

Appendix

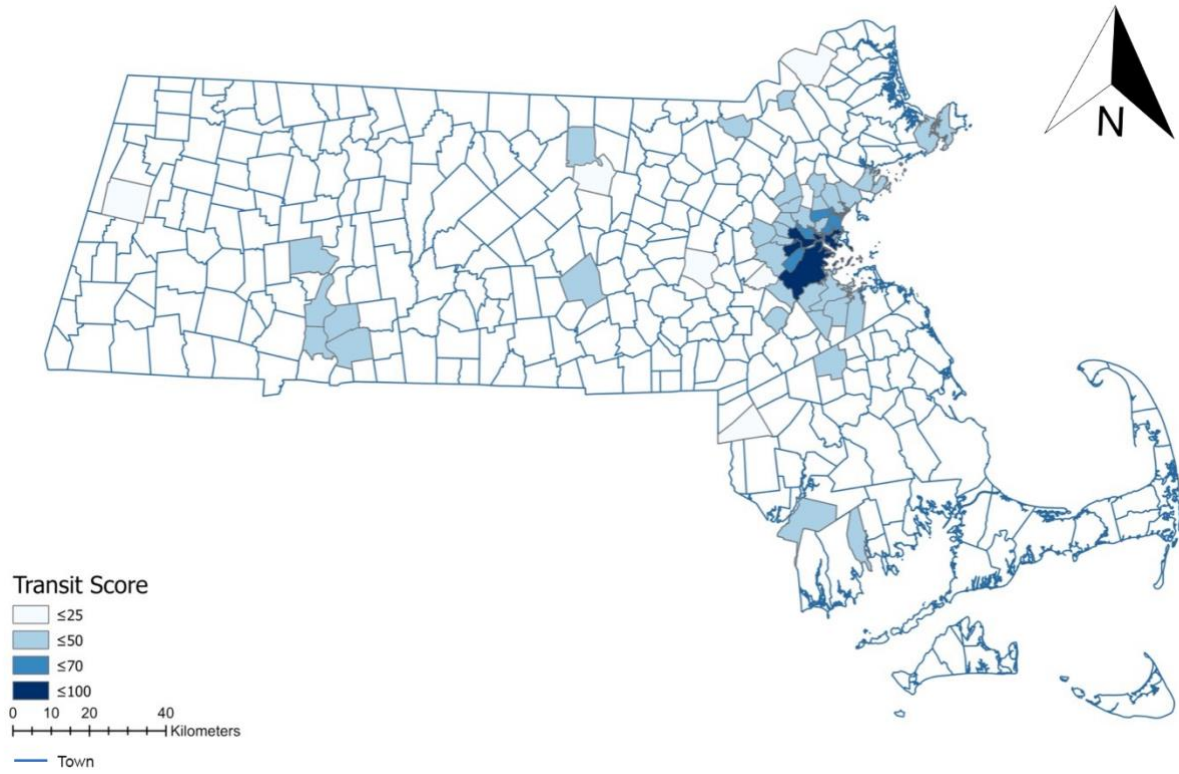


Figure S1. City level Transit Score in 72 Massachusetts cities.

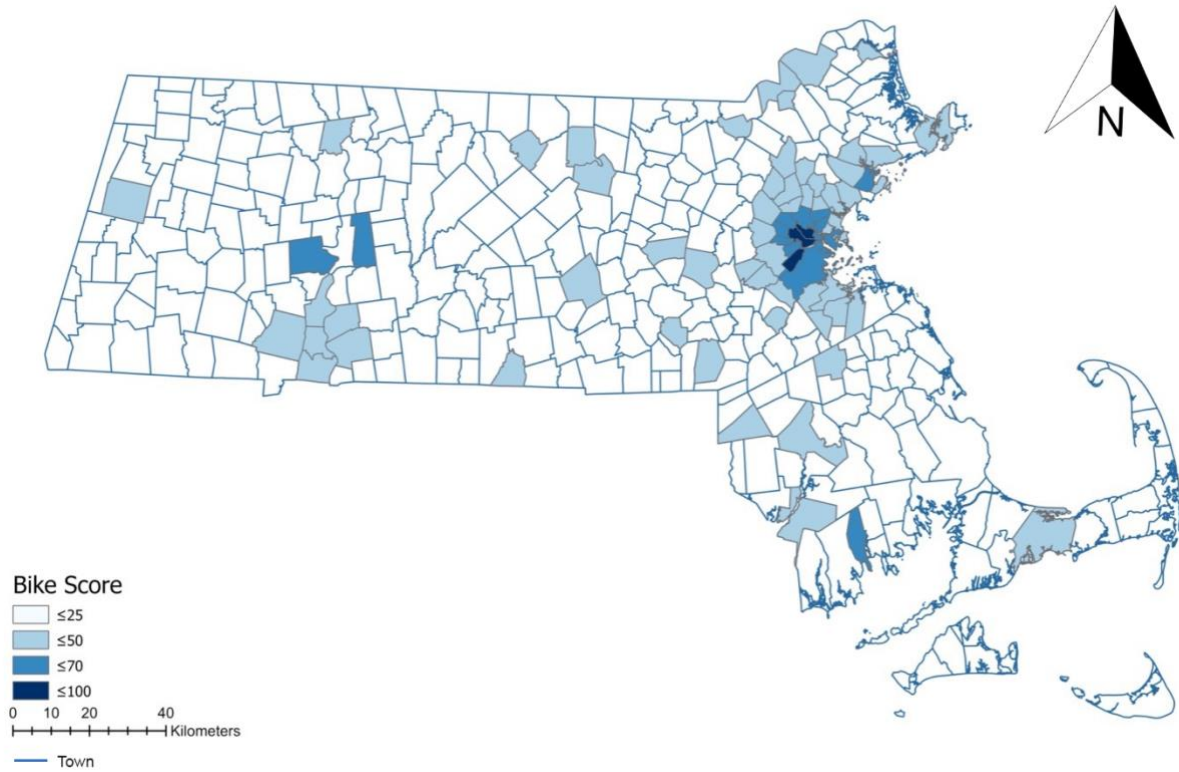


Figure S2. City level Bike Score in 72 Massachusetts cities.

Table S1. Spearman correlations of all variables.

	Cases/ 100,000	Walk Score	Transit Score	Bike Score	Overall pop (no.)	Pop density (person s/mile ²)	Hispani c pop (%)	Black pop (%)	Cars (%)	Income (USD)	Work (%)	Beds/1, 000	Pop >6 5 (%)
Cases/ 100,000	-	0.173	0.056	-0.116	0.318**	0.161	0.669** *	0.422** *	0.398** *	- 0.629** *	0.522** *	0.034	- 0.394** *
Walk Score	0.173	-	0.814** *	0.762** *	0.484** *	0.786** *	0.435** *	0.332** *	0.709** *	-0.199	0.08	0.009	- 0.494** *
Transit Score	0.056	0.814** *	-	0.75***	0.421**	0.808** *	0.22	0.318*	0.65***	0.014	-0.013	-0.168	- 0.583** *
Bike Score	-0.116	0.762** *	0.75***	-	0.422** *	0.666** *	0.197	0.339**	0.505** *	-0.003	-0.021	-0.025	- 0.349** *
Overall pop (no.)	0.318**	0.484** *	0.421**	0.422** *	-	0.432** *	0.506** *	0.657** *	0.587** *	-0.37**	0.402** *	0.08	- 0.562** *
Pop density (person s/mile²)	0.161	0.786** *	0.808** *	0.666** *	0.432** *	-	0.189	0.329**	0.428** *	0.16	-0.132	-0.154	- 0.387** *
Hispani c pop (%)	0.669** *	0.435** *	0.22	0.197	0.506** *	0.189	-	0.444** *	0.688** *	- 0.73***	0.644** *	0.137	- 0.622** *
Black pop (%)	0.422** *	0.332** *	0.318*	0.339**	0.657** *	0.329**	0.444** *	-	0.452** *	- 0.322**	0.349**	0.214	- 0.509** *
Cars (%)	0.398** *	0.709** *	0.65***	0.505** *	0.587** *	0.428** *	0.688** *	0.452** *	-	- 0.665** *	0.445** *	0.098	- 0.576** *
Income (USD)	- 0.629** *	-0.199	0.014	-0.003	-0.37**	0.16	- 0.73***	- 0.322**	- 0.665** *	-	- 0.735** *	-0.205	- 0.354** *
Work (%)	0.522** *	0.08	-0.013	-0.021	0.402** *	-0.132	0.644** *	0.349**	0.445** *	- 0.735** *	-	0.135	- 0.435** *
Beds/1, 000	0.034	0.009	-0.168	-0.025	0.08	-0.154	0.137	0.214	0.098	-0.205	0.135	-	0.031
Pop >6 5 (%)	- 0.394** *	- 0.494** *	- 0.583** *	- 0.349** *	- 0.562** *	- 0.387** *	- 0.622** *	- 0.509** *	- 0.576** *	- 0.354** *	- 0.435** *	0.031	-

SD, standard deviation; P25, 25th percentile; P75, 75th percentile; POP, population; Cars, housings without cars; Income, median household income; Work, unemployment rate; Beds, hospital beds. *P<0.05, **P<0.01, ***P<0.001.

Table S2. Association of Walk Score, Transit Score and Bike Score with COVID-19 cases rate in fully adjusted models with all covariates.

	Walk Score Model 3		Transit Score Model 3		Bike Score Model 3	
	estimate (95% CI)	P-value	estimate (95% CI)	P-value	estimate (95% CI)	P-value
Every 10 points of Walk Score	-1089.4 (-2240.8,61.9)	0.0632	.	.	.	.
Every 10 points of Transit Score	.	.	-1915.7 (-3329.4,-502.1)	0.0092	.	.
Every 10 points of Bike Score	.	.	.	.	-2059.2 (-2882.2,-1236.3)	<.0001
Log(population density)	4553.7 (2360.9,6746.5)	0.0001	3953.8 (1622.5,6285.1)	0.0015	3772 (2446.8,5097.3)	<.0001
Percentage of people over 65	83.9 (-247.3,415.1)	0.6141	-70.5 (-574.3,433.3)	0.7785	13.8 (-273.3,300.8)	0.9239
Hispanic	.	.	.	.	.	.
Tertile 1 (n=24)	.	.	.	.	.	.
Tertile 2 (n=24)	1586 (-640.4,3812.4)	0.1593	712.3 (-2058.8,3483.4)	0.6058	3114.9 (1081.6,5148.3)	0.0033
Tertile 3 (n=24)	3278.4 (709.7,5847.1)	0.0133	1126.1 (-2263.1,4515.2)	0.5053	3606.7 (1389.5,5823.8)	0.0019
Black	.	.	.	.	.	.
Tertile 1 (n=24)	.	.	.	.	.	.
Tertile 2 (n=25)	-601.2 (-2435.6,1233.1)	0.5145	-458.5 (-3105.6,2188.6)	0.7278	-665 (-2245.3,915.2)	0.4031
Tertile 3 (n=23)	-1935.5 (-4081.5,210.5)	0.0762	-1195.6 (-3895.9,1504.7)	0.3757	-1106.6 (-2925.8,712.6)	0.2284
Percentage of housings without cars	-146.1 (-310.4,18.3)	0.0806	27.7 (-228.3,283.7)	0.8277	-36.6 (-180.3,107)	0.6118
Household income	.	.	.	.	.	.
Tertile 1 (n=24)	.	.	.	.	.	.
Tertile 2 (n=24)	-3227.6 (-4890.7,-1564.6)	0.0003	-1854.9 (-3884.4,174.7)	0.0721	-1574.6 (-3070.9,-78.4)	0.0395
Tertile 3 (n=24)	-6364.5 (-9062.1,-3666.9)	<.0001	-4387.3 (-7822.3,-952.3)	0.0137	-2286.3 (-5108.4,535.8)	0.1103
Unemployment rate	502.5 (-87.1,1092.2)	0.0934	727.5 (39.6,1415.4)	0.0387	616.9 (112,1121.8)	0.0175
Hospital beds per 1000	-56.8 (-291.8,178.1)	0.6302	-143.9 (-431.9,144.1)	0.3182	-93.2 (-294.9,108.6)	0.3593

*Models were population weighted.

Table S3. Cities by tertiles of Walk Score, Transit Score, Bike Score, and median household income.

Walk Score*	Median Household Income		
	Tertile 1 (n=24) Range: 36730 to 64178	Tertile 2 (n=24) Range: 64850 to 90511	Tertile 3 (n=24) Range: 91168 to 188908
Tertile 1 (n=24) Range: 20 to 38	Gardner, Leominster, Pittsfield, Taunton, West Springfield, Westfield	Agawam, Attleboro, Barnstable, Danvers, Methuen, Randolph, Somerset, Weymouth	Braintree, Burlington, Franklin, Lexington, Milton, Needham, Reading, Wellesley, Wilmington, Winchester
Tertile 2 (n=25) Range: 39 to 55	Amherst, Brockton, Chicopee, Fitchburg, Greenfield, Holyoke, Southbridge	Beverly, Framingham, Gloucester, Haverhill, Marlborough, Milford, Northampton, Norwood, Peabody, Saugus, Waltham, Woburn	Dedham, Marblehead, Newburyport, Newton, Stoneham, Wakefield
Tertile 3 (n=23) Range: 56 to 89	Chelsea, Everett, Fall River, Lawrence, Lowell, Lynn, Malden, New Bedford, Revere, Springfield, Worcester	Boston, Quincy, Salem, Winthrop	Arlington, Belmont, Brookline, Cambridge, Medford, Melrose, Somerville, Watertown
Transit Score			
Missing (n=21)	Gardner, Taunton, Amherst, Greenfield, Southbridge	Agawam, Danvers, Methuen, Somerset, Beverly, Marlborough, Milford, Peabody, Winthrop	Burlington, Franklin, Lexington, Reading, Wellesley, Wilmington, Newburyport
Group 1 (n=27) Range: 14 to 33	Leominster, Pittsfield, West Springfield, Westfield, Fitchburg, New Bedford, Worcester	Attleboro, Barnstable, Randolph, Weymouth, Framingham, Gloucester, Haverhill, Northampton, Norwood, Saugus, Waltham, Woburn, Salem	Braintree, Needham, Winchester, Dedham, Marblehead, Stoneham, Wakefield
Group 2 (n=24) Range: 34 to 74	Brockton, Chicopee, Holyoke, Chelsea, Everett, Fall River, Lawrence, Lowell, Lynn, Malden, Revere, Springfield	Boston, Quincy	Milton, Newton, Arlington, Belmont, Brookline, Cambridge, Medford, Melrose, Somerville, Watertown
Bike Score			
Tertile 1 (n=26) Range: 28 to 37	Gardner, Taunton, Southbridge, Leominster, Westfield, Fitchburg	Agawam, Danvers, Methuen, Somerset, Marlborough, Peabody, Barnstable, Weymouth, Gloucester, Haverhill, Saugus, Woburn	Burlington, Franklin, Reading, Wellesley, Wilmington, Braintree, Needham, Dedham
Tertile 2 (n=21) Range: 38 to 45	Greenfield, Pittsfield, West Springfield, Worcester, Chicopee, Holyoke	Beverly, Milford, Winthrop, Attleboro, Randolph, Framingham, Norwood, Quincy	Lexington, Newburyport, Winchester, Marblehead, Stoneham, Wakefield, Melrose
Tertile 3 (n=25) Range: 46 to 96	Amherst, New Bedford, Brockton, Chelsea, Everett, Fall River, Lawrence, Lowell, Lynn, Malden, Revere, Springfield	Northampton, Waltham, Salem, Boston	Milton, Newton, Arlington, Belmont, Brookline, Cambridge, Medford, Somerville, Watertown

*Walk Score 90-100: Walker's Paradise; 70-89: very walkable; 50-69: somewhat walkable; 0-49: car-dependent. Transit Score 90-100: Rider's Paradise; 70-89: excellent transit; 50-69: good transit; 25-49: some transit; 0-24: minimal transit. Bike Score 90-100: Biker's Paradise; 70-89: very bikeable; 50-69: bikeable; 0-49: somewhat bikeable.

Table S4. Cities by tertiles of Walk Score, Transit Score, Bike Score, and percentage of Hispanic population.

Walk Score	Percentage of Hispanic residents		
	Tertile 1 (n=24) Range: 0.8 to 5	Tertile 2 (n=24) Range: 5.1 to 10.4	Tertile 3 (n=24) Range: 10.8 to 80.3
Tertile 1 (n=24) Range: 20 to 38	Danvers, Somerset, Barnstable, Weymouth, Burlington, Franklin, Reading, Wellesley, Wilmington, Braintree, Needham, Lexington, Winchester, Milton	Gardner, Taunton, Westfield, Agawam, Pittsfield, West Springfield, Attleboro, Randolph	Leominster, Methuen
Tertile 2 (n=25) Range: 39 to 55	Gloucester, Woburn, Beverly, Newburyport, Marblehead, Stoneham, Wakefield	Peabody, Saugus, Dedham, Greenfield, Norwood, Amherst, Northampton, Newton	Southbridge, Fitchburg, Marlborough, Haverhill, Chicopee, Holyoke, Milford, Framingham, Brockton, Waltham
Tertile 3 (n=23) Range: 56 to 89	Quincy, Melrose, Belmont	Winthrop, Fall River, Malden, Arlington, Brookline, Cambridge, Medford, Watertown	Worcester, New Bedford, Chelsea, Everett, Lawrence, Lowell, Lynn, Revere, Springfield, Salem, Boston, Somerville
Transit Score			
Missing (n=21)	Beverly, Burlington, Danvers, Franklin, Lexington, Newburyport, Reading, Somerset, Wellesley, Wilmington	Agawam, Amherst, Gardner, Greenfield, Peabody, Taunton, Winthrop	Marlborough, Methuen, Milford, Southbridge
Group 1 (n=27) Range: 14 to 33	Barnstable, Braintree, Gloucester, Marblehead, Needham, Stoneham, Wakefield, Weymouth, Winchester, Woburn	Attleboro, Dedham, Northampton, Norwood, Pittsfield, Randolph, Saugus, West Springfield, Westfield	Fitchburg, Framingham, Haverhill, Leominster, New Bedford, Salem, Waltham, Worcester
Group 2 (n=24) Range: 34 to 74	Belmont, Melrose, Milton, Quincy	Arlington, Brookline, Cambridge, Fall River, Malden, Medford, Newton, Watertown	Boston, Brockton, Chelsea, Chicopee, Everett, Holyoke, Lawrence, Lowell, Lynn, Revere, Somerville, Springfield
Bike Score			
Tertile 1 (n=26) Range: 28 to 37	Burlington, Danvers, Franklin, Reading, Somerset, Wellesley, Wilmington, Barnstable, Braintree, Gloucester, Needham, Weymouth, Woburn	Agawam, Gardner, Peabody, Taunton, Dedham, Saugus, Westfield	Marlborough, Methuen, Southbridge, Fitchburg, Haverhill, Leominster
Tertile 2 (n=21) Range: 38 to 45	Beverly, Lexington, Newburyport, Marblehead, Stoneham, Wakefield, Winchester, Melrose, Quincy	Greenfield, Winthrop, Attleboro, Norwood, Pittsfield, Randolph, West Springfield	Milford, Framingham, Worcester, Chicopee, Holyoke
Tertile 3 (n=25) Range: 46 to 96	Belmont, Milton	Amherst, Northampton, Arlington, Brookline, Cambridge, Fall River, Malden, Medford, Newton, Watertown	New Bedford, Salem, Waltham, Boston, Brockton, Chelsea, Everett, Lawrence, Lowell, Lynn, Revere, Somerville, Springfield

*Walk Score 90-100: Walker's Paradise; 70-89: very walkable; 50-69: somewhat walkable; 0-49: car-dependent. Transit Score 90-100: Rider's Paradise; 70-89: excellent transit; 50-69: good transit; 25-49: some transit; 0-24: minimal transit. Bike Score 90-100: Biker's Paradise; 70-89: very bikeable; 50-69: bikeable; 0-49: somewhat bikeable.

Table S5. Cities by tertiles of Walk Score, Transit Score, Bike Score, and percentage of black population.

Walk Score	Percentage of black residents		
	Tertile 1 (n=24) Range: 0.3 to 2.5	Tertile 2 (n=25) Range: 2.6 to 5.2	Tertile 3 (n=23) Range: 5.3 to 40.8
Tertile 1 (n=24) Range: 20 to 38	Danvers, Franklin, Reading, Somerset, Wellesley, Agawam, Gardner, Westfield, Methuen, Lexington, Winchester	Burlington, Wilmington, Barnstable, Braintree, Needham, Weymouth, Attleboro, Pittsfield, West Springfield	Taunton, Leominster, Randolph, Milton
Tertile 2 (n=25) Range: 39 to 55	Gloucester, Haverhill, Beverly, Newburyport, Marblehead, Wakefield, Greenfield, Milford, Northampton	Peabody, Saugus, Marlborough, Southbridge, Fitchburg, Stoneham, Chicopee, Holyoke, Newton	Woburn, Dedham, Norwood, Framingham, Amherst, Waltham, Brockton
Tertile 3 (n=23) Range: 56 to 89	Winthrop, Belmont, Watertown, Lawrence	Melrose, Quincy, Arlington, Brookline, Fall River, Salem, Revere	Worcester, Cambridge, Malden, Medford, New Bedford, Boston, Chelsea, Everett, Lowell, Lynn, Somerville, Springfield
Transit Score			
Missing (n=21)	Danvers, Franklin, Reading, Somerset, Wellesley, Agawam, Gardner, Methuen, Lexington, Beverly, Newburyport, Greenfield, Milford, Winthrop	Burlington, Wilmington, Peabody, Marlborough, Southbridge	Taunton, Amherst
Group 1 (n=27) Range: 14 to 33	Westfield, Winchester, Gloucester, Haverhill, Marblehead, Wakefield, Northampton	Barnstable, Braintree, Needham, Weymouth, Attleboro, Pittsfield, West Springfield, Saugus, Fitchburg, Stoneham, Salem	Leominster, Randolph, Woburn, Dedham, Norwood, Framingham, Waltham, Worcester, New Bedford
Group 2 (n=24) Range: 34 to 74	Belmont, Watertown, Lawrence	Chicopee, Holyoke, Newton, Melrose, Quincy, Arlington, Brookline, Fall River, Revere	Milton, Brockton, Cambridge, Malden, Medford, Boston, Chelsea, Everett, Lowell, Lynn, Somerville, Springfield
Bike Score			
Tertile 1 (n=26) Range: 28 to 37	Danvers, Franklin, Reading, Somerset, Wellesley, Agawam, Gardner, Methuen, Westfield, Gloucester, Haverhill	Burlington, Wilmington, Peabody, Marlborough, Southbridge, Barnstable, Braintree, Needham, Weymouth, Saugus, Fitchburg	Taunton, Leominster, Woburn, Dedham
Tertile 2 (n=21) Range: 38 to 45	Lexington, Beverly, Newburyport, Greenfield, Milford, Winthrop, Winchester, Marblehead, Wakefield	Attleboro, Pittsfield, West Springfield, Stoneham, Chicopee, Holyoke, Melrose, Quincy	Randolph, Norwood, Framingham, Worcester
Tertile 3 (n=25) Range: 46 to 96	Northampton, Belmont, Watertown, Lawrence	Salem, Newton, Arlington, Brookline, Fall River, Revere	Amherst, Waltham, New Bedford, Milton, Brockton, Cambridge, Malden, Medford, Boston, Chelsea, Everett, Lowell, Lynn, Somerville, Springfield

*Walk Score 90-100: walker's paradise; 70-89: very walkable; 50-69: somewhat walkable; 0-49: car-dependent. Transit Score 90-100: rider's paradise; 70-89: excellent transit; 50-69: good transit; 25-49: some transit; 0-24: minimal transit. Bike Score 90-100: biker's paradise; 70-89: very bikeable; 50-69: bikeable; 0-49: somewhat bikeable.