Systems for Action
National Coordinating Center
Systems and Services Research to Build a Culture of Health

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

Improving Population and Clinical Health with Integrated Services and Decision Support

Research-in-Progress Webinar
Wednesday, January 9, 2019
12:00-1:00 pm ET/ 9:00 am-10:00 am PT

Funded by the Robert Wood Johnson Foundation

College of Public Health
Center for Public Health Systems and Services Research

Agenda

Welcome: **Shana Moore, PhD, MPA**
Director of Dissemination and Research Development
RWJF Systems for Action National Coordinating Center
University of Kentucky College of Public Health

Presenter: **Joshua Vest, PhD, MPH**
Director, Center for Health Policy
Associate Professor, Health Policy & Management
Indiana University Richard M Fairbanks School of Public Health - Indianapolis
Affiliated Scientist, Regenstrief Institute

Commentary: **Glen Mays, PhD**
Director
RWJF Systems for Action National Coordinating Center
University of Kentucky College of Public Health

Q & A: Moderated by **Shana Moore, PhD, MPA**

Presenter

Joshua Vest, PhD, MPH

Director, Center for Health Policy

Associate Professor, Health Policy & Management

Indiana University Richard M Fairbanks
School of Public Health - Indianapolis

Affiliated Scientist, Regenstrief Institute

Commentary Speaker

Glen P. Mays, PhD, MPH

Director

RWJF Systems for Action National Coordinating Center

University of Kentucky College of Public Health

Improving Population and Clinical Health with Integrated Services and Decision Support

Joshua R Vest, PhD, MPH

Director, Center for Health Policy

Associate Professor, Health Policy & Management

Indiana University Richard M Fairbanks School of Public Health at IUPUI

Investigator, Regenstrief Institute, Inc.

Regenstrief Institute

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- Paul K Halverson (Co-PI)
- Nir Menachemi
- Shaun Grannis
- Suranga Kasthuriranthne
- …many, many, others

Vest JR, Harris LE, Haut DP, Halverson PK, Menachemi N. Indianapolis Provider's Use Of Wraparound Services Associated With Reduced Hospitalizations And Emergency Department Visits. Health Aff (Millwood). 2018;37(10):1555-1561.

Vest JR, Menachemi N, Grannis S, Ferrell J, Kasthurirathne S,* Zhang Y, Tong Y, Halverson P. Impact of risk stratification on referrals and uptake of wraparound services to address social determinants: a stepped wedged trial. American Journal of Preventative Medicine. In press.

US policy is moving to make providers accountable for patient health.

Upstream thinking

Focus on prevention

Public Health
Prevent. Promote. Protect.

Addressing social determinants

More and more health care organizations are offering non-medical or “wraparound” services to improve patient health.

www.chelseajewish.org/celebrating-social-work-month-senior-care/

http://cchci.org/_services/behavioral-health/

Fitday.com

usf.edu

dmkelite.com

Pplay.google.com

guide.berkeley.edu/undergraduate

What roles does these services fulfill?

- These services most directly address: health behaviors, social contexts, and environments
  - These social determinants of health are larger drivers of health than medical care
  - These social determinants can inhibit care delivery
    - Lack of transportation, poor social networks, low education all complicate (or prevent) care
- Clinicians traditionally not trained (and health care system were not organized) to address these issues
  - Requires specialized professionals

Research question:

Does receipt of wraparound services reduce patients' health care utilization?

Approach:

Measure the association between receipt of wraparound services and utilization outcomes in an 11-year panel of adult patients.

Setting, sample, & measures

Setting:

- Eskenazi Health FQHCs
- Expanded wraparound services on co-located basis in 2011

Sample:

- Adults (≥18) with primary care visits from 2006-2016
  - Had to have ≥1 visit before 2011 & ≥1 visit after 2011

Determinant of interest: receipt of wraparound services (Vest, Grannis, et al IJMI 2017)

- Any social work, behavioral health, nutrition counseling, respiratory therapy, financial planning, medical-legal partnership, patient navigation, or pharmacist consultation
  - All patients in the study sample received at least one wraparound service during the study period

Outcome:

- Outcomes: annual hospitalizations; annual ED visits

Measures:

- Annual risk scores, utilization history, (binary) receipt of wraparound services (time-varying)
- Chronic conditions and demographic factors (time invariant)

Patient-level fixed-effects Poisson regression models described the association between wraparound services and outcomes.

- Patient-fixed effects controlled for time-invariant factors (e.g. race/ethnicity)
- Time-varying measures included in model (e.g. annual risk scores)
- Year dummies included to adjust for trends
- Robust standard errors to adjust for clustering
- Wraparound services entered as a lagged binary-indicator
  - Association with subsequent year utilization

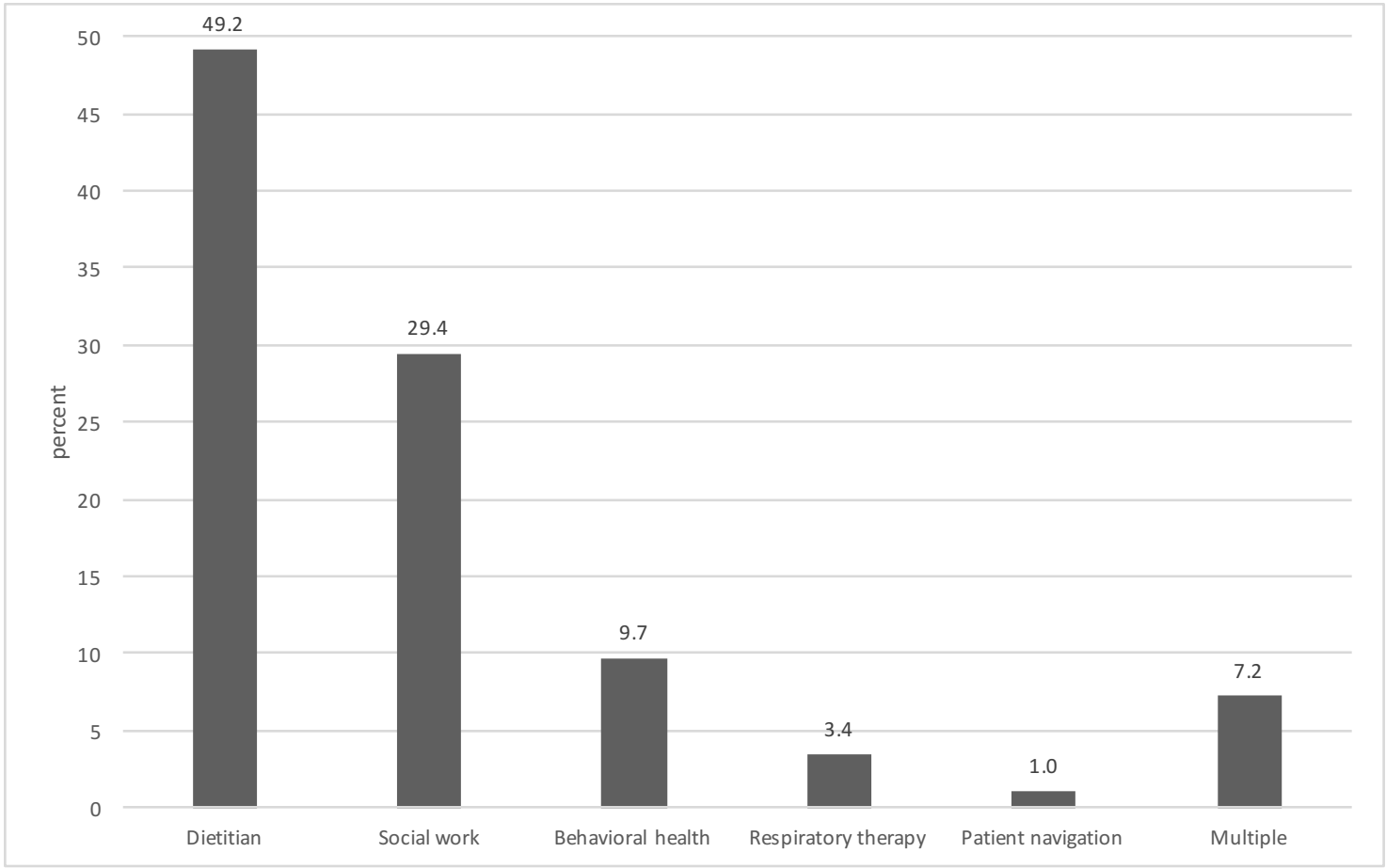
Robustness checks:

- repeated using fixed-effects negative binomial regression
- propensity-score matched comparison group of patients who did not receive any wraparound services with random-intercept Poisson models

High disease burden reflective of a safety-net population

	%
Demographics	
Age	49.7 (mean)
Female	71.9
Race/ethnicity	
Hispanic	18.7
African American	41.4
White, non-Hispanic	26.7
Other/unknown	13.4
Patient severity	
Resource utilization band	2.54 (mean)
Diagnoses	
Hypertension	65.2
Asthma	17.8
Depression	42.3
Diabetes	43.8
Substance abuse history	20.7
Tobacco use history	33.8
Annual utilization history	
Outpatient visit count	3.42 (mean)
Specialist visit count	2.86 (mean)
Emergency department visit count	0.81 (mean)
Hospitalization count	0.20 (mean)

Dietitians followed by social workers are the most commonly accessed wraparound services.



Receipt of any wraparound service was associated with a lower count of hospitalizations in the subsequent year.

	Hospitalizations	
	β (95% CI)	p
Receipt of any wraparound service in the prior year	-0.07 (-0.12, -0.02)	0.006
Severity score	0.66 (0.63, 0.69)	<0.001
Annual number of encounters		
Hospitalizations	--	
ED visits	0.01 (0.00, 0.02)	0.008
Outpatient visits	0.01 (0.01, 0.02)	<0.001
Specialty care visits	0.03 (0.03, 0.03)	<0.001

Patient fixed effects regression models with year dummies omitted for readability.

Receipt of any wraparound service was associated with a lower count of ED visits in the subsequent year.

	Hospitalizations		Emergency department visits	
	β (95% CI)	p	β (95% CI)	p
Receipt of any wraparound service in the prior year	-0.07 (-0.12, -0.02)	0.006	-0.05 (-0.09, -0.02)	0.003
Severity score	0.66 (0.63, 0.69)	<0.001	0.52 (0.51, 0.54)	<0.001
Annual number of encounters				
Hospitalizations	--		0.03 (0.01, 0.04)	<0.001
ED visits	0.01 (0.00, 0.02)	0.008	--	
Outpatient visits	0.01 (0.01, 0.02)	<0.001	0.01 (0.00, 0.01)	<0.001
Specialty care visits	0.03 (0.03, 0.03)	<0.001	0.01 (0.00, 0.01)	0.016

Patient fixed effects regression models with year dummies omitted for readability.

Limitations

- Generalizability
  - Single, safety-net institution
  - Wraparound services offered on a co-located basis (may not apply to organizations relying on referrals)
- Reductions may be attributable to other quality improvement activities occurring at the same time
- Results do not provide insights as to the relative value of each service

Receipt of any wraparound service was associated with a 7% lower count of hospitalizations & a 5% lower count of ED visits in the subsequent year.

- A portfolio of wraparound services may be an effective strategy for organizations serving a complex patient populations.
- Wraparound service could complement health information exchange, risk stratification, or cross-sectoral collaborations.

So how can we better support efficient and effective use of wraparound services?

Machine learning algorithms to identify those in need of wraparound services.

Claims & EHR

Diagnoses & Utilization

Algorithm

- Any wraparound
- Behavioral
- Dietitian
- Social work referral risk score

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Area resources
Living conditions
Social context
Safety
Transport

MARION COUNTY PUBLIC HEALTH DEPARTMENT
Prevent. Promote. Protect.

Neighborhood risk behaviors
Chronic diseases

INPC

Additional health behaviors
Utilization at other providers

Journal of the American Medical Informatics Association, 25(1), 2018, 47–53
doi: 10.1093/jamia/ocx130
Advance Access Publication Date: 21 November 2017
Research and Applications

Research and Applications

Assessing the capacity of social determinants of health data to augment predictive models identifying patients in need of wraparound social services

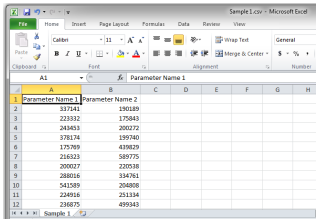
Suranga N Kasthurirathne,[1] Joshua R Vest,[2,3] Nir Menachemi,[2,3] Paul K Halverson,[2] and Shaun J Grannis[3,4]

[1]Indiana University School of Informatics and Computing, Indianapolis, IN, USA, [2]Indiana University Richard M. Fairbanks School of Public Health, Indianapolis, IN, USA, [3]Regenstrief Institute, Indianapolis, IN, USA and [4]Indiana University School of Medicine, Indianapolis, IN, USA

Automated process to provide risk stratification information.

ESKENAZI HEALTH

Before clinics open



5:00 AM

MRN	Name	provider	DOB	Any referral - need category	Any referral - probability	Mental health - need category	Mental health - probability	Dietitian - need category	Dietitian - probability	Social Work - need category	Social Work - probability
1	A	B	C	Low risk	0.70	Rising risk	0.50	Low risk	0.40	Rising risk	0.30
2	A	B	C	Low risk	0.60	Rising risk	0.40	Low risk	0.20	Low risk	0.10
3	A	B	C	Rising risk	0.90	Low risk	0.20	Low risk	0.50	Rising risk	0.40
4	A	B	C	Low risk	0.60	Low risk	0.20	Low risk	0.40	Rising risk	0.20
5	A	B	C	Low risk	0.50	Low risk	0.27	Low risk	0.30	Low risk	0.00
6	A	B	C	Rising risk	0.90	Low risk	0.20	Low risk	0.40	High risk	0.70
7	A	B	C								
8	A	B	C								
9	A	B	C								
10	A	B	C	Low risk	0.40	Rising risk	0.67	Low risk	0.50	Rising risk	0.20

The predicted probably the patient is in need of mental health services.

Identifiers

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Research question:

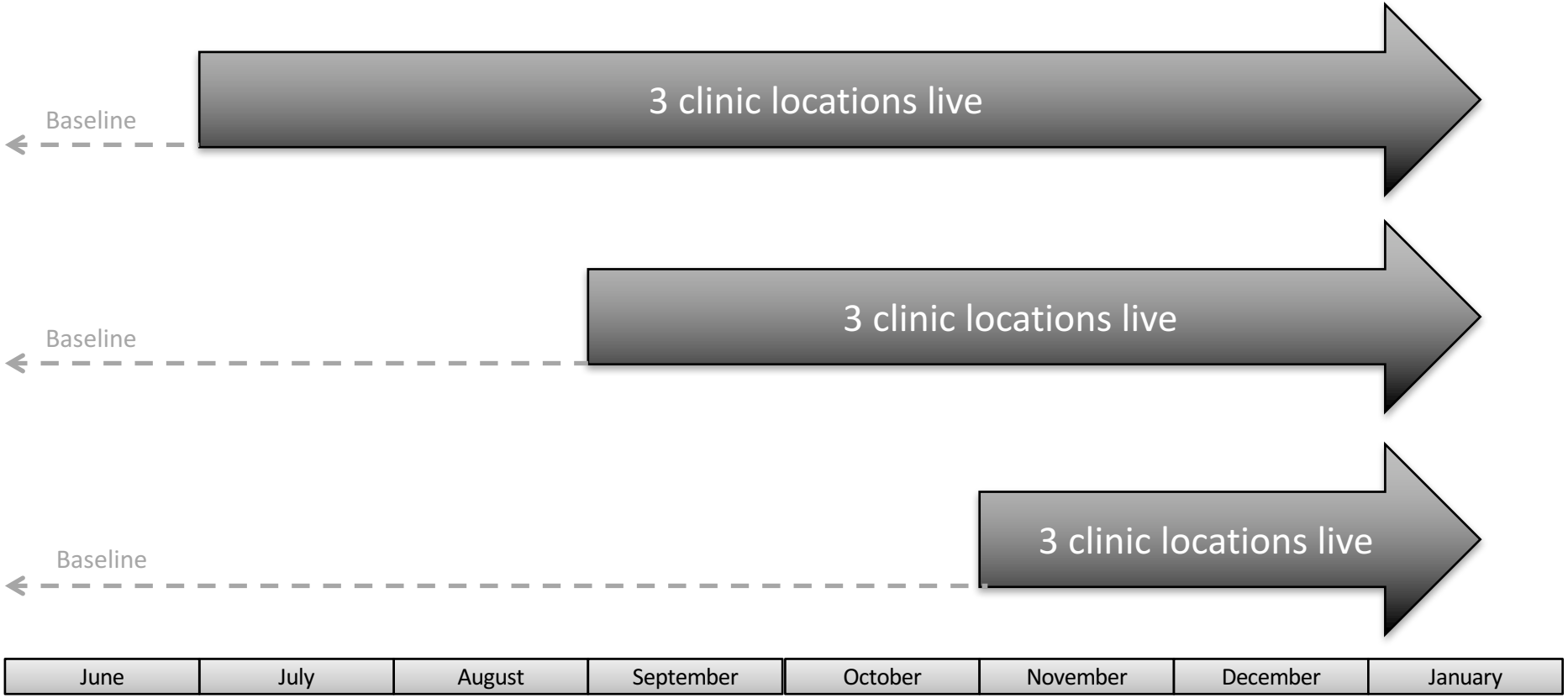
Does risk stratifying patients according to wraparound service needs:

1. Increase referrals
2. Increase kept appointment (i.e. better uptake)

Approach:

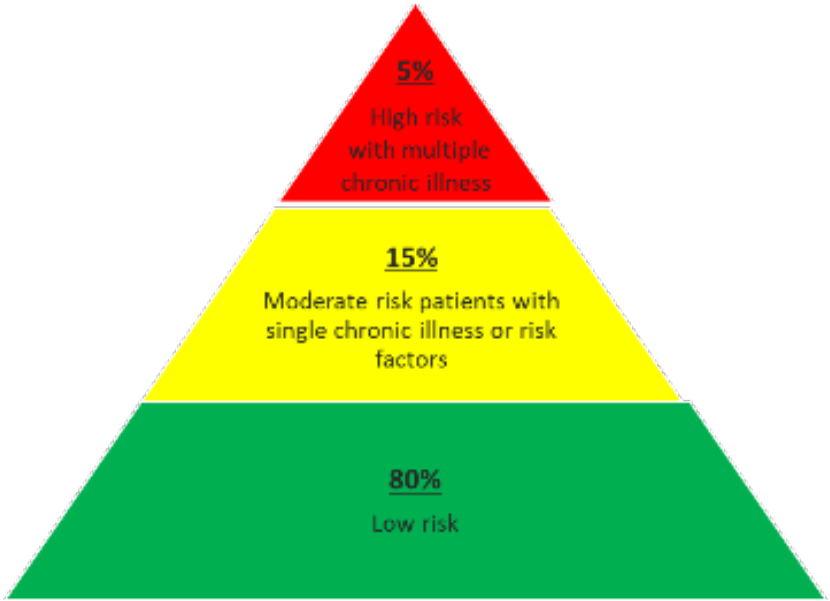
Pragmatic trial using a stepped-wedge design

Risk stratification was rolled out 3 clinics at a time from July to November 2017.



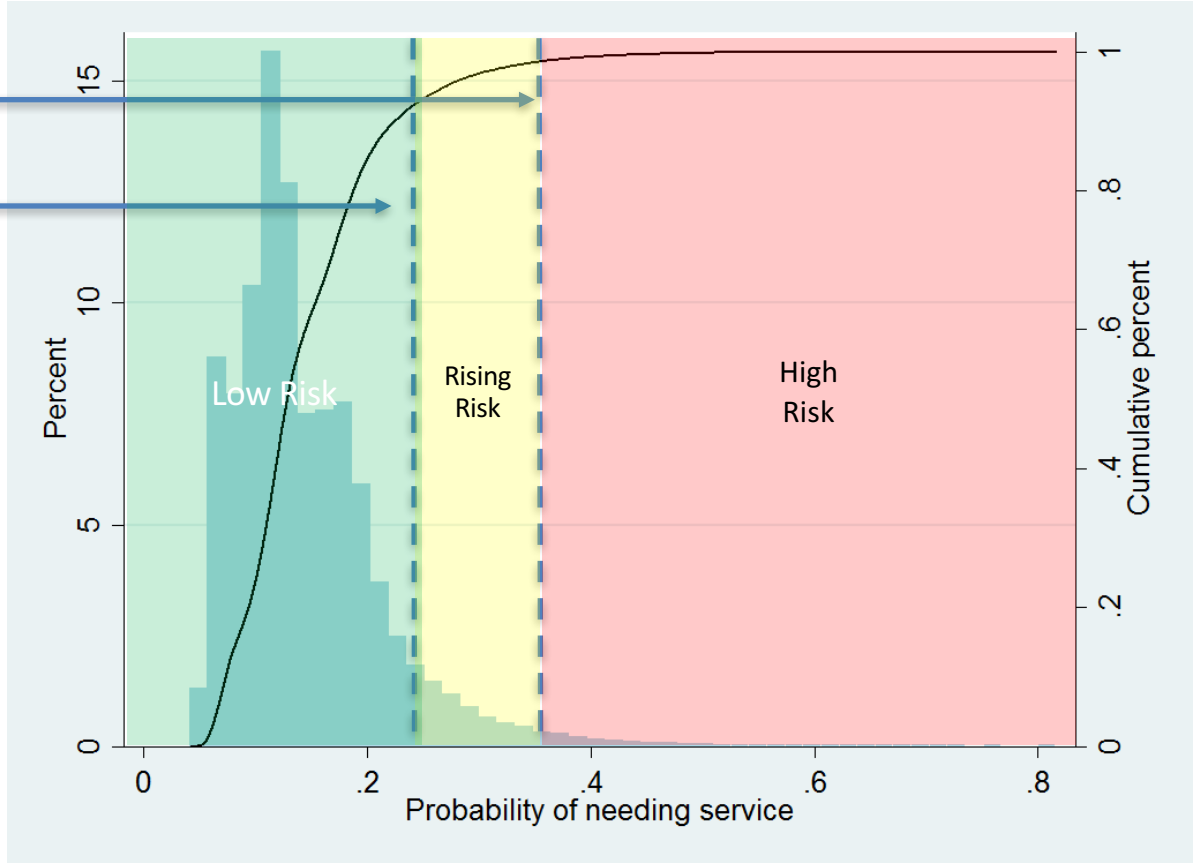
Measures & analyses

- Exposure:
  - Risk stratification category for each service



95% of the population has a probability <0.27

80% of the population has a probability <0.19

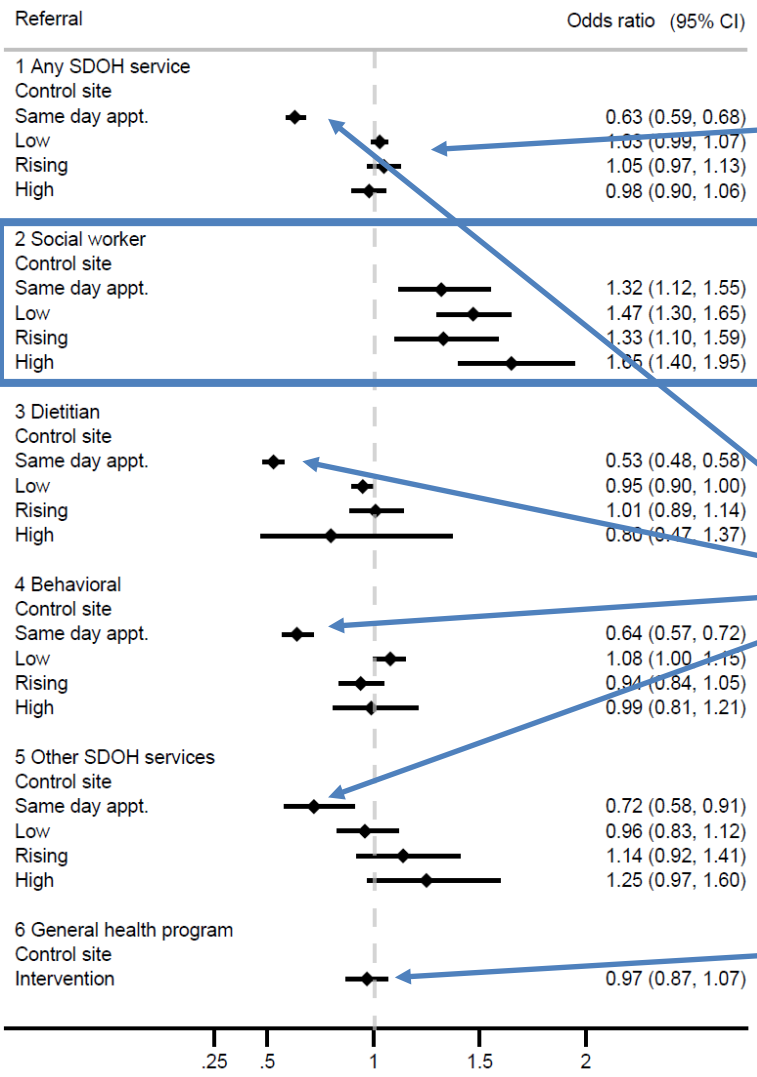


Measures & analyses

- Exposure:
  - Risk stratification category for each service
    - High
    - Rising
    - Low
    - Same day appointments
    - Control site (reference group)

Measures & analyses

- Exposure:
  - Risk stratification category (high, rising, low, same day, none)
- Covariates
  - Demographics (e.g. gender, age, race/ethnicity)
  - Location
  - Comorbidity scores
- Analysis
  - Generalized Estimating Equation (GEE) logistic regression models for each wraparound service (accounts for repeated patient observation)
  - Kept appointments only for patients with referrals
  - Nonequivalent DV (HealthyMe)



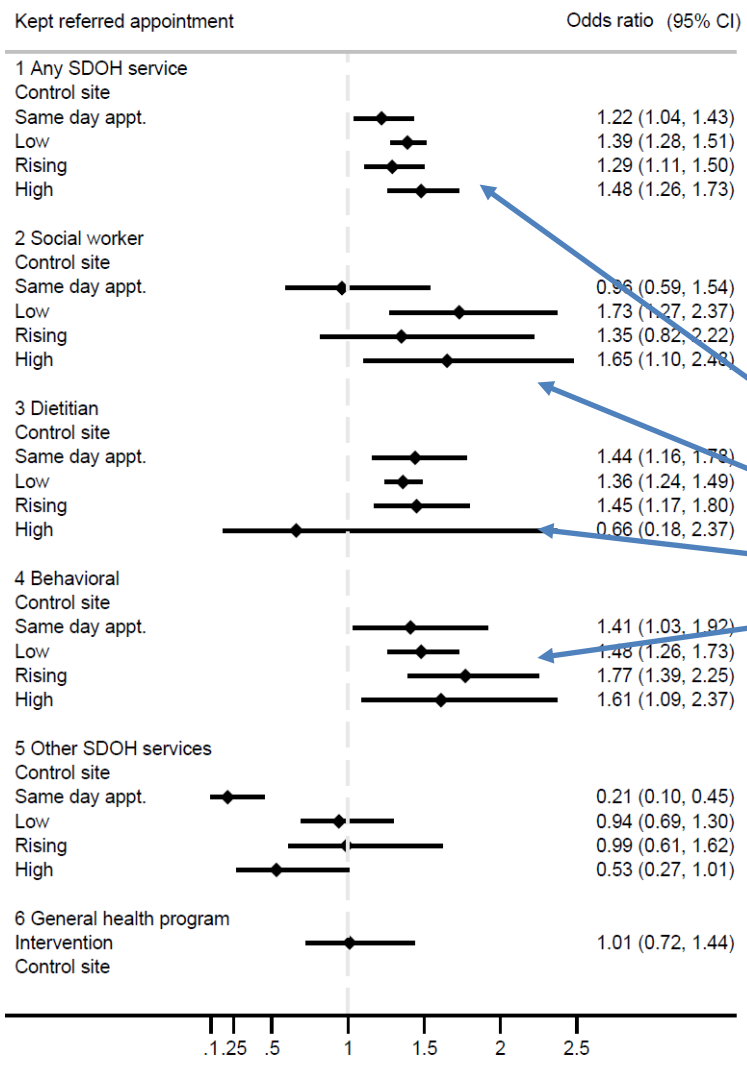
Intervention was not associated with increased referrals for any service.

Intervention was associated with increased referrals to social workers

For say day appointments (when no score available) referrals are less likely

- Workflow issue?
- Same day more likely to be acute condition?

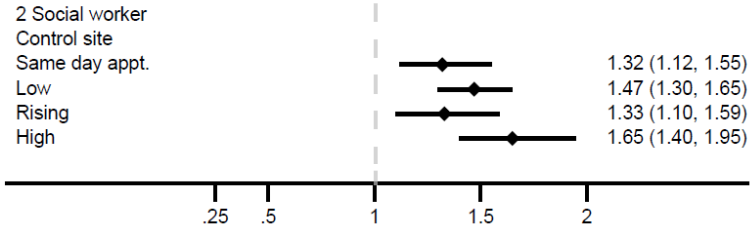
Suggests no broad changes to general referral practices in the clinics.



General increase in kept appointments once patients were referred to services.

- Even with some indications of dose response (not overselling pilot!)

Automated risk stratification scores successfully delivered to Eskenazi Health primary care clinics.



- Intervention associated with increased referrals for social workers.
- Intervention associated with increased rates of kept appointments for multiple social determinants of health services.
- Next step: put it into EPIC

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Upcoming Webinars

Archives

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

Upcoming

January 23, 2019, 12 p.m., ET

Systems for Action Individual Research Project

Implementing a Culture of Health among Delaware's Probation Population

Daniel J. O'Connell, PhD, Department of Criminal Justice, University of Delaware

February 13, 2019, 12 p.m., ET

Systems for Action Intramural Research Project

TBA

Glen P. Mays, PhD, MPH, and CB Mamaril, PhD, Systems for Action National Program Office, University of Kentucky College of Public Health

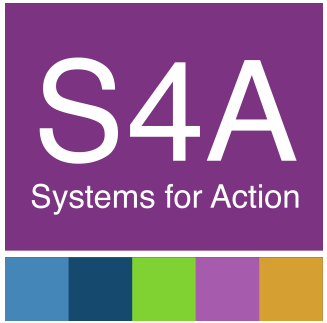
February 27, 2019, 12 p.m., ET

Systems for Action Individual Research Project

Housing for Health: Cross-Sector Impacts of Supportive Housing for Homeless High Users of Health Care

Ricardo Basurto Davila, PhD, MS, Chief Executive Officer, Policy Analysis Unit, Los Angeles Co. Department of Public Health and Corrin Buchanan, MPP, Program Manager, Housing for Health, Los Angeles Co. Department of Public Services

Questions?



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Acknowledgements

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Center for Public Health Systems and Services Research

and

Gatton College of Business and Economics