High Impact Prioritization of Bikeshare Program Investment to Improve Underserved Communities' Access to Jobs and **Essential Services**

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Research Question

- Current bikeshare systems have not captured high levels of ridership from underserved populations. There is some evidence that current bikeshare systems have specifically targeted certain populations to ensure sufficiently high demand for profitability. Far less attention has been paid to bikeshare programs' potential to provide greater access to jobs and essential services for underserved communities.
- This research tries to first, examine whether bikeshare systems have targeted specific populations and second, to quantitatively assess the potential for bikeshare systems to provide greater accessibility for underserved communities.

Methods and Data

Case study cities (Chicago and Philadelphia)



- Identifying underserved population (Adequately served/Moderately served/Underserved)
- Bicycle infrastructure (High/Moderate/Low level of bicycle lane density)
- Accessibility analyses

(High/Moderate/Low level)

$$A_{i} = \sum_{j \in e}^{N} O_{j} e^{-\beta t_{ij}}$$

Here A_{i} is the accelssibility of block
oup $i, 0, j$ is the opportunities

available at block group *j*, and *N* is the total number of blocks that block group has access to within a specific time threshold.

Identifying priority areas

A: Very high priority for bikeshare stations B: High priority for bikeshare stations C: Intermediate priority for bikeshare stations D: High priority bikeshare and bike infrastructure combined need area





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Level		Value				
High		P ³ > Mean + 0.5×Sd ⁴				
Moderate		Mean - 0.5×Sd <= P <= Mean + 0.5×Sd				
Low		P < Mean - 0.5×Sd				
Data			Chicago	Philadelphia		
ome: below the poverty line			< \$ 25,000 per year			
Percentage 1 ¹ : High			> 60.9%	> 70.9%		
Percentage 2 ² : High			> 77.9%	> 84.9%		
Income						
Percentage 1		Everything else				
Percentage 2						
ome: above the poverty line		> \$ 25,000 per year				
Percentage 1: Low			< 22.4% < 35.7		%	
Percentage 2: Low			< 59.1% < 67.8%		%	
ulations Level of bike infrastructures		Potential for increased Job and essential service				

oulations		Level of bike infrastructures			and essential service access			
/	Adequately served	High	Moderate	Low	High	Moderate	Low	
		\checkmark			\checkmark			
			\checkmark		\checkmark			
		\checkmark				\checkmark		
			\checkmark			\checkmark		
		\checkmark			\checkmark			
			\checkmark		\checkmark			
		\checkmark				\checkmark		
			\checkmark			\checkmark		
				\checkmark	\checkmark			
				\checkmark		\checkmark		
				\checkmark	\checkmark			
				\checkmark		\checkmark		





Priority areas for bikeshare stations in underserved communities and Current bikeshare station locations

	Philadelphia	
%)	20 (1.5%)	
1%)	174 (13.0%)	
24.5%)	326 (24.5%)	
7.6%)	285 (21.3%)	
3.1%)	531 (39.7%)́	
)	1336	
Chicago a	nd Philadelphia	
ago	Philadelphia	
ago 3%)	Philadelphia 1 (1.0%)	
ago 3%) 0%)	Philadelphia 1 (1.0%) 33 (31.4%)	
ago 3%) 2.0%) 1.2%)	Philadelphia 1 (1.0%) 33 (31.4%) 24 (22.9%)	
ago 3%) .0%) 1.2%) .0%)	Philadelphia 1 (1.0%) 33 (31.4%) 24 (22.9%) 6 (5.7%)	
cago.3%)2.0%)31.2%)0.0%)46.5%)	Philadelphia 1 (1.0%) 33 (31.4%) 24 (22.9%) 6 (5.7%) 41 (39.0%)	 Bike Share Station
ago 3%) 2.0%) 1.2%) 0.0%) 6.5%) 1	Philadelphia 1 (1.0%) 33 (31.4%) 24 (22.9%) 6 (5.7%) 41 (39.0%) 105	Bike Share Station Central Business District Boundary Category Very high priority for bike share stations
ago 3%) .0%) .2%) .0%) 5.5%) 1 0ns	Philadelphia 1 (1.0%) 33 (31.4%) 24 (22.9%) 6 (5.7%) 41 (39.0%) 105	Bike Share Station Central Business District Boundary Category Very high priority for bike share stations High priority for bike share stations
o () () () () () () () () () () () () ()	Philadelphia 1 (1.0%) 33 (31.4%) 24 (22.9%) 6 (5.7%) 41 (39.0%) 105	 Bike Share Station Central Business District Boundary Category Very high priority for bike share stations High priority for bike share stations Intermediate priority for bike share stations High priority bike share and bike infrastructure combined need and

Conclusions

 Not enough bikeshare stations are placed in underserved areas in Chicago and Philadelphia, despite the great need for bikeshare in these communities. • The index developed in this study can prioritize high bikeshare investment area to eliminate access barrier and indicate potential accessibility improvement for underserved populations. Furthermore, our results show that the presence of bikeshare systems brings greater accessibility improvements in underserved communities when compared to well-served areas. • However, as our study implies, a bikeshare system at its developing stage (like Indego in Philadelphia) with a small scale can also make a significant reduction in access barriers for underserved communities. • If we could have more detailed data of bikeshare trips in underserved areas, we

could prove the existence of accessibility improvements with real trip data.

of jobs at different levels of served and bicycle infrastructure								
	Мс	Moderate			Low			
phia	Chicago	P	hiladelphia	Chica	go	Philadelphia		
%	2105%		1662%	17549	%	1081%		
%	2149%		1418%	17839	%	1701%		
%	2045%		2857%	1507%		2261%		
f services at different levels of served nd bicycle infrastructure								
	Moderate				Low			
delph	ia Chica	jo	Philadelphia	a Chic	ago	Philadelphia		
44%	13459	%	818%	632	2%	501%		
35% 1113%		6	847%	862	2%	548%		

