Improving population and clinical health with integrated services and advanced analytics

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IU Collaborating Research Center Partners

- Indiana University Richard M. Fairbanks School of Public Health
- Eskenazi Health
- Regenstrief Institute
- Marion County Public Health Department
- Indiana University Polis Center

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Overall objective

Increasing use of and determining the impact of “wrap around” services in an urban safety-net population.

Wrap around services: nutrition, social work, dental, financial planning, medical-legal partnership, mental health

Study 1

Impact of integrated services

Study 2

Social determinants of health decision support

Study 3

Integration of public health into case conferencing

Study 1

Impact of integrated services

- Integrated (i.e. “wraparound”) services offered at Eskenazi Health
- Outcome: utilization
- Propensity score matched groups and Difference-in-difference approach

- Case conferences include medical, social, and behavioral health
- Public health nurses will join conferences
- Qualitative assessment of public health contributions and organizational learning

Study 3

Integration of public health into case conferencing

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Focus of this presentation

Need to more effectively and efficiently identify patients in need of "wrap around" services.

- Wrap around services target the social and behavioral determinants of health
- Traditional risk identification has not included social determinants of health
- *Objective*: **Determine the impact of decision support that includes social determinants on referral and uptake of wrap around services**

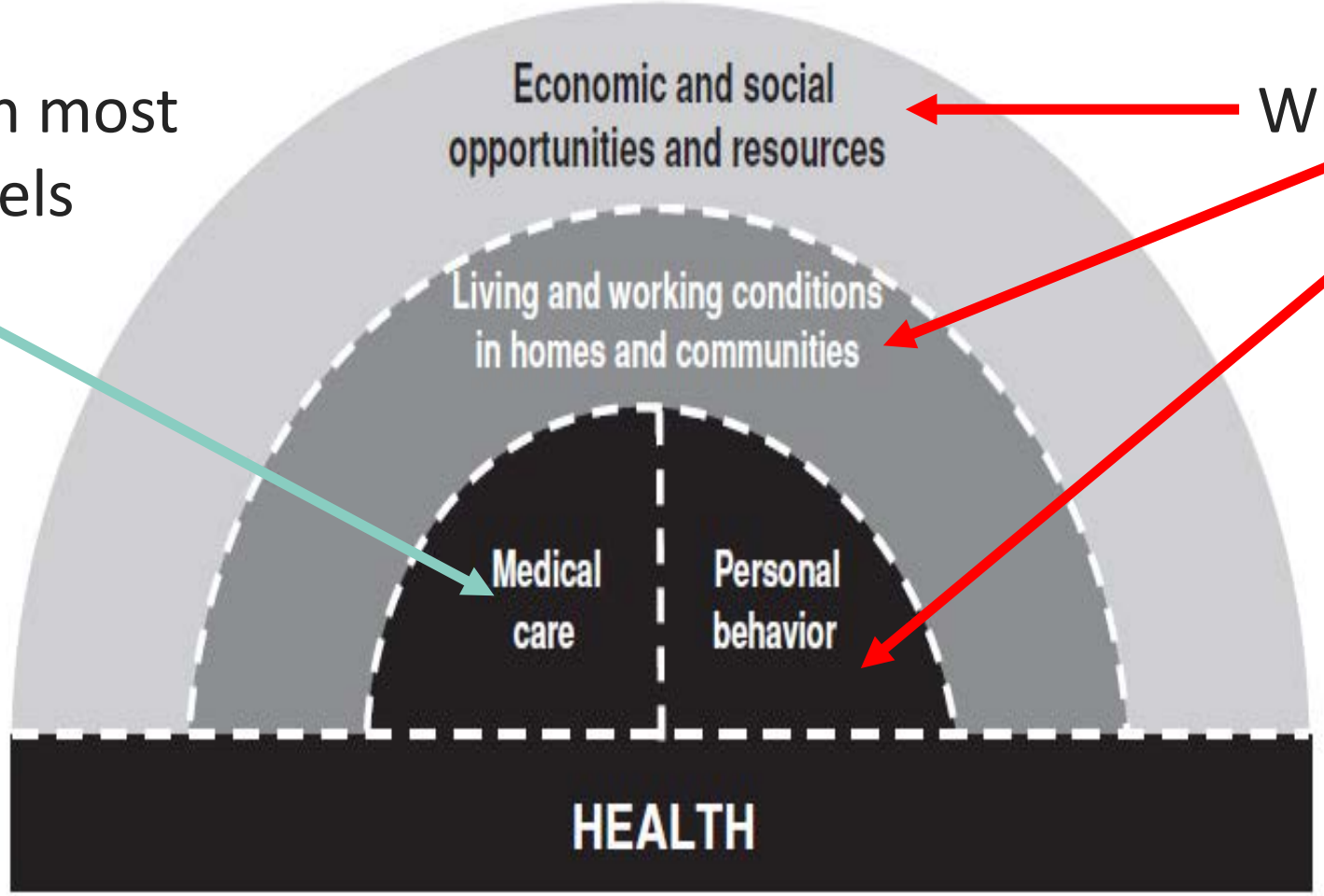
Creating a Decision Support Tool with Advanced Analytics

1. Risk identification tool
2. Summary of recent emergency encounters
3. Social context look up tools

Framework for organizing the factors included in risk identification tool

Data included in most prediction models

What we are adding



"Social Determinants of Health Model" by Braveman et al (2011) Annu. Rev. Public Health, 32:381-398

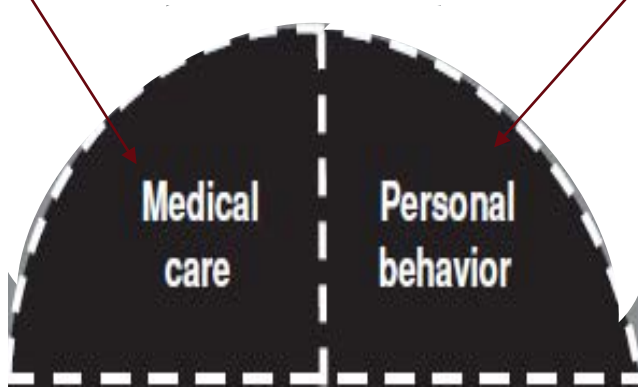
Access to comprehensive information possible through collaboration

1. Indiana Network for Patient Care (INPC)
   - Oldest & largest health information exchange in the US
2. IU POLIS Center
   - Developer of the nation's largest community information system
3. Marion County Public Health Department
   - Large local health department in Indianapolis with tradition of innovation

Framework for organizing the factors included in decision support modeling

INPC

- Diagnoses
  - AHD
  - Asthma
  - Autism
  - Coronary artery disease
  - Cervical cancer
  - Chronic kidney disease
  - Colorectal cancer
  - Congestive heart failure
  - COPD
  - Stroke / cerebrovascular accident
  - Depression
  - Diabetes
  - Hypertension
  - Ischemic vascular disease
  - Obesity
  - Pregnancy
  - Peripheral vascular disease
- ED visits (number)
- >2 ED / urgent care visits in 6 months
- Inpatient admissions
- >2 readmissions in 1 year
- >5 medications
- PCP visits
- Mental illness



INPC

- Smoking
- Substance abuse
- Age
- Domestic violence
- Care fragmentation
- Payer?

Annu. Rev. Public Health 2011.32:381-398

Framework for organizing the factors included in decision support modeling

POLIS
Marion County LHD

Annu. Rev. Public Health 2011.32:381-398

Framework for organizing the factors included in decision support modeling

Figure 2

Social Determinants of Health

Economic Stability	Neighborhood and Physical Environment	Education	Food	Community and Social Context	Health Care System
Employment	Housing	Literacy	Hunger	Social integration	Health coverage
Income	Transportation	Language	Access to healthy options	Support systems	Provider availability
Expenses	Safety	Early childhood education		Community engagement	Provider linguistic and cultural competency
Debt	Parks	Vocational training		Discrimination	Quality of care
Medical bills	Playgrounds	Higher education			
Support	Walkability				

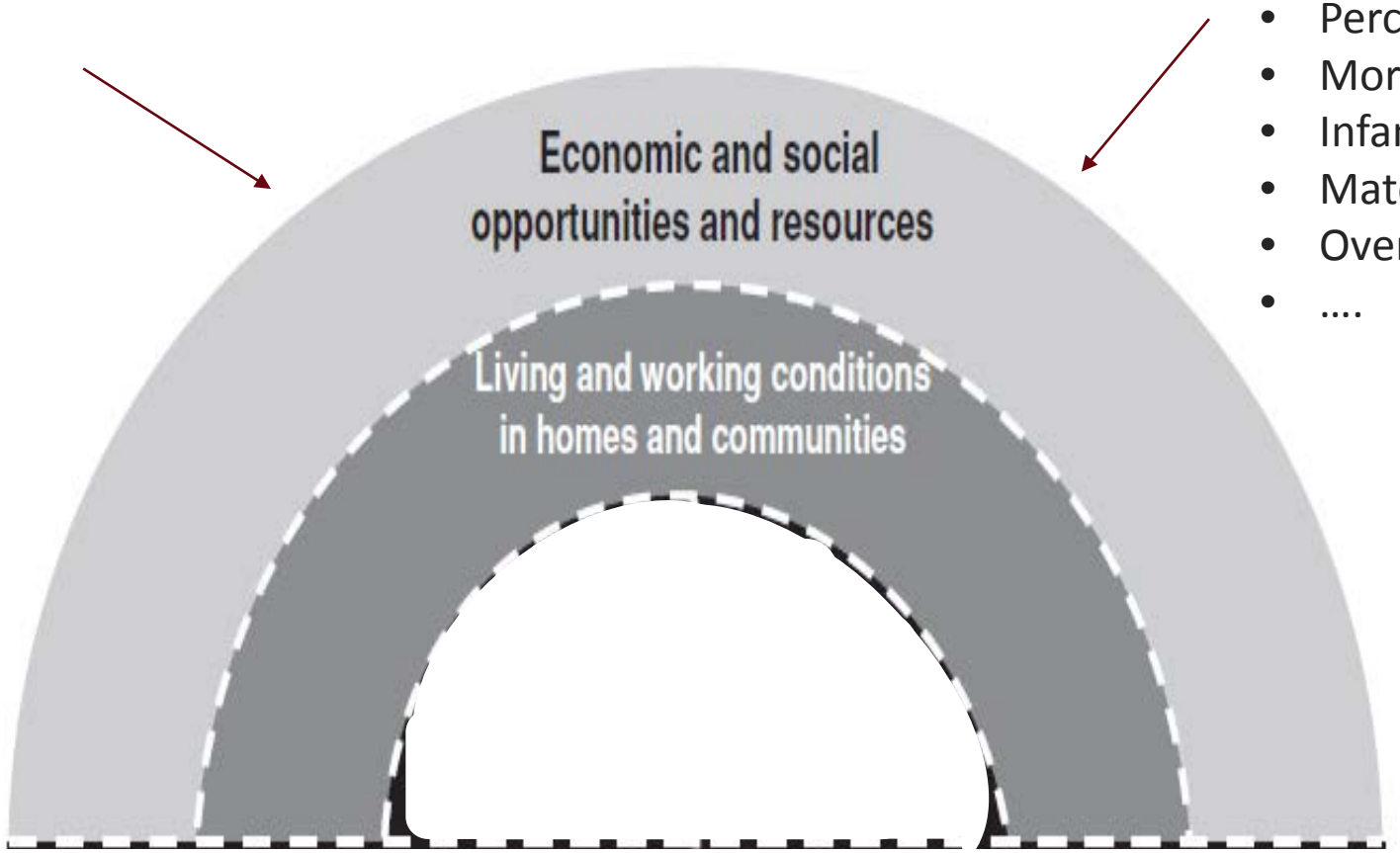
Health Outcomes
Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations

kff.org/disparities-policy/issue-brief/beyond-health-care-the-role-of-social-determinants-in-promoting-health-and-health-equity/

Examples of indicators

IU POLIS @ census tract

- Employment rates
- Tax delinquent properties
- Crime indices
- Education rates
- Voter participation
- Walkability
- ….



Marion County LHD @ census / health planning area

- Smoking prevalence
- Perceived safety
- Mortality rates
- Infant mortality rates
- Maternal smoking
- Overweight / obesity prevalence
- ….

Annu. Rev. Public Health 2011.32:381-398

Methods

Based on daily clinic appointment lists, population health nurses automatically receive:

1. Results of predictive algorithm of need for wrap around services
    - Service specific need (e.g. mental health, or social work)
    - Machine learning algorithm (2 years of training data)
2. Recent ED and inpatient encounters from across the state
3. Supplemented with access to online resource look up tool in patients neighborhood

Methods continued

- Will be implemented as a pragmatic trial
  - Wave 1 (this fall): implementation at 3 clinics
  - Wave 2 (at 3 months): implementation at 3 clinics
  - Wave 3 (at 6 months): implementation at 3 clinics
  - At least 3 months follow up for all clinics

Future directions

- Evaluate changes in patient utilization outcomes
- Integration into EHR (outside of messaging tool)

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