

# Chicago COVID-19 Community Vulnerability Index Chicago CCVI

**January 25, 2021** 

### Chicago COVID19 Community Vulnerability Index

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- Adapted and modified from Surgo Ventures collaboration <a href="https://precisionforcovid.org/ccvi">https://precisionforcovid.org/ccvi</a> and the CDC Social Vulnerability Index
- Chicago CCVI identifies communities that have been disproportionately impacted by COVID-19 and are uniquely vulnerable to barriers to COVID-19 vaccine uptake
- Vulnerability is defined as a combination of:
  - Sociodemographic factors
  - Epidemiological factors
  - Occupational factors
  - Cumulative COVID burden
- Ten (10) components included in the index are COVID-specific risk factors and outcomes combined with factors known to be associated with social vulnerability in the context of emergency preparedness
- Chicago CCVI is derived from ranking values of the 10 components by geography, then synthesizing them into a single composite weighted score. The higher the score, the more vulnerable the geographic area
- In Chicago, we are currently measuring CCVI at the community area level

### Chicago CCVI Sociodemographic Risk Factors

At the community area level:	
% Individual Poverty	2018 US Census American Community Survey
% 16+ unemployment	2018 US Census American Community Survey
% Per capita income	2018 US Census American Community Survey
% 25+ no HS diploma	2018 US Census American Community Survey
% Uninsured	2018 US Census American Community Survey
% Population 17 and under	2018 US Census American Community Survey
% living w disability	2018 US Census American Community Survey
% Crowded housing	2018 US Census American Community Survey
% Single-parent households	2018 US Census American Community Survey

Surgo combined 9 equally weighted values into 2 components:

- Socioeconomic (percentile)
- Household (percentile)

% w/ no primary care	2019 CDPH Healthy Chicago Survey
provider	

Data analyzed and compiled by CDPH into one component

These 3 components were averaged into the overall risk factor score

## Chicago CCVI Epidemiological Risk Factors

At the community area level:	
% 65+ years	2019 US Census American Community Survey

Data analyzed and compiled by CDPH into one component

% adult obesity	2019 CDPH Healthy Chicago Survey
% adult current smoking	2019 CDPH Healthy Chicago Survey
% adult diabetes	2019 CDPH Healthy Chicago Survey

3 indicators were equally weighted and combined into 1 component:

% of population w/ one or more of these comorbid conditions

• These 2 components were averaged into the overall risk factor score

### Chicago CCVI Occupational Risk Factors



At the community area level:	Data Source
Education (teachers, support staff)	2019 US Census American Community Survey
Manufacturing/Food production	2019 US Census American Community Survey
Material moving (grocery store, laborers, freight)	2019 US Census American Community Survey
Personal Service (Childcare, recreation and entertainment workers)	2019 US Census American Community Survey
Public Safety (first Responders/corrections)	2019 US Census American Community Survey
Transportation (public transit, airport truck, taxi)	2019 US Census American Community Survey
Food Service (cooks, servers, food prep, kitchen)	2019 US Census American Community Survey
Ratio of mobility in 2020 compared to 2019	BlueDot (2019 and 2020)

Data analyzed and compiled by CDPH based on ACIP guidance and US Bureau of Labor Statistics Occupation Classifications

Total # of each occupation group in each community area were equally weighted and combined into 1 component [% of population that are essential workers]



Data compiled by CDPH into one component

### Chicago CCVI Cumulative COVID Burden

At the community area level:	
Diagnosed COVID-19 cases (rate per 100k)	CDPH Communicable Disease Surveillance, I-NEDSS, Jan 1 – Dec 31, 2020
COVID-19 hospital admissions (rate per 100k)	CDPH Communicable Disease Surveillance, I-NEDSS, Jan 1 – Dec 31, 2020
COVID-19 mortality rate (rate per 100k)	CDPH Communicable Disease Surveillance, I-NEDSS, Jan 1 – Dec 31, 2020

Data analyzed and compiled by CDPH into 3 components

- Deaths in congregate settings were removed from the total death counts to better represent community area residents affected by community-level transmission.
- All three components were averaged into the cumulative COVID burden score

#### Construction of index



- Each component is measured and ranked by community area
- Rank scores (0-76) are combined and averaged into two groups: Risk Factors and COVID Burden
- The average of the ranks in each group are calculated for each community area
- Higher rank score indicates more vulnerability
- Index is inherently weighted towards COVID burden
  - COVID burden: 3 components averaged
  - Risk factor burden: 7 components averaged
- The COVID-19 Community Vulnerability Index score for each community area is calculated as follows:

(Average of Risk Factor ranks + Average of Overall COVID Burden ranks)

2

### **Findings**



- Rank-values of Chicago community areas ranged from 4 (lowest vulnerability) to 64 (highest vulnerability). Tie scores between CAs were ranked equally with each other.
- A high CCVI score correlates most strongly with high mobility during COVID, low socioeconomic status,
  high rates of COVID hospital admission and high rates of COVID mortality
- Strength of index appears well balanced between traditional measures of vulnerability (SES) and COVID-specific measures (mobility, morbidity/mortality)
- 26 HIGH Vulnerability Community Areas and 15 in the top quintile
  - 7 majority Latinx; 8 majority Black;
  - 9 communities on the Northwest and Southwest sides and 6 on Southside and far Southside;
  - Top 15 includes <u>all</u> PC+ zipcodes and 2 of 3 RERRT community areas
- Residents of high vulnerability community areas have been almost 3 times as likely to have died from COVID-19 as low vulnerability community areas. Top 10 CAs account for 25% of all COVID-19 deaths

#### Chicago COVID-19 Community Vulnerability Index (CCVI) HIGH Category

Chicago Community Area Name	Chicago Community COVID-19 Vulnerability Index (CCVI)	Population	Socioeconomic Status (Surgo CCVI)	Household Composition and Disability (Surgo CCVI)	Cumulative mobility ratio (current over prior year)	% adults w/o PCP (HCS)		65+ (ACS)	% 18-64yo adults w/1+ comorbid conditions (HCS)	Cumulative COVID-19 incidence rate (Jan-Dec 2020)	Cumulative COVID-19 hospital admission rate (Jan-Dec 2020)	Cumulative COVID-19 crude mortality rate (non-congregate deaths only) (Jan-Dec 2020)
West Englewood	64	26346	0.94	0.85	0.99	30.2	12.1	20.2	76.4	7,674.80	1,598.00	242.9
New City	60	39508	0.92	0.64	0.98	42.7	17.5	12.1	56.7	9,901.80	1,136.50	151.9
Gage Park	59	37478	0.92	0.48	0.94	32.8	19.5	9.2	44.7	13,370.50	1,064.60	216.1
North Lawndale	58	32073	0.93	0.81	0.99	33.5	13.1	10.8	60.0	6,831.30	1,309.50	208.9
South Lawndale	58	72157	0.94	0.56	0.92	35.9	15.9	9.3	48.4	11,120.20	1,136.40	225.9
Chicago Lawn	58	51352	0.94	0.58	0.90	29.8	16.8	12.3	59.5	10,934.30	1,180.10	155.8
Englewood	55	22921	0.97	0.89	1.00	29.6	10.9	14.4	60.7	5,833.10	1,278.30	161.4
Roseland	55	39162	0.81	0.82	0.96	29.3	13.7	18.1	68.7	5,717.30	1,212.90	176.2
Archer Heights	53	13726	0.83	0.40	0.90	23.1	18.2	12.7	69.2	12,312.40	1,034.50	145.7
Washington Heights	53	26742	0.75	0.83	0.93	31.3	15.4	18.2	54.7	5,781.20	1,256.50	157.1
Austin	53	93727	0.88	0.80	0.94	31.1	15.2	14.3	62.4	7,791.80	1,022.10	151.5
Montclare	53	14267	0.65	0.50	0.82	34.6	15.8	17.0	60.8	10,338.50	1,030.30	161.2
Belmont Cragin	52	78601	0.81	0.51	0.84	33.2	20.2	9.6	40.2	13,069.80	1,011.40	160.3
South Deering	52	15475	0.92	0.89	0.93	30.8	13.0	15.7	64.3	6,785.10	1,111.50	135.7
Humboldt Park	52	55364	0.88	0.63	0.91	33.4	18.8	9.6	56.1	9,630.80	1,040.40	137.3
Hermosa	50	23481	0.81	0.44	0.87	15.9	22.0	10.6	52.7	12,184.30	975.3	183.1
Brighton Park	49	44156	0.89	0.44	0.90	33.5	18.7	9.6	42.2	10,861.50	865.1	140.4
West Pullman	49	30020	0.86	0.81	0.97	26.0	15.7	16.5	62.0	4,870.10	1,039.30	179.9
Garfield Ridge	49	37207	0.61	0.44	0.82	20.2	16.5	15.7	50.2	10,729.20	1,056.30	161.3
Lower West Side	49	33203	0.73	0.18	0.90	31.4	20.6	9.8	42.5	10,267.10	975.8	177.7
West Elsdon	49	19126	0.76	0.39	0.88	36.2	18.1	10.2	43.9	11,821.60	946.4	141.2
West Lawn	49	31886	0.84	0.50	0.88	16.4	19.8	10.4	42.9	13,811.70	1,063.20	134.9
Auburn Gresham	48	45909	0.88	0.78	0.97	30.1	15.7	17.9	55.5	5,314.90	1,119.60	122
East Garfield Park	48	18940	0.95	0.81	0.96	22.4	10.9	10.2	65.5	6,610.30	1,145.70	116.2

#### Chicago COVID-19 Community Vulnerability Index (CCVI) MEDIUM Category

Chicago Community Area Name	Chicago Community COVID-19 Vulnerability Index (CCVI)	Population	Socioeconomic Status (Surgo CCVI)	Household Composition and Disability (Surgo CCVI)	Cumulative mobility ratio (current over prior year)		% Frontline essential workers (% of CA population)	% Age 65+ (ACS)	% 18-64yo adults w/1+ comorbid conditions (HCS)	Cumulative COVID-19 incidence rate (Jan-Dec 2020)	Cumulative COVID-19 hospital admission rate (Jan-Dec 2020)	Cumulative COVID- 19 crude mortality rate (non- congregate deaths only) (Jan-Dec 2020)
West Garfield Park	47	16415	0.98	0.92	0.94	42.6	12.5	11.9	63.5	5,945.80	1,035.60	103.6
Pullman	46	6840	0.76	0.59	0.96	26.7	18.6	15.6	47.8	5,482.50	818.7	190.1
Calumet Heights	46	12815	0.67	0.76	0.90	21.0	16.5	23.1	52.2	5,423.30	1,248.50	132.7
Greater Grand Crossing	46	30149	0.89	0.77	0.98	37.5	15.4	14.4	68.2	5,058.20	1,031.50	109.5
South Shore	46	50265	0.81	0.69	0.94	26.7	15.8	13.3	59.5	4,995.50	1,124.00	137.3
Ashburn	45	43356	0.69	0.41	0.89	22.8	17.0	11.7	43.9	9,484.30	1,144.00	117.6
Avalon Park	44	9713	0.77	0.83	0.93	16.5	12.9	22.1	75.2	4,725.60	1,060.40	144.1
East Side	44	23723	0.88	0.62	0.92	32.7	17.1	11.1	46.1	10,361.30	708.2	97
South Chicago	44	29936	0.90	0.80	0.92	24.5	14.4	14.0	66.3	4,947.20	1,005.50	147
Morgan Park	43	27114	0.51	0.56	0.88	31.6	13.8	18.2	62.7	5,783.00	877.8	143.8
Chatham	43	30967	0.80	0.80	0.94	18.6	14.7	15.9	68.3	4,986.00	1,107.60	129.2
Clearing	43	24976	0.62	0.39	0.79	25.5	17.7	12.3	60.5	10,061.70	824.8	132.1
Grand Boulevard	41	22643	0.75	0.76	0.88	25.2	13.8	15.1	47.5	6,293.30	1,126.20	97.2
Washington Park	41	10969	0.92	0.91	0.96	27.0	12.1	7.7	78.3	5,178.20	929.9	118.5
North Park	41	18914	0.52	0.44	0.75	21.6	14.8	19.8	53.6	7,211.60	840.6	137.5
Albany Park	38	49806	0.68	0.27	0.74	31.1	19.2	10.1	44.8	7,750.10	728.8	112.4
Woodlawn	38	24844	0.86	0.74	0.86	39.1	12.2	12.7	67.7	5,107.90	929.8	88.6
McKinley Park	37	15177	0.87	0.28	0.81	25.4	20.0	11.2	35.7	8,216.40	685.2	98.8
West Ridge	36	78466	0.70	0.45	0.75	19.5	17.6	13.3	37.7	7,014.50	944.4	103.2
Dunning	36	43445	0.41	0.28	0.79	23.0	15.8	17.6	41.6	8,875.60	713.5	108.2
Douglas	36	21353	0.73	0.48	0.79	35.6	12.1	14.8	33.8	5,067.20	1,053.70	112.4
Hegewisch	36	9089	0.61	0.13	0.90	21.2	16.4	18.7	57.0	10,331.20	539.1	88
Riverdale	36	7359	0.97	0.65	1.04	35.8	12.1	4.8	56.1	2,908.00	625.1	135.9
Portage Park	34	64605	0.55	0.20	0.77	20.3	17.3	12.8	44.5	8,620.10	702.7	108.4
Oakland	31	7227	0.86	0.92	0.84	21.1	15.1	9.1	39.3	5,050.50	1,023.90	83
Norwood Park	31	43405	0.23	0.24	0.72	18.3	17.0	19.4	37.1	6,575.30	705	112.9

#### Chicago COVID-19 Community Vulnerability Index (CCVI) LOW Category

Chicago Community Area Name	Chicago Community COVID-19 Vulnerability Index (CCVI)	Population	Socioeconomic Status (Surgo CCVI)	Household Composition and Disability (Surgo CCVI)	Cumulative mobility ratio (current over prior year)	% adults w/o PCP (HCS)	% Frontline essential workers (% of CA population)	65+ (ACS)	% 18-64yo adults w/1+ comorbid conditions (HCS)	Cumulative COVID-19 incidence rate (Jan-Dec 2020)	Cumulative COVID-19 hospital admission rate (Jan-Dec 2020)	Cumulative COVID- 19 crude mortality rate (non- congregate deaths only) (Jan-Dec 2020)
Rogers Park	31	55475	0.67	0.19	0.74	26.6	19.9	8.8	55.8	6,132.50	841.8	66.7
Armour Square	31	13538	0.93	0.44	0.72	8.6	18.6	24.9	37.1	3,752.40	642.6	125.6
Mount Greenwood	30	19190	0.15	0.24	0.75	19.0	22.1	12.5	39.8	8,384.60	646.2	83.4
Irving Park	30	53530	0.40	0.12	0.72	23.8	18.7	10.5	51.6	6,865.30	551.1	104.6
Avondale	28	38118	0.59	0.14	0.73	21.4	19.1	9.7	51.4	7,573.80	582.4	63
Logan Square	28	73277	0.44	0.11	0.66	33.1	17.4	7.1	41.4	6,863.00	584.1	91.4
Beverly	27	19791	0.14	0.22	0.76	21.8	16.9	17.5	34.9	6,452.40	621.5	85.9
Jefferson Park	26	27503	0.40	0.23	0.73	22.1	17.4	16.0	28.4	6,326.60	483.6	94.5
Kenwood	25	17954	0.47	0.43	0.76	30.4	13.9	16.9	41.2	3,943.40	774.2	61.3
Uptown	24	58979	0.47	0.14	0.66	35.6	15.9	12.6	33.8	5,208.60	690.1	67.8
Edison Park	24	11264	0.05	0.14	0.70	17.0	16.0	16.3	57.5	6,436.40	479.4	71
Bridgeport	22	34540	0.71	0.17	0.65	23.7	19.1	13.2	36.3	4,849.40	498	69.5
Near West Side	20	63170	0.66	0.31	0.69	27.8	11.4	7.3	30.6	6,376.40	577.8	49.1
O'Hare	19	23669	0.55	0.27	0.64	26.7	17.4	16.2	32.5	4,268.10	337	60.8
Forest Glen	19	19384	0.18	0.43	0.64	17.3	12.9	18.4	44.5	5,623.20	309.5	46.4
West Town	18	83757	0.28	0.05	0.65	30.3	13.7	5.9	32.8	6,601.20	512.2	58.5
Edgewater	17	57649	0.44	0.24	0.69	21.4	16.5	15.6	32.6	3,963.60	522.1	55.5
Hyde Park	17	27482	0.43	0.07	0.68	41.9	19.1	15.7	24.0	2,787.30	334.8	7.3
Near South Side	15	24729	0.13	0.25	0.54	45.0	9.9	10.8	30.0	4,949.70	448.9	36.4
Lincoln Square	15	42103	0.24	0.09	0.69	21.3	16.2	9.3	38.2	4,612.50	418	87.9
Near North Side	12	93318	0.13	0.11	0.44	19.8	7.7	16.1	30.4	5,273.40	377.2	32.1
Loop	8	38655	0.23	0.01	0.50	34.0	8.7	9.9	20.4	4,265.90	212.1	20.7
Lincoln Park	7	69465	0.11	0.03	0.44	21.1	9.1	9.6	28.9	4,976.60	411.7	21.6
Lake View	5	101365	0.10	0.05	0.47	18.8	12.5	8.1	30.4	4,705.80	300.9	20.7
North Center	4	35543	0.10	0.08	0.49	14.6	11.3	8.2	35.2	3,910.80	244.8	28.1

#### Chicago COVID-19 Community Vulnerability Index (CCVI) Data Dictionary

Component	Definition	Data Source	Link
Socioeconomic Status (Surgo CCVI)			
	From Surgo COVID Community Vulnerability Index: Equal weighting of the national ranking of: percent below poverty; percent		
_	unemployed; income level; percent less than high school education; percent uninsured	Surgo Ventures using American Community Survey	https://precisionforcovid.org/ccvi
Household Composition and Disability (Surgo CCVI)	From Surgo COVID Community Vulnerability Index: Equal weighting of the national ranking of: percent lving in group quarters;		
	percent under 18 years old; percent of households headed by a single parent; percent aged 5 or greater with a disability; percent		
	living in crowded housing	Surgo Ventures using American Community Survey	https://precisionforcovid.org/ccvi
Cumulative mobility ratio (current year over prior year)	Cumulative amount of time spent more than 200 feet away from home from March 19 - December 31, 2020 divided the cumulative		
	amount of time spent more than 200 feet away from home from March 19 - December 31, 2019.	Blue Dot	https://bluedot.global/
% adults w/o PCP (HCS)			https://www.chicago.gov/city/en/de
			pts/cdph/supp_info/healthy-
			communities/healthy-chicago-
	Percent of adults aged 18+ with no primary care provider	Healthy Chicago Survey 2016-2018	survey.html
% Frontline essential workers (% of CA population)	Number of frontline workers (census standard occupational codes (SOC): 25,33, 35, 39, 45,51, 53, 53-7000) in the community area		https://www.census.gov/programs-
	divided by the total population in the community area	American Community Survey	surveys/acs/data.html
% Age 65+ (ACS)			https://www.census.gov/programs-
	Number of people in specified age range divided by the total population in the community area	American Community Survey	surveys/acs/data.html
% 18-64 yo adults w/1+ comorbid conditions (HCS)			https://www.chicago.gov/city/en/de
			pts/cdph/supp_info/healthy-
	Percent of adults aged 18-64 years old with two or more of the following conditions (current smoking, obesity, diabetes) divided by		communities/healthy-chicago-
	alla dults aged 18-64	Healthy Chicago Survey 2016-2018	survey.html
Cumulative COVID-19 incidence rate (Jan-Dec 2020)			https://www.chicago.gov/city/en/sit
	Cumulative number of hospitalized unique cases of COVID-19 of people residing in a community area and occuring between January		es/covid-19/home/covid-
	1 and December 31, 2020 divided by the total population of the community area multiplid by 100,000	INEDSS; Chicago COVID-19 Surveillance	dashboard.html
Cumulative COVID-19 hospital admission rate (Jan-Dec			https://www.chicago.gov/city/en/sit
2020)	Cumulative number of diagnosed cases of COVID-19 of people residing in a community area and occuring between January 1 and		es/covid-19/home/covid-
	December 31, 2020 divided by the total population of the community area multiplid by 100,000	INEDSS; Chicago COVID-19 Surveillance	dashboard.html
Cumulative COVID-19 crude mortality rate (non-	Cumulative number of deaths from COVID-19 of people residing in a community area and occuring between January 1 and		https://www.chicago.gov/city/en/sit
congregate deaths only) (Jan-Dec 2020)	December 31, 2020 divided by the total population of the community area mulitplied by 100,000. Any death that occurred to a		es/covid-19/home/covid-
	resident or worker at a congregate living facility (eg, nursing home, group home, etc) was excluded from this calculation.	INEDSS; Chicago COVID-19 Surveillance	dashboard.html
The ranks are assigned from 0 to 76 for the 77 Chicago con	nmunity areas; when two community areas were tied with the same value, they were assigned the same ranking but counted uniquely		
5	indicators/components were defined in such a way higher value corresponded to a higher likelihood for priority within the index.		

#### **Findings**



#### **High Vulnerability**

high to low score

**West Englewood New City Gage Park North Lawndale South Lawndale Chicago Lawn Burnside\* Englewood** Roseland **Archer Heights Washington Heights Austin** Montclare **South Deering Belmont Cragin Humboldt Park** Fuller Park\* Hermosa **West Pullman Garfield Ridge Lower West Side** West Elsdon **West Lawn Brighton Park Auburn Gresham East Garfield Park** 

\* population <2500

#### Medium Vulnerability

high to low score **West Garfield Park Pullman Calumet Heights Greater Grand Crossing South Shore Ashburn Avalon Park East Side South Chicago Morgan Park** Chatham Clearing **Grand Boulevard Washington Park North Park Albany Park** Woodlawn **McKinley Park West Ridge Dunning Douglas** Hegewisch Riverdale **Portage Park Oakland** 

**Norwood Park** 

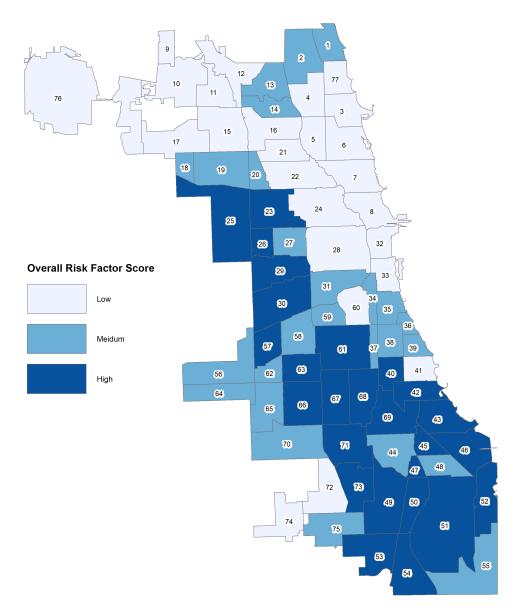
#### **Low Vulnerability**

high to low score

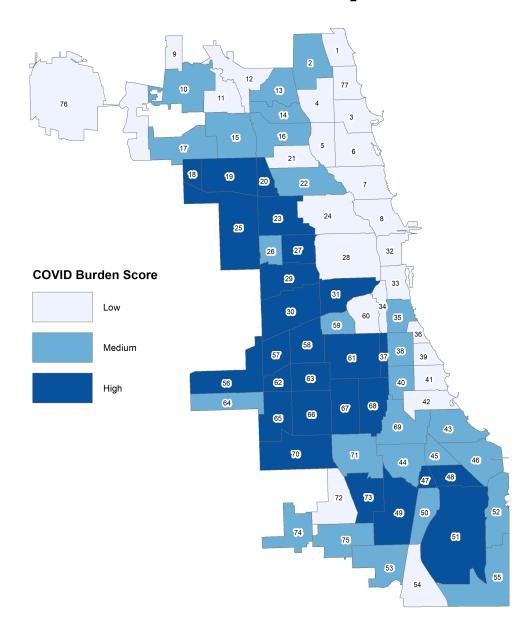
**Rogers Park Armour Square Mount Greenwood Irving Park Avondale Logan Square** Beverly Jefferson Park Kenwood **Uptown Edison Park Bridgeport Near West Side** O'Hare **Forest Glen West Town Edgewater Hvde Park Near South Side Lincoln Square Near North Side** Loop Lincoln Park **Lake View North Center** 

#### **CCVI Risk factor map**





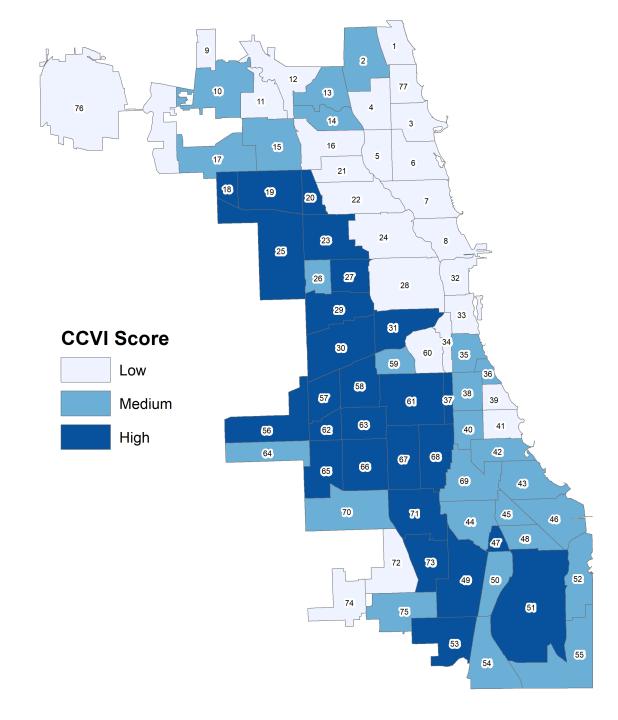
### **COVID Burden map**



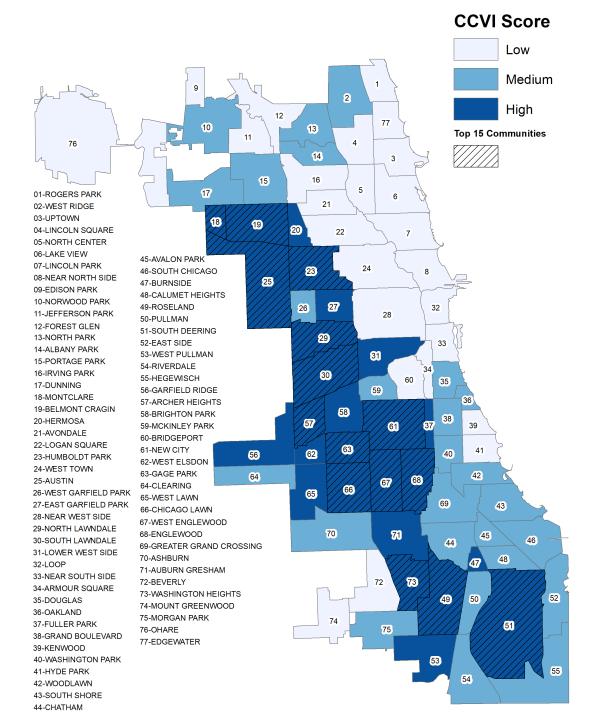
### Chicago CCVI Map







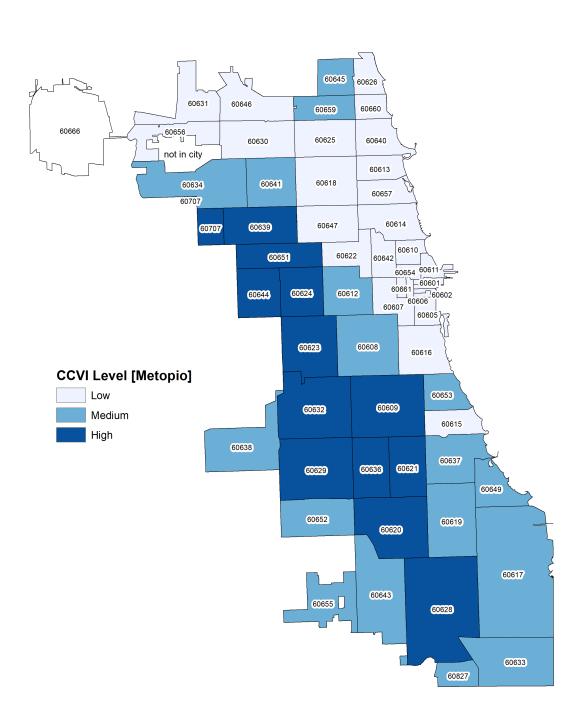
# CCVI Score w Top 15 Community Area overlay



### **CCVI Category by Zipcode**



Zipcode-level CCVI was computed based on overlapping population proportions of individual community areas (CA) within each zipcode. CCVI scores of overlapping CAs were weighted by population proportion and summed to determine zipcode CCVI score. Zipcode CCVI categories utilized the same cutoff thresholds as the CA CCVI scores: HIGH (48+); MEDIUM (32-47); LOW (<32)



#### **Limitations**



- There exist know and unknown factors related to social vulnerability, COVID risk and barriers to vaccine uptake that are not included in this index
- Surgo components were originally validated at the county level from a nationally developed index;
  Chicago index not formally validated to date
- Occupation groups at the community area level include a broader set of job types than are proscribed by ACIP guidance
- Index only includes COVID outcome data through 12/31/20 outbreak situation could change in the future significantly altering distribution of disease impact
- Heterogeneity within a community area or a zipcode may misrepresent the vulnerability of subpopulations or geographies within each area