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colorado school of public health

Transit and Treatment: Effectiveness of Transit Systems to Improve Substance Use and Mental Health in Connecticut

Strategies to Achieve Alignment, Collaboration, and Synergy Across Delivery and Financing Systems

Research-In-Progress Webinar
October 27, 2021
12-1pm ET

Agenda

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Welcome: **Glen Mays, PhD**
Director, Systems for Action

Presenters: **Jeffrey Cohen, PhD & Carla Rash, PhD**
University of Connecticut

Steven Huleatt, MPH
Capital Region Council of Governments

Q&A: **Glen Mays, PhD**

Presenters

Jeffrey Cohen, PhD

UCONN
UNIVERSITY OF CONNECTICUT

- Economist; UCONN Professor
- Expert in transit and real estate
- Past empirical research includes substance use treatment costs; other public health issues

Presenters

Carla Rash, PhD

UCONN HEALTH

- Clinical Psychologist
- Addictions expert
- Most research to date focused on efficacy trials of addictions treatments

Commentator

Steven Huleatt, MPH

CRCOG CAPITOL REGION COUNCIL OF GOVERNMENTS
Working together for a better region.

Steven Huleatt currently serves the Capitol Region Council of Governments as the Public Health Emergency Preparedness (PHEP) Grant Manager and as the Metropolitan Medical Response System (MMRS) Project Manager in Hartford, CT. He is also Adjunct Instructor in Clark University's Department of Community Medicine. Prior to joining the CRCOG, Mr. Huleatt was the Director of Health for the West Hartford-Bloomfield Health District for 25 years. Mr. Huleatt is a two-time past President of the Connecticut Association of Directors of Health (NACCHO State affiliate) and a past President of the Connecticut Public Health Association (APHA State affiliate).

Project Background

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- Access to substance use disorder (SUD) and mental health (MH) treatment
  - Is a costly problem in the US
  - Drives health disparities, and
  - Has been exacerbated by the opioid crisis.

- Aside: An example from a sample of 1198 patients initiating SUD treatment in CT/Western MA
  - 54% did not have a driver's license
  - Of the 553 with a license, 39% had no access to a vehicle

Background Cont'd

- Strong transit systems can improve treatment outcomes and impact clinic operating costs.

- Past studies: evidence of decreasing unit costs with more patients, but wide variation. (Duffy *et al.*, 2004; Beaston-Blaakman *et al.*, 2007; Dunlap, 2008)
  - Unknown why this variation occurs.
  - Results in difficult decision making on the part of state agencies.

- Treatment facilities' proximity to transit may:
  - Increase patient volumes
  - Reduce unbillable clinician time (missed appointments)
  - Pushing down unit cost curves (economies of scale)
  - If integrated (MH and SUD services), may also produce cost savings (economies of scope)

Research Aims

- Using a quasi-experimental, empirical estimation approach, we will examine:
  1. *How treatment costs differ, after vs. before a new transit line and/or change to transit service schedules, for providers near vs. far from transit.
  2. How transit impacts provider costs who offer comprehensive vs limited SUD services.
  3. How transit impacts provider costs who offer SUD or MH in isolation versus integrated care.
  4. For transit improvements, how is the reduction in treatment costs from treating patients with better treatment outcomes different, for clients treated at providers close to these enhanced social services, and after social services improvements? And how is this related to client demographics (i.e., equity)?

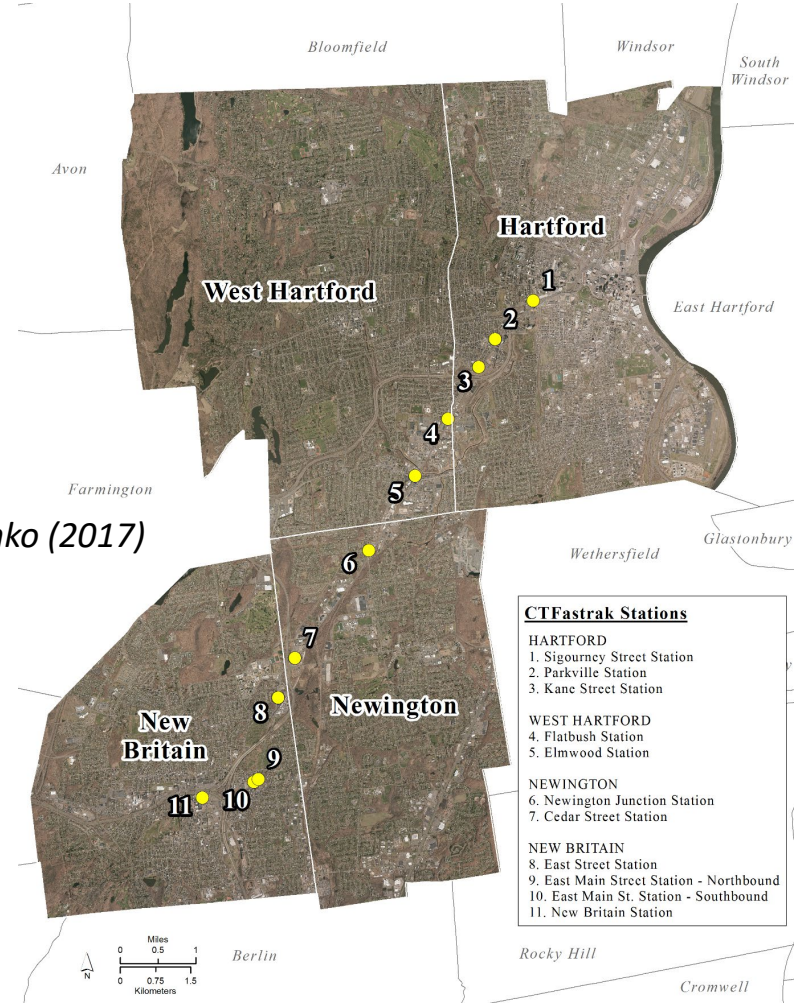
Data

- Facility level
  - State substance use agencies
  - IRS tax forms data
- Population level
  - *CTfastrak* Station Access
  - Population Demographics from ACS
- Primary area of focus: Connecticut

Data Universe

- 175 providers reported data to DMHAS regarding 1596 programs across 8 years (2012-2019)
- We have 20 different program types – 2 categories (outpatient and inpatient)
- Current results focus on 2015 *CTFastrak* rapid transit station openings in Hartford County, CT

Research Methods: New Transit



Graphic from Cohen and Danko (2017)

CTfastrak (bus rapid transit): Opened March 2015

Data Summary

- Our data includes 32,000-39,000 Client interactions per year
- About 17% are within one mile of *CTFastrak*

Statistic	N	Mean	St. Dev.
Clients Per Facility (Nclients)	1,527	3,436.75	3,302.31
DistanceDummy1Mile	1,567	0.174	0.379
Total Operating Cost	1,567	21,042,717	15,850,580
Total Assets	1,567	9,187,840	10,752,265
Total Salary	1,567	11,301,970	8,929,745
Age.18.25	1,527	0.18	0.21
Age.26.34	1,527	0.23	0.24
Age.35.44	1,527	0.18	0.18
Female	1,527	0.43	0.47
Black	1,527	0.12	0.11
Hispanic	1,527	0.15	0.14

Who is Served by New *CTFastrak* Stations

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- Our data includes 32,000-39,000 client interactions per year
- About 17% are within one mile of *CTFastrak*
- Providers with locations close to *CTFastrak* stations saw decrease in incremental expenditures (or costs) and a small increase in clients

Model

- Difference in Difference – Change in Volume and Cost

$$OpCost_{it} = \beta_0 + \beta_1 Year_i XDistance_i + \beta_2 Z + \epsilon$$
$$NCliens_{it} = \beta_0 + \beta_1 Year_i XDistance_i + \beta_2 Z + \epsilon$$

- Log – Elasticity

$$\ln(OpCost_{it}) = \beta_0 + \beta_1 \ln(NClients_{it}) + \beta_2 Z + \epsilon$$

- Triple Difference + Elasticity

$$\ln(OpCost_{it}) = \beta_0 + \beta_1 \ln(NClients_{it}) + \beta_3 \ln(NClients_{it})\, XDistance_i + \beta_4 \ln(NClients_{it})\, XYear_i + \beta_5 \ln(NClients)\, XDistance_i XYear_i + \beta_6 Z + \epsilon_{it}$$

Change in Operating Costs, Salary, & No. of Clients

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$$OpCost_{it} = \beta_0 + \beta_1 Year_i X Distance_i + \beta_2 Z + \epsilon$$
$$NCliens_{it} = \beta_0 + \beta_1 Year_i X Distance_i + \beta_2 Z + \epsilon$$

	Dependent Variable		
	log(OpCost)	log(Salary)	log(Nclients)
Year/Distance interaction term	-0.032***	-0.035**	-0.012
	(0.008)	(0.014)	(0.02)
Constant	16.247***	15.709***	6.775***
	(0.007)	(0.013)	(0.018)
Fixed Effects	Y	Y	Y
Year Effects	Y	Y	Y
Demographic Controls	Y	Y	Y
Observations	1,567	1,552	1,513
R2	0.996	0.988	0.99

Costs and Salary decreased after 2015; Number of Clients was steady

Elasticity

$$\ln(OpCost_{it}) = \beta_0 + \beta_1 \ln(NClients_{it}) + \beta_3 \ln(NClients_{it})\, XDistance_i + \beta_4 \ln(NClients_{it})\, XYear_i + \beta_5 \ln(NClients)\, XDistance_i XYear_i + \beta_6 Z + \epsilon_{it}$$

- Column 1:
  Elasticity of Cost to Volume can be calculated using a log-log regression
- Elasticity is close to zero
- Interaction terms on Log-number of clients parameter -> change in elasticity across interaction term
- So column 2:
  Elasticity of Cost to Volume increased slightly after 2015
  However, elasticity of Cost to Volume decreased for facilities within one mile of *CTFastrak* Stations.

	Dependent Variable	
	Log(OpCost)	Log(OpCost)
Log(Nclients)	-0.02	-0.021
	(0.015)	(0.021)
Log(NClients)XDistanceDummy		0.049
		(0.03)
Log(NClients)XYearDummy		0.023***
		(0.003)
DistanceDummyXYearDummy		0.269***
		(0.049)
Log(Nclients)XDistanceDummyXYearDummy		-0.040***
		(0.007)
Constant	16.361***	16.050***
	(0.1)	(0.151)
Fixed Effects	Y	Y
Year Effects	Y	Y
Demographic Controls	Y	Y
Observations	1,527	1,527
R2	0.996	0.996

Implications

- Opening of *CTFastrak* had a negligible effect on utilization
- However, spending decreased at facilities close to stations
  - And did not change at facilities not close to stations
- Further, spending per client decreased at facilities close to stations
  - And increased slightly at facilities not close to stations

Discussion

- Next Steps:
  - Incorporate individual program locations
  - Outcomes as regressors; consider demographic access (equity) – Aim #4
  - Multiple programs (inpatient vs. outpatient – Aim #2; SUD and MH – Aim #3)

- Facility Organization: Where are the savings coming from?
  - Can we see a change in spending on client attendance that is reduced as a result of the new transportation options?

- System Alignment and Advisory Panel:
  - What do the answers to the previous questions imply for system alignment?

Commentary

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Steven Huleatt, MPH

Thank you!

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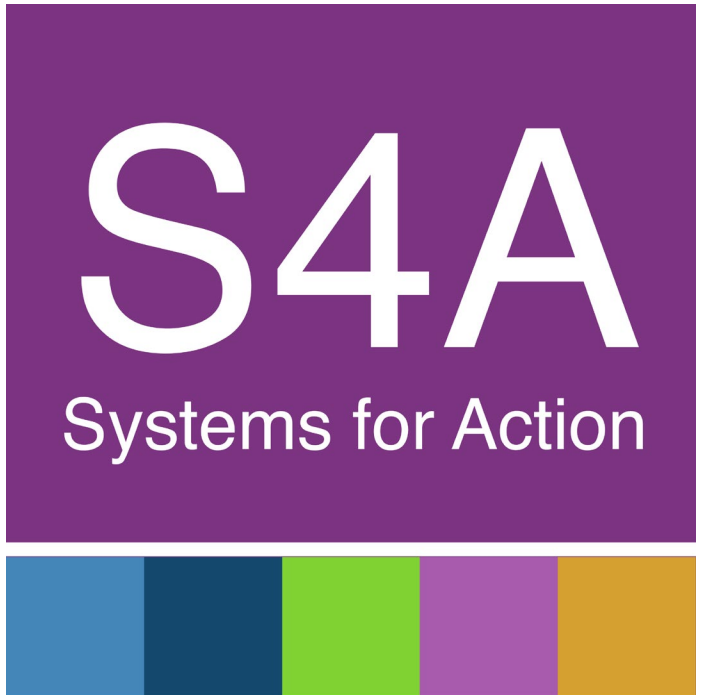
Questions?



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Upcoming Webinars

Nov. 10 **Closing the Gaps in Health & Social Services for Low-Income Pregnant Women**

Dec. 8 **Can Subsidized Transportation Options Slow Diabetes Progression?**

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https://systemsforaction.org/research-progress-webinars

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