Context Matters: Neighborhood Socioeconomic Disadvantage and Health in Transitions

Amy JH Kind, MD, PhD
Associate Director-Clinical
Madison VA Geriatrics Research Education and Clinical Center (GRECC)
&
Associate Professor, Division of Geriatrics
University of Wisconsin School of Medicine and Public Health

Financial Disclosures

Amy JH Kind, MD, PhD: ajk@medicine.wisc.edu

Funding:
NIH/National Institutes on Aging
NIH/National Institutes on Minority Health and Health Disparities
US Department of Veterans Affairs
US Centers for Medicare and Medicaid Services
Multiple non-profit foundations
Consultant, State of Maryland
Case: One of Many…

- 78yo hospitalized with pneumonia
- Mild dementia, not recognized
- Discharged on oral antibiotic x 7 days
- Discharge teaching performed once (intensively) on the day of discharge. Caregiver not notified. (Daughter working 2 jobs to make ends meet.) Home health won’t visit due to neighborhood safety concerns.
- Rehospitalized 3 days later; recurrent pneumonia
- Antibiotic prescription found in patient’s pocket. He forgot to fill the medication.

Overview

- The influence of socioeconomic contextual disadvantage on health outcomes and rehospitalization
- Tools for improving care transitions in vulnerable populations
- Harnessing protocolized adaptation to achieve local program sustainability, especially in low-resource settings
Overview

- The influence of socioeconomic contextual disadvantage on health outcomes and rehospitalization
- Tools for improving care transitions in vulnerable populations
- Harnessing protocolized adaptation to achieve local program sustainability, especially in low-resource settings

Socioeconomic Disadvantage

- The state of being challenged by low income, limited education, and substandard living conditions for both the person and his or her social network*

Neighborhood Socioeconomic Disadvantage Impacts Health

- Associated with behaviors*, access to food**, safety†
- Linked to outcomes like mortality††, development of diabetes***, birth weight‡
- Health indicators improve with moving persons to areas of less concentrated poverty‡‡

Moving to Opportunity Study

- Sponsored by the US Dept of Housing and Urban Development (HUD)
- Random lottery (1994-1998) offered some public housing families, but not others, the chance to move into a less distressed (lower-poverty) neighborhood (N=4,604 families)
- Five cities: Baltimore, Boston, Chicago, Los Angeles, New York
- Data collected for 10-15 years post-randomization
  - Included measures on racial segregation of neighborhoods


Results

“Moving from a high-poverty to lower-poverty neighborhood leads to long-term improvements in adult physical and mental health and subjective well-being, despite not affecting economic self-sufficiency.”

Case: One of Many…

78yo hospitalized with pneumonia

- Mild dementia, not recognized
- Discharged on oral antibiotic x 7 days
- Discharge teaching performed once (intensively) on the day of discharge. Caregiver not notified. (Daughter working 2 jobs to make ends meet.) Home health won't visit due to neighborhood safety concerns.
- Rehospitalized 3 days later; recurrent pneumonia
- Antibiotic prescription found in patient's pocket. He forgot to fill the medication.

Does Context Impact Rehospitalization Risk?

30-Day Rehospitalizations

- Affect 1 in 5 hospitalized Medicare patients*
- Cost more than $30 billion annually
- Target of hospital-based Medicare payment penalties
- Rehospitalization measures to which these penalties are linked adjust for patient comorbidities, but do not account for socioeconomic factors

Rehospitalization Penalties Disproportionately Impact Hospitals Serving the Disadvantaged

- Safety-net hospitals have borne a disproportionate share of rehospitalization penalties since their initiation in 2012
- >2 times the risk of being penalized

*Joynt and Jha, JAMA, Jan 2013

Context

(Credit: AP/Robert F. Bukaty)
Target percentage of Medicare FFS payments linked to quality and alternative payment models in 2016 and 2018

- **2016**
  - All Medicare FFS (Categories 1-4): 30%
  - FFS linked to quality (Categories 2-4): 85%

- **2018**
  - Alternative payment models (Categories 3-4): 50%
  - All Medicare FFS (Categories 1-4): 90%

*Source: CMS*
“Finding bipartisan approaches to improve the US health care system has been a challenge, but considering socioeconomic status in readmission rates is one area of remarkable consensus.”

(JAMA, July 2015)

- Andrew Boozary, MD, MPP, Harvard
- Joseph Manchin III, US Senate, D-West Virginia
- Roger Wicker, JD, US Senate, R-Mississippi

Harnessing the Area Deprivation Index (ADI)

- A validated census-based measure
  - Factor-based index, 17 US Census-based indicators
- Correlated with multiple county-level health outcomes
  - Cardiovascular mortality
  - Cancer mortality
  - Cervical cancer prevalence
- Re-constructed and validated at the Census block-group (i.e., “neighborhood”) level

ADI Components

- Education
- Income
- Poverty
- Housing Cost
- Housing Quality
- Employment
- Single-parent Households

Table 1: Census Data Block Group Components and Factor Score Coefficients in the Singh ADI*

<table>
<thead>
<tr>
<th>Census Block Group Component</th>
<th>Factor Score Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of population aged ≥25 y with &lt;9 y of education</td>
<td>0.0649</td>
</tr>
<tr>
<td>Percentage of population aged ≥25 y with at least a high school diploma</td>
<td>0.0073</td>
</tr>
<tr>
<td>Percentage of employed persons aged ≥16 y in white collar occupations</td>
<td>0.0978</td>
</tr>
<tr>
<td>Median family income</td>
<td>-0.0977</td>
</tr>
<tr>
<td>Income disparity</td>
<td>0.0860</td>
</tr>
<tr>
<td>Median home value</td>
<td>-0.0688</td>
</tr>
<tr>
<td>Median gross rent</td>
<td>-0.0181</td>
</tr>
<tr>
<td>Median monthly mortgage</td>
<td>-0.0700</td>
</tr>
<tr>
<td>Percentage of owner-occupied housing units (home ownership rate)</td>
<td>-0.0614</td>
</tr>
<tr>
<td>Percentage of civilian labor force population aged ≥16 y unemployed (unemployment rate)</td>
<td>0.0806</td>
</tr>
<tr>
<td>Percentage of families below the poverty level</td>
<td>0.0972</td>
</tr>
<tr>
<td>Percentage of population below 150% of the poverty threshold</td>
<td>0.1907</td>
</tr>
<tr>
<td>Percentage of single-parent households with children aged ≤18 y</td>
<td>0.0719</td>
</tr>
<tr>
<td>Percentage of occupied housing units without a motor vehicle</td>
<td>0.0604</td>
</tr>
<tr>
<td>Percentage of occupied housing units without a telephone</td>
<td>0.0877</td>
</tr>
<tr>
<td>Percentage of occupied housing units without complete plumbing (bath)</td>
<td>0.0510</td>
</tr>
<tr>
<td>Percentage of occupied housing units with &gt;1 person per room (crowding)</td>
<td>0.0556</td>
</tr>
</tbody>
</table>

ADI = area deprivation index.
* Components and factor score coefficients shown from reference 28. All coefficients are multiplied by -1 to ease interpretation (greater ADI means a greater risk).


Neighborhood Socioeconomic Disadvantage Increases Rehospitalization Risk

ADE = area deprivation index; ADI = area deprivation index; CHF = congestive heart failure; PNA = pneumonia.
* On the ADI percentile range shown it is the least socioeconomically disadvantaged group of neighborhoods ranging sequentially by equally sized neighborhood groupings up to 10th or the most disadvantaged group of neighborhoods. Solid lines represent the mean relationship over each ADI percentile.

*Kind et al, Annals of Internal Medicine, Dec 2014
Risk for Rehospitalization

**Powerful Predictor**

- Living in a severely disadvantaged neighborhood predicts rehospitalization as powerfully as the presence of illnesses, such as chronic pulmonary disease
  - Stronger predictor than diabetes or Medicaid

- Association remains regardless of hospital

---

Kind et al, Annals, Dec 2014
Locations of the 15% Most Disadvantaged US Neighborhoods Based on 2000 ADI

*Kind et al, Annals, Dec 2014

Free On-Line 2000 ADI

- Look-up tool: www.hipxchange.org
- Data set: www.hipxchange.org/ADI
Brisk Use of On-Line Tool

- Individual look-up tool accessed >3000 times since publication in December 2014
- Full dataset downloaded >400 times by state/federal agencies, several notable health systems and universities
  - State Departments of Health
  - Massachusetts General Hospital, Brigham and Women’s, Johns Hopkins and others
  - Blue Shield of California

R01 NIH - National Institute on Minority Health and Health Disparities*

- Update the ADI, and assess geographic stability and association consistency
- Investigate hospital versus neighborhood effects
- Identify and study resiliency at the hospital level

*1R01MD010243 (PI: Kind)
Next Steps

- Socioeconomic contextual disadvantage and...
  - Program targeting
  - Policy
  - Research to clarify health impact
Overview

- The influence of socioeconomic contextual disadvantage on health outcomes and rehospitalization
- Tools for improving care transitions in vulnerable populations
- Harnessing protocolized adaptation to achieve local program sustainability, especially in low-resource settings

Case: One of Many…

- 78yo hospitalized with pneumonia
- Elderly patient is only able to communicate through his daughter.
- Patient lived independently at home but his daughter works 2 jobs to make ends meet.
- Home health service is unable to visit due to neighborhood safety concerns.
- Patient was discharged on oral antibiotic x 7 days and discharge teaching was performed once (intensively) on the day of discharge. Caregiver was not notified.
- Patient was rehospitalized 3 days later with recurrent pneumonia.
- Antibiotic prescription found in patient’s pocket. Patient forgot to fill the medication.

How Can We Help?
US Health System: 50 Years Ago

Hospital  →  Primary Care

US Health System: Today

Hospital  →  Primary Care

Assisted Living Facilities

Nursing Home

Inpatient Rehabilitation

Long-Term Hospitals
Post-Hospital Transitions are Difficult for Patients

- Patients are often not prepared for next setting
- Little patient empowerment in hospital
- Lack of reinforced patient education

* Coleman. JAGS. 2003;51: 549-555.

Transitional Care

- Broadly, a set of actions designed to ensure the coordination and continuity of health care as patients transfer between different locations or different levels of care in the same location*

* Coleman, JAGS, 2003
Common Misperceptions

- Discharge practice = transitional care
  - Discharge is only one piece of a high-quality transition
- Any post-discharge phone call or contact = transitional care
  - Not all phone calls/contacts are created equal
- Transitional care is not necessary if I use ‘teach back’
  - Many patients will not fully understand their care plan without reinforced messaging over time

Components of Effective Transitional Care

- Multi-component, multi-disciplinary, team-based care
- Clear integration with both inpatient and outpatient sites of care
- Reinforced messages over time
- Patient-centered
  - Post-hospital support needs vary; transitional care must be tailored to these needs
Concept for Comprehensive Post-Hospital Transitional Care

Strong Discharge Practices
- Medication Reconciliation
- Discharge Teaching/Materials
- Medical Follow-Up Plans
- Quality Discharge Documentation

All Hospitalized Patients

* Programs are additive. They are not mutually-exclusive.

Unpublished figure, © Amy JH Kind, MD, PhD
Concept for Comprehensive Post-Hospital Transitional Care

Hospitalized Population

- Highest-Risk Patients
  - Patient must be geographically close & agreeable to a home-visit

All Hospitalized Patients

Strong Discharge Practices
- Medication Reconciliation
- Discharge Teaching/Materials
- Medical Follow-Up Plans
- Quality Discharge Documentation

Home-Visit Based Transitional Care Program

* Programs are additive. They are not mutually-exclusive.

Unpublished figure, © Amy JH Kind, MD, PhD
Unmet Need

- Many of the patients who need transitional care cannot access such services
  - Socioeconomically disadvantaged populations
  - Areas with poor health care access

- Need transitional care programs that adapt, succeed and sustain in underserved and disadvantaged areas

Concept for Comprehensive Post-Hospital Transitional Care

**Home-Visit Based Transitional Care Program**

**Coordinated Transitional Care Program (C-TraC)**
- Hospital-Based C-TraC Nurses
- Outpatient Integration

**Strong Discharge Practices**
- Medication Reconciliation
- Discharge Teaching/Materials
- Medical Follow-Up Plans
- Quality Discharge Documentation

**Hospitalized Population**

**Highest-Risk Patients**
- Patient must be geographically close & agreeable to a home-visit
- Could be identified by C-TraC nurses in addition to pre-defined patient characteristics

**All Higher-Risk Patients**
- Examples: cognitively impaired or lives-alone or prior hospitalization or medically complex

**All Hospitalized Patients**

* Programs are additive. They are not mutually-exclusive.

Unpublished figure, © Amy JH Kind, MD, PhD
VA Coordinated-Transitional Care Program (C-TraC)

- Phone-based program
- Specially-trained RN nurse case manager
- Protocolized encounters
- Teachings based on theory of Spaced Retrieval*
  - Method of learning information by practicing recalling that information over increasingly longer periods of time
  - Applicable in early stages of dementia
- Caregivers involved, activated at each step


C-TraC Goals

1. Educate and empower the patient/caregiver in medication management
2. Ensure the patient/caregiver has medical follow-up
3. Educate the patient/caregiver regarding red flags
4. Ensure the patient/caregiver knows whom to contact if questions arise

*Kind, Health Affairs, 2012.
Eligibility

- Hospitalized on non-psychiatric acute-care ward
- Discharged to community

AND one or more of the following:

1. Have documentation of dementia, delirium or cognitive impairment
2. 65 years or older AND
   - lives alone OR
   - had a previous hospitalization in past 12 months

* Kind, Health Affairs, 2012.

Coordinated-Transitional Care (C-TraC) Program

**HOSPITAL**

1. Core Step 1: Identification of Eligible Patient
2. Core Step 2: Multi-Disciplinary Rounds (Inpatient Team Integration)
3. Core Step 3: Inpatient Visit
4. Core Step 4: 48 Hour Phone Call

**COMMUNITY**

1. Core Step 5: Subsequent Phone Calls
2. Core Step 6: Discharge from Program
3. Urgent Actions
4. Outpatient Team Contact

* Kind at al, JAGS, 2016
C-TraC: In-Hospital Visit

C-TraC: Telephone Follow-up

- Initial call is 48-72 hours after discharge with caregiver/veteran to reinforce
  - Medication management
  - Medical follow-up
  - 3 Red flags
  - C-TraC Nurse case manager contact information

- Average 36 min per call
  - Patient led medication reconciliation
  - 1 in 3 have medication discrepancies
  - Active coordination with outpatient providers
**C-TraC Cut Rehospitalizations**

- 30-day rehospitalizations cut by 1/3 when compared to baseline group

<table>
<thead>
<tr>
<th>C-TraC Group (N = 500)</th>
<th>30 Day Rehospitalization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adjusted**</td>
</tr>
<tr>
<td>Establishment period (Months 1-6), n = 103</td>
<td>1.00</td>
</tr>
<tr>
<td>Intervention period (Months 7-18), n= 397</td>
<td>0.56</td>
</tr>
</tbody>
</table>

**Multivariate logistic regression model adjusted for veteran age, gender, race, Medicaid status, education level, VA service connected status; whether veteran lives alone; presence of dementia/other cognitive impairment/delirium; Charlson comorbidity score; needing more help with bathing, dressing, transferring and toileting in 2 weeks prior to hospitalization; decline in ability to stand or walk in 2 weeks prior to hospitalization; and whether veteran manages own medications.**


**The Coordinated-Transitional Care (C-TraC) Program**

- Net cost avoidance of over $1,200 per Veteran served
- Veterans and caregivers reported high satisfaction with intervention, decreased caregiver stress; Providers loved the program
- C-TraC successfully sustained (and expanded) at multiple VA and non-VA launch sites
C-TraC Continues to Disseminate

- Mentored C-TraC launches at a range of VA and private hospitals throughout US
  - Boston VA Hospital newest C-TraC site
  - Mentored implementations, free on-line toolkit (>500 downloads) and grassroots program growth
    - www.hipxchange.org/C-TraC

- 5-year NIH-funded RCT to evaluate C-TraC’s impact in a non-VA dementia-specific population (results in 2020)

Initial Dissemination Results

* Kind et al., JAGS, 2016
Overview

- The influence of socioeconomic contextual disadvantage on health outcomes and rehospitalization
- Tools for improving care transitions in vulnerable populations
- Harnessing protocolized adaptation to achieve local program sustainability, especially in low-resource settings

Goal: Engineer Sustainable Programs for the Most Socioeconomically Disadvantaged Areas

*Kind et al, Annals, Dec 2014
Medicare-funded 2-year C-TraC Pilot Dissemination to Rural Colorado

- Implementation science to engineer a platform for sustainment at the microsystem level
  - Replicate, adapt, “succeed” & sustain
- Protocolized adaptation in dissemination
- Completion: 2017

* Kind et al, JAGS 2016

Implementation Mentoring* for C-TraC

18-24 months for full process

Pre-Conditions
- Identification of need
- Review existing interventions

Pre-Implementation
- Core elements
- Customize delivery
- Logistical training

Implementation
- Process evaluation
- Feedback/protocol refinement

Maintenance and Evolution
- Sustain
- Disseminate

1. Coach local C-TraC staff to ensure they achieve widespread local stakeholder engagement prior to launch
2. Coach local C-TraC leadership through iterative phased protocol refinement post-launch
3. Mentor local teams to perform continuous process monitoring, documentation
4. Mentor local C-TraC teams to perform key outcome monitoring and reporting to ensure strongest chances of post-grant sustainability

1. Document existing local discharge processes
2. Provide a comprehensive overview of C-TraC

1. Convene local multidisciplinary key-stakeholder group
2. Coach local key-stakeholders to define local high-impact outcomes, goals
3. Detailed discussion of core C-TraC elements, processes
4. Formally adapt C-TraC operations to accommodate local VA system
5. Ensure integration with (not duplication of) existing processes
6. Train newly hired C-TraC local staff in clinical program delivery, and provide ongoing coaching of program leadership in program assessment, reporting and administrative barrier reduction

* Adapated from CDC’s Replicating Effective Programs Implementation Theory Model

* Kind et al, JAGS, 2016
Conclusions

- **Context matters**: It impacts patient health as well as care delivery

- Context must be carefully considered in the engineering of solutions to eliminate health disparities

- New tools and approaches are available

- More work in this area is needed
Funding
• NIA 2P50AG033514-06 (Asthana PI; Kind Project 3 PI)
• NIMHD R01MD010243-01 (Kind PI)
• NIA Beeson Career Development Award (1K23AG034551)
• Madison VA GRECC
• VA T-21 GEC: Innovative Patient Centered Alternatives to Institutional Care
• VA Office of Rural Health
• Wisconsin Partnership Program New Investigator Award
• Centers for Medicare and Medicaid Services

Thank you!
C-TraC patients and families

Acknowledgements

Dissemination Team/Collaborators
Alan Bridges
Becky Kordahl
Sanjay Asthana
Laury Jensen
Ken Shay
Karen Massey
VISN 12 Leadership
Madison VA Hospital Leadership
VACO Leadership
UWHC Leadership
Beth Houlahan
Maria Brenny-Fitzpatrick
UWHC C-TraC Team
Madison VA C-TraC Team
Andrea Gilmore-Bykovskyi
Korey Kennelly
Jane Brock
Steve Jencks

Funding
• NIA 2P50AG033514-06 (Asthana PI; Kind Project 3 PI)
• NIMHD R01MD010243-01 (Kind PI)
• NIA Beeson Career Development Award (1K23AG034551)
• Madison VA GRECC
• VA T-21 GEC: Innovative Patient Centered Alternatives to Institutional Care
• VA Office of Rural Health
• Wisconsin Partnership Program New Investigator Award
• Centers for Medicare and Medicaid Services

Thank you!
C-TraC patients and families