominee County.

<u>County</u>	<u>INDEX</u>	<u>RANK</u>	<u>UI</u> <u>Claims</u> <u>(1000)</u>	<u>Labor</u> <u>Force</u> <u>(1000)</u>	<u>Unemp</u> <u>gain</u> <u>(%)</u>	<u>Avg</u> <u>Wage</u> <u>(\$)</u>	<u>Lost</u> <u>Weekly</u> <u>Income</u> <u>(\$M)</u>	<u>GDP</u> <u>Decline</u> <u>(%)</u>	<u>Lost</u> <u>Weekly</u> <u>GDP</u> <u>(\$M)</u>
<b>Statewide</b>	<b>29.5</b>	<b>--</b>	<b>501.26</b>	<b>3096.89</b>	<b>16.2</b>	<b>930</b>	<b>466.17</b>	<b>26.6</b>	<b>1537.5</b>
Pierce	21.2	1	1.97	25.40	7.8	666	1.31	26.9	4.6
Pepin	21.2	2	0.33	4.01	8.2	744	0.25	26.0	1.2
Lafayette	22.2	3	0.88	9.99	8.8	694	0.61	26.9	2.8
Taylor	22.3	4	0.92	10.90	8.4	743	0.68	27.9	4.3
Green	23.0	5	2.07	21.15	9.8	819	1.70	26.3	7.6
Marquette	33.9	68	1.55	7.80	19.9	666	1.03	28.0	2.0
Trempealeau	34.8	69	3.09	15.74	19.6	817	2.52	30.3	7.8
Sawyer	35.1	70	7.08	34.79	20.3	757	5.36	29.5	19.1
Forest	36.4	71	0.97	3.96	24.5	557	0.54	23.9	0.9
Menominee	40.1	72	0.42	1.55	27.3	296	0.13	25.5	0.2

Table 4: Current economic index and its components statewide and in the five highest and lowest counties in Wisconsin.

The fact that Menominee County, the poorest county in the state, has suffered the largest losses is consistent with the broader picture. On average counties which were in the worst economic position before the pandemic (as measured by our baseline economic index) have fared the worst during the crisis. Low income individuals typically suffer the most in an economic downturn, and the same holds true when aggregated to county

level. This is particularly the case for the current broad-based economic downturn, which has hit all geographical areas and has been especially strong in lower-wage sectors like food & beverage and retail.

We also provide two measures of lost income to get a sense of the overall magnitude of losses statewide and by county. The measure of lost labor income from unemployment is calculated as the average weekly wage, from 2019:Q2, multiplied by the number of initial unemployment applications. The lost GDP is the calculated from 2018 GDP by county, converted to a weekly measure. Thus we see that statewide losses total \$466 million per week in lost labor income from unemployment, and \$1.5 billion per week in lost output. Clearly given the smaller populations, the total dollar losses are smaller in most counties.

## 2. Current Health Index

As in the full report, our current health index captures many of the metrics from both the national and state guidelines. These include 14-day trends in new COVID-19 case diagnoses, 14-day trends in the fraction of positive tests, and hospital capacity including immediate hospital bed availability and PPE availability. However rather than analyzing these metrics at the state level, we look at them regionally. The state health capacity data is published by HERC region, so we group counties into regions for this measure.

Both the federal and state guidelines also consider trends in influenza-like illness (ILI) reports, which provide a useful warning signal for infections. In data from the CDC, ILI reports statewide have declined steadily since the peak in the week of 3/21/20.<sup>3</sup> The state DHS uses a different source in their metrics, but this has also recently shown a two-week decline.<sup>4</sup> The ILI reports will be important to monitor for increases as advance warnings of infections if and when distancing restrictions are eased, but the condition for a downward trend in ILI reports in the reopening guidelines seems to have been met.

The key current health indicators are shown in Table 8, using data through 4/25/20. For each HERC, we list the total cumulative cases per 100,000 population, the 7-day average of new cases per day per 100,000 as well as the change in this value from one and two weeks ago, the 7-day average of the rate of positive tests as well as the change in this value from one and two weeks ago, the percentage of hospitals reporting less than 7 days of PPE availability (taken as the max of reports of N95 masks, shields, gowns, and paper masks shortages), the percentage of hospital beds immediately available, and the percentage of ICU beds immediately available.

While the previous guidelines have emphasized these key factors, they have not discussed how to operationalize or weigh them, suggesting that each component must be satisfactorily addressed. That is, the minimum performance across measures may be what matters. We list each element so that readers can evaluate the components.

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<sup>3</sup> See <https://gis.cdc.gov/grasp/fluview/fluportaldashboard.html>

<sup>4</sup> See <https://www.dhs.wisconsin.gov/covid-19/prepare.htm#symptoms>

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Data through 5/6/20

HERC Name	INDEX	Cases	New	2 week	1 week	Pos.	2 week	1 week	PPE	Bed	ICU
		per	Cases			Test					change
		100K	per	change	change	Rate	change	change	Avail	Avail	Avail
Northeast	22.51	374.17	22.16	13.10	4.27	20.59	-10.61	-7.37	20.0	35.5	24.7
North Central	1.18	14.32	0.31	-0.06	0.21	0.95	-1.96	0.36	50.0	45.5	39.1
Northwest	4.72	45.10	1.31	1.07	1.01	2.19	1.51	1.44	53.8	37.5	35.1
Western	2.01	28.56	0.46	0.31	0.31	1.19	0.52	0.65	30.0	27.8	52.8
South Central	8.24	87.92	7.30	4.15	1.71	4.69	0.42	1.14	26.1	33.5	24.9
Fox Valley	3.37	39.12	2.59	1.98	1.40	5.74	2.60	2.13	7.7	32.6	22.7
Southeast	50.41	243.88	38.56	17.83	12.64	13.74	0.06	2.72	41.9	26.1	26.4

Table 8: Current health index and its components by HERC region.

We see that three of the HERC regions (North Central, Northwest, and Western) have low infection rates, new case rates (a daily average one or fewer new cases per 100,000 people), and positive test rates (less than 2.2% positive tests). Moreover the cases and positive test rates have been stable at very low levels for all of these regions. However a majority of the hospitals in North Central and Northwest regions are reporting less than a week of PPE supplies.

Two HERC regions, Northeast and Southeast, have much higher infection and positive test rates. The Northeast region also has seen substantial increases in infections and positive tests, stemming from the outbreak in Brown County. While some of the growth in new cases is due to increased testing, the positive test rates remain relatively high in these regions and they have not declined.

The other two regions, Fox Valley and South Central are somewhere in between, with new case rates and positive test rates slightly elevated but relatively stable.

To summarize these variables, we compute an index which is interpretable as a weighted trend in new cases. That is, we scale the 7 day average of new COVID cases by a factor that takes into account the trends in new cases and positive tests as well as health system capacity.<sup>5</sup> This index scales up the new case average if there is a positive trend in cases or test rates, as well as if there are PPE shortages at more than 40% of hospitals or fewer than 30% of ICU beds available. The index results align with our discussion: three regions are very low, two are high, Fox Valley is relatively low, and South Central is somewhere in the middle. The index for Northwest comes in slightly higher than Fox Valley, because there has been a slight acceleration in positive cases and test rates. But they increase came from near zero, so the overall levels are still quite low.

Depending on PPE availability, the North Central, Northwest, and Western regions may be close to satisfying the current health guidelines, if they have not already been met.

<sup>5</sup> In particular, we use the formula:  $(\text{New cases} + (\text{one week change})/2) * (1 + (\text{one week change in test rates})/100) * (1 + \text{MAX}(\text{PPE} - 40, 0)/20) * (1 + \text{MAX}(\text{ICU} - 30, 0)/10)$ .

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Appendix: Economic and Health Indexes by County

<u>County</u>	<u>Baseline Health INDEX</u>	<u>Base Health RANK</u>	<u>HERC Name</u>	<u>Current Health INDEX</u>	<u>Health Rank (HERC)</u>	<u>Baseline Econ INDEX</u>	<u>Base Econ RANK</u>	<u>Current Econ INDEX</u>	<u>Current Econ RANK</u>
Adams	119.17	70	South Central	8.24	5	112.62	69	25.1	14
Ashland	101.39	43	Northwest	4.72	4	112.24	67	33.1	64
Barron	108.88	62	Northwest	4.72	4	107.67	61	29.5	48
Bayfield	109.53	63	Northwest	4.72	4	109.31	62	27.2	27
Brown	89.87	8	Northeast	22.51	6	91.03	10	28.3	37
Buffalo	92.36	15	Western	2.01	2	100.84	38	26.9	24
Burnett	120.91	71	Northwest	4.72	4	111.06	65	27.2	28
Calumet	95.77	25	Fox Valley	3.37	3	83.12	4	31.4	58
Chippewa	98.32	38	Northwest	4.72	4	101.12	39	27.7	32
Clark	97.02	33	North Central	1.18	1	103.73	44	25.4	15
Columbia	101.43	45	South Central	8.24	5	89.85	8	33.4	65
Crawford	102.78	48	Western	2.01	2	110.23	63	29.9	52
Dane	82.24	1	South Central	8.24	5	84.19	6	23.3	7
Dodge	96.36	31	South Central	8.24	5	94.74	20	28.2	36
Door	104.74	52	Northeast	22.51	6	98.73	28	30.2	54
Douglas	102.06	47	Northwest	4.72	4	106.14	55	24.3	9
Dunn	98.95	39	Northwest	4.72	4	98.96	29	24.4	10
Eau Claire	94.17	20	Northwest	4.72	4	99.47	32	27.5	31
Florence	103.70	51	Northeast	22.51	6	104.58	48	30.6	57
Fond du Lac	95.89	28	Southeast	50.41	7	92.92	13	28.9	44
Forest	105.25	53	North Central	1.18	1	110.51	64	36.4	71
Grant	97.76	35	South Central	8.24	5	103.96	45	23.6	8
Green	93.29	16	South Central	8.24	5	93.58	16	23.0	5
Green Lake	106.11	56	Fox Valley	3.37	3	105.97	54	32.4	62
Iowa	94.17	21	South Central	8.24	5	95.30	22	28.5	39
Iron	108.42	60	North Central	1.18	1	112.25	68	32.1	59
Jackson	87.59	5	Western	2.01	2	105.58	53	33.7	67
Jefferson	90.09	9	South Central	8.24	5	93.52	15	27.0	25
Juneau	100.06	40	South Central	8.24	5	104.87	49	32.3	60
Kenosha	95.82	26	Southeast	50.41	7	97.66	25	26.4	22
Kewaunee	90.36	11	Northeast	22.51	6	92.00	11	28.5	38
La Crosse	83.43	2	Western	2.01	2	93.70	17	27.3	29
Lafayette	94.92	24	South Central	8.24	5	97.46	23	22.2	3
Langlade	102.78	49	North Central	1.18	1	107.24	60	25.6	17
Lincoln	97.91	36	North Central	1.18	1	99.68	33	28.8	42
Manitowoc	95.87	27	Northeast	22.51	6	99.25	31	32.4	61
Marathon	91.11	13	North Central	1.18	1	90.85	9	28.9	45
Marinette	97.98	37	Northeast	22.51	6	107.05	58	33.5	66

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Marquette	114.78	68	South Central	8.24	5	106.53	56	33.9	68
Menominee	108.67	61	Fox Valley	3.37	3	134.55	72	40.1	72
Milwaukee	143.97	72	Southeast	50.41	7	111.98	66	29.8	51
Monroe	94.52	23	Western	2.01	2	100.67	37	27.9	34
Oconto	101.70	46	Northeast	22.51	6	98.50	27	26.4	21
Oneida	105.90	55	North Central	1.18	1	101.33	40	30.3	55
Outagamie	97.08	34	Fox Valley	3.37	3	86.99	7	27.9	33
Ozaukee	89.48	6	Southeast	50.41	7	72.09	2	26.4	20
Pepin	106.16	57	Northwest	4.72	4	101.79	42	21.2	2
Pierce	84.38	3	Northwest	4.72	4	94.34	19	21.2	1
Polk	100.74	42	Northwest	4.72	4	104.37	47	24.9	13
Portage	85.58	4	North Central	1.18	1	97.88	26	25.5	16
Price	105.26	54	North Central	1.18	1	107.11	59	29.6	50
Racine	101.41	44	Southeast	50.41	7	99.08	30	29.5	49
Richland	96.84	32	South Central	8.24	5	104.90	50	26.9	23
Rock	100.71	41	South Central	8.24	5	100.38	36	29.1	46
Rusk	106.65	58	Northwest	4.72	4	112.76	70	30.6	56
St. Croix	90.27	10	South Central	4.72	4	83.34	5	23.3	6
Sauk	96.15	30	Northwest	8.24	5	93.91	18	35.1	70
Sawyer	114.23	67	Fox Valley	4.72	4	112.90	71	32.6	63
Shawano	110.28	64	Southeast	3.37	3	101.74	41	25.7	18
Sheboygan	89.62	7	Northwest	50.41	7	92.32	12	29.3	47
Taylor	94.28	22	North Central	1.18	1	103.22	43	22.3	4
Trempealeau	92.02	14	Western	2.01	2	97.60	24	34.8	69
Vernon	93.85	19	Western	2.01	2	104.20	46	24.9	12
Vilas	117.74	69	North Central	1.18	1	105.45	52	28.9	43
Walworth	93.81	18	Southeast	50.41	7	94.74	21	24.7	11
Washburn	113.71	66	Northwest	4.72	4	106.71	57	30.1	53
Washington	93.81	17	Southeast	50.41	7	75.65	3	27.5	30
Waukesha	95.94	29	Southeast	50.41	7	71.76	1	26.4	19
Waupaca	107.66	59	Fox Valley	3.37	3	99.77	34	28.8	41
Waushara	110.56	65	Fox Valley	3.37	3	105.14	51	27.9	35
Winnebago	102.92	50	Fox Valley	3.37	3	93.32	14	28.8	40
Wood	90.85	12	North Central	1.18	1	100.07	35	27.2	26