‘Co-construction’ of community infrastructure to reduce health disparities

Exploring sociotechnical design in the Jackson CBRN and Longmont Enabling Caring Communities projects.

Mike Klinkman  University of Michigan, GRIN
Don Nease  University of Colorado, SNOCAP
Ken Toll  United Way of Jackson County
WE have 4 goals for the session

- Demonstrate the importance of connecting community and medical information silos to support integrated health care
- Discuss the core principles of sociotechnical design as a framework to organize work on community health problems
- Draft a ‘methods toolbox’ to guide researchers and communities
- Build a collaborative community of researchers engaged in this type of work
Figure 1

Impact of Different Factors on Risk of Premature Death

Public health? Community? Government?

Medical [health care] enterprise

WHO? Individuals themselves? Medical enterprise? Social services?

Epigenetics???

Communities of solution (COSs) are the key principle for improving population health. The 1967 Folsom Report explains that the COS concept arose from the recognition that complex political and administrative structures often hinder problem solving by creating barriers to communication and compromise. A 2012 reexamination of the Folsom Report resurrects the idea of the COS and presents 13 grand challenges that define the critical links among community, public health, and primary care and call for ongoing demonstrations of COSs grounded in patient-centered care. In this issue, examples of COSs from around the country demonstrate core principles and propose visions of the future. Essential themes of each COS are the crossing of “jurisdictional boundaries,” community-led or -oriented initiatives, measurement of outcomes, and creating durable connections with public health. (J Am Board Fam Med 2013;26:232–238.)

Keywords: Connecting Communities: Public and Personal Health
Community-led or –oriented

Measurement of outcomes

Durable connections
Our approach

Create a ‘reference architecture’ including human infrastructure + technical (IT) infrastructure to support and sustain the Community of Solution approach.

People need to work with systems.
Systems need to serve people.

This probably requires durable partnerships between academic health centers (or CTSAs) and communities to overcome the ‘self-organizing’ problem.
The importance of technical (IT) infrastructure
Applications vs. Infrastructure

- Rather than focusing on fancy new IT solution for (one) problem
- Promote building a platform to solve (most) problems
<table>
<thead>
<tr>
<th>Views of Information.</th>
<th>Socio-cultural View</th>
<th>Conversational View</th>
<th>Informatics View</th>
<th>Engineering View</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Individuals, values and principles.</em></td>
<td><em>Roles, relationships and responsibilities.</em></td>
<td><em>Meanings are predefined and concrete.</em></td>
<td><em>Meanings are predefined and concrete.</em></td>
</tr>
<tr>
<td></td>
<td>New meanings are negotiated.</td>
<td>Meanings include Intentionality.</td>
<td></td>
<td>Measurements but no meaning.</td>
</tr>
</tbody>
</table>
Pairing human and technical infrastructures
Sociotechnical design:

A process by which social systems (communities) and technical experts co-create, co-design, and co-evolve technical solutions to problems affecting their systems.
Concepts of opportunistic discovery and emergent communities

Issues of community resolve, stamina, and trust

Methods for community exploration, mapping, and activation

Giving up control -- MUTUALITY
Jackson, Michigan

70 mi W of Detroit
1 city, 19 townships, 7 villages
County population: 160,248
City population: 33,534
11%+ unemployment rate
$47,424 median household income
1 in 3 with more than HS diploma
39% children insured by Medicaid
19% of children live in poverty
• Founded in 2009
• Community-wide Clinically Integrated Network, open to all
• Over 230 community physicians
  — 80 primary care (90% of PCPs), 150 specialty care
• 80,000 primary care patients (160K in county)
• Henry Ford Allegiance Health as partner/parent
• Single community ambulatory EHR (Epic in 2017)
• Strong relationships with HIO, Public Health, CMH
Community:
- Jackson HIO
- Jackson County HD
- Jackson Health Network
- Henry Ford Allegiance
- LifeWays CMH
- United Way
- Central MI 2-1-1

Technical experts:
- RiverStar Software
- VisionLink (MI 2-1-1)
- JCMR (Epic)
- MiBridges (MDHHS)
- MiHIN

Researchers:
- MICHR (CTSA) CE field team
- MPHI
- MI/CO/Newcastle collab
AIM: Redesign health care delivery to integrate social services and medical care (and behavioral health care) for at-risk population

OVERALL DESIGN:

• Community Health Innovation Region (CHIR)—backbone organization that convenes a governing body of community partners, including health systems, community based organizations, and governmental entities in a geographic region

• Accountable Systems of Care (ASCs) – organized clinical networks that provide and support medical services

• Patient-Centered Medical Homes – core of medical-side intervention

• Michigan Pathways to Better Health – Pathways community hub model for community service delivery, core of community-side intervention

• Payment Reform – to support and sustain redesigned care model
Community groundwork in Jackson

• Pre-work: action research
  – *Semi-structured interviews of lay community, stakeholders, providers, leaders*

• Creation of working group structure
  – *Collective Impact model extended to new participants, groups*
  – *Health Improvement Organization Coordinating Committee as lead*

• Clinical-Community Linkages core group
  – *Data/IT ad hoc group as lead*
  – *Convening community service agencies*
  – *Co-design of care model, infrastructure, and core application(s)*

• Large-scale conversations across domains
  – *Governance, stewardship, sustainability*
Some boundary objects* from Jackson.

*Boundary objects: representational forms—things or theories—that can be shared between different communities, with each holding its own understanding of the representation. The creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds.

- Star and Grisemer, 1989
3 core IT functions for community information exchange

INTELLIGENCE
Predictive models
Registries
Notifications

REPORTING
Cost/utilization
Services used
Quality metrics
Dashboards

CARE SUPPORT
Permissions/security
Communication (DIRECT)
Messaging/alerts
Closed Loop Referral System
Summaries
Assessments
Outcome assessment/monitoring

Highest priority for development
Community care model

[Work of the Care Model ad hoc group]

- **IDENTIFY**
  - ...can take place anywhere...

- **ASSESS**
  - ...determine best coordinator
  - 2-1-1? Medical? BH? Agency?

- **ASSIST**
  - Many helpers, one lead

- **FOLLOW UP**
Community care model

SDOH screener

ASSM
Function
Medical
Behavioral

Referrals
Communication
Outcome monitoring
[CLRS]

IDENTIFY

...can take place anywhere...

ASSESS

...determine best coordinator
2-1-1? Medical? BH? Agency?

ASSIST

Many helpers, one lead

FOLLOW UP

[Work of the Pilot Agency and Data/IT ad hoc groups]
High-level view: Jackson Community Hub

[Work of the Data/IT ad hoc group, collaborating with IT partners]
Longmont, CO – 4984 ft, pop. 86,270

NextLight™, the community-owned high-speed fiber-optic network, has soared into the spotlight with its gigabit service to homes and businesses. In 2015, Ookla Speedtest named NextLight the fastest ISP in the nation, with a five-star customer satisfaction rating.
Longmont, CO

37mi N of Denver
1 city, straddles Boulder & Weld Counties
2.1%+ unemployment rate
$58,698 median household income
24.6% Hispanic
14.7% below poverty line
Longmont partners – so far...

- city partners include:
  - City Manager
  - Senior Services
  - Public Safety
  - IT department
City of Longmont:
- City Manager
- Senior Services
- Public Safety
- Family Services
60+ community service organizations
UC Health, Longmont United

Still emerging...
CORHIO
Boulder Co Connect
Local tech community

Community  ➔  Technical experts

Researchers

CU Dept. of Family Med.
CCTSI Comm. Engagement
CSU OneHealth Inst.
MI/CO/Newcastle collab
Longmont steps to date...

• Invitation by city and new UC Health CEO
• initial meet & greet
• presentation of vision to <25 stakeholders
• meeting with key partners to lay out initial steps
• beginning community resource mapping
• NSF funding application
• planning to engage local tech community
Some boundary objects from Longmont
Care Co-ordination Service

Service Providers

Assessing outcomes

Metrics and feedback

Service Specific Information

Delivery notifications

Requests & reservations

Discussing & Planning

Gathering information

Delivering & Monitoring

Care plan

Gathering information

Conversations of care

mike.martin@ncl.ac.uk

Newcastle University Business School
Longmont City

Departmental Information Systems

Boulder County Connect

Hub

Index Switch Portal

A User Session

Identity (user and device), role, relationship, context

Longmont Community

Longmont Community Identity (user and device), role, relationship, context

Boulder County Connect

A User Session

Identity (user and device), role, relationship, context

Longmont Community

Longmont Community Identity (user and device), role, relationship, context
Person Falls → Fall → Fire

- Lift assist
- Fall prevention

Senior Services
- Matter of Balance
- Stepping off
- Vision

1st care

Gaps - poor but not enough to qual
- Dental
- Eligibility process info

Adult child visits - parent in trouble
- Phone
- Walk-in
- City Senior Services
- e-mail
- AAA
- Public Safety
- Tra Para
- Referrals

- Meals on wheels
- Home health
- Transportation
- Medical → Fire

LUH AgeWell
- Salad
- 1st case/specialty care
- Dental
- Eye
- Hearing
- Financial
- Housing

BCC Network of Care

- Holistic assessment
- Client driven - supports
- Strengths - solutions
- Chemos & financial

Maintain
What does it take to do this stuff?

Is it even research??
Concepts of opportunistic discovery and emergent communities

Issues of community resolve, stamina, and trust

Methods for community exploration, mapping, and activation

Giving up control -- MUTUALITY
Some critical points along pathway

1. Community shared visioning (convening)

2. “All Aboard!” (who’s in? who’s out?)
   
   at this point, is there an emergent community?

3. Bringing in medical care delivery system(s)
   
   as partners, not as controllers

4. Bringing in IT suppliers – EHR, SS Nav
   
   to support co-designed care model and workflow

5. Developing governance structure and ownership
Sociotechnical design staff roles  (idealized!)

• **Project coordinator: 1.0 FTE.** Manages all operational elements

• **Community stakeholder liaison: 0.5-1.0 FTE.** primary link to main formal community stakeholders

• **Clinical liaison: 0.5-1.0 FTE.** primary link to medical and behavioral health care establishment.

• **Community liaison: 1.0 FTE.** primary link to the community at-large, including community ‘attractors’ and informal care networks

• **Ethnographer/Scribe: 1.0-2.0 FTE.** carries out qualitative/observational work to tell the story of how the project unfolds (descriptive), and to capture perceptions/ preferences/ responses/ reactions of community members

• **Administrative coordinator: 1.0 FTE.**
Research partnership issues

• Research impact on practices and community must be carefully assessed
• Local CoI (if not PI) on projects
• Need local Federal grants management capacity
• IRB reciprocity/delegation?
• Formal MOU or contract – pros and cons
• Research culture vs. local culture
• Research speed vs. business speed
Oversight and review of all proposed JHN and community research
- Projects introduced through respective representative
- Reviewed for feasibility, merit, alignment with community priorities
- Feedback and revision(s) if needed
- Assists with IRB, community and practice interfaces as needed

Review team for community-based proposals

- Jackson Health Network
  - Paula Pheley, Mike Klinkman
- Jackson County Health Dept
  - Richard Thoune
- Health Improvement Org
  - Elisabeth Cross
- MICHR
  - Leslie Paulson
- Research and Sponsored Programs
  - Al Pheley
Discussion.
Ambitious stuff in development.
For many health problems of interest to communities, biomedical data alone is insufficient to create a learning health cycle.
“COMMUNITY GAP”
Missing social and environmental data

Incomplete behavioral/mental health data

Consequence: Interventions ineffective OR translation delayed

Consequence: Limited insight to address problems in next cycle
We propose to develop, implement, and evaluate a **Community-based Learning Health System (CLHS)** that will capture and link information gathered locally in the course of care for biomedical, behavioral, and social needs to close the ‘community gap’ in our LHS evidence base and enhance community engagement in improving translation.

**SURVEILLANCE** + *Local effector arm*
Community Health IT Infrastructure collaborative

University of Michigan
Jackson, LH4M

University of Colorado
Longmont, Durango, Grand Junction

Lehigh Valley Health Network
Allentown

Newcastle University
Connected Health Cities
# Local partners in collaborative

<table>
<thead>
<tr>
<th>Michigan</th>
<th>Colorado</th>
<th>Newcastle</th>
</tr>
</thead>
<tbody>
<tr>
<td>University – Dept LHS</td>
<td>CTSA - CCTSI</td>
<td>University – NUBS</td>
</tr>
<tr>
<td>CTSA – MICHR</td>
<td>QHN, CORHIO</td>
<td>NHS – Connected Cities</td>
</tr>
<tr>
<td>MiHIN</td>
<td>Longmont city government</td>
<td>Newcastle city government</td>
</tr>
<tr>
<td>Jackson community</td>
<td>Longmont, Grand Junction, Durango communities</td>
<td>Newcastle region</td>
</tr>
<tr>
<td>Henry Ford Allegiance Health/JHN (MDHHS) (SIM)</td>
<td>UC Health</td>
<td>NHS regional trust, Newcastle Hospital</td>
</tr>
<tr>
<td>Michigan 2-1-1</td>
<td>NextLight (fiber)</td>
<td>Tiani Spirit (hub?)</td>
</tr>
<tr>
<td>RiverStar (IT hub) VisionLink (2-1-1)</td>
<td>(Boulder Co Connect)</td>
<td>Virgin Media (fiber)</td>
</tr>
</tbody>
</table>
Current work of the collaborative:

- Methods development and inventory
- Community meetings  
  (The Grand Tour 12/17; 5/18; 7/18)
- Field manual
- Writing narratives for each site
- Supporting new groups
- Exploring funding options

LH4M proposal (MI)
Colorado Health Foundation (UC)
CTSA Admin supp (UC and UM)
Pool Trust (learning collaborative)
# Basic IT ‘tools’ used in CARE SUPPORT design

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
<th>Purpose</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD</td>
<td>Health directory [MiHIN]</td>
<td>Establish user credentials</td>
<td></td>
</tr>
<tr>
<td>Common Key</td>
<td>Unique patient identifier [MiHIN]</td>
<td>Ensure data correctly linked to individual</td>
<td></td>
</tr>
<tr>
<td>ACRS</td>
<td>Active Care Relationship Service [MiHIN]</td>
<td>Confirm membership in care team and allow access to individual’s record</td>
<td>Need expansion to cover CSA staff, others</td>
</tr>
<tr>
<td>ADT</td>
<td>Admit/Discharge/Transfer notification [MiHIN]</td>
<td>Confirm that an ‘event’ occurred</td>
<td>Expand to cover all interactions (visits, calls, referrals, services)</td>
</tr>
<tr>
<td>CCDA</td>
<td>Consolidated Clinical Document Architecture</td>
<td>Specifies encoding, structure and semantics of clinical documents for exchange between EHR and Hub (HL7 standard, uses XML)</td>
<td>Need to create CCDs containing SDOH and referral data</td>
</tr>
<tr>
<td>SDOH</td>
<td>SDOH screening instrument</td>
<td>Identify individual’s SDOH needs by domain</td>
<td>Standardization VERY difficult</td>
</tr>
</tbody>
</table>
**IT components and vendor partners**

**Michigan 2-1-1 database  [VisionLink]**
Indexed database of CSAs retrievable using taxonomy terms

**Community SS navigation platform  [RiverStar]**
SDOH screening and assessment tool (homegrown) linked to Arizona Self-Sufficiency Matrix scoring, communications function, closed-loop referral function, outcomes monitoring *(in development)*

**Community IT Hub  [RiverStar]  *(in development)***
Enables data exchange between SS Nav and JCMR
Enables other local CSA IT platforms to exchange data across Hub

**Jackson Community Medical Record  [Epic]**
RiverStar SDOH screening and assessment tool mirrored in Epic

**MI Bridges  [MDHHS]**
Data exchange across Hub *(in development)*
A COMMUNITY INFORMATION EXCHANGE

Brings together multiple community (social) service stakeholders to follow the same general care model and to share a connecting IT infrastructure

...that supplements their own IT
...that uses common assessment tools
...that has a single connecting point to the medical enterprise

That they co-create and co-govern

That is a partner to, not owned by, the medical enterprise
FIGURE: INTEGRATED CARE TRIANGLE and the COMMUNITY HEALTH INFORMATION HUB

Supported by EMR capabilities

MEDICAL ENTERPRISE
Hospital(s) and ER(s)
Affil PCMH practices
Affil spec practices
Affil BH (firewalls)
Indep PCMH practices
Indep spec practices
EMS
Home Health
SNF/EOF/SRF

Fragmented IT infrastructure- requires coordination and some investment

[COMMUNITY] BEHAVIORAL HEALTH
LifeWays
Embedded CMH

PLUS:
Recovery Technology
Catholic Charities
Family Services and
Children’s Aid
AWARE
Many other agencies
and private therapists
About half are
currently paper-based.

Jackson County
State Innovation Model
demonstration

Concept model for
Community Health
Information Hub

January 2017

Minimal IT infrastructure- requires investment

Department on Aging
Region 2 AAA

AWARE
Council for the Prevention of
Child Abuse and Neglect
Family Services and Children’s Aid

Community Action Agency
Catholic Social Services
DisAbility Connections
Habitat for Humanity
Highfields
Jackson Transportation
Authority
MDHHS local office
Salvation Army

Community Health Information Hub

COMMUNITY SERVICES
‘hublets’
2-1-1
Region 2 AAA
MDHHS/Bridges
[Others TBD]
Work to date – primarily human infrastructure

MiPCT

Practice facilitation

CM initiatives

BH integration

Social (human) focus

Jackson SIM

Michigan SIM

M-DOCC

P4P initiatives

Quality reporting

MI Bridges AHC

Technical (IT) focus
medicine alone is not enough…

The community triangle: care integration in Jackson

Behavioral Health

Clinical Delivery System

Social Services
Jackson HIO CC social network
Care Model ad-hoc group

Co-design of Community Care Model

- Over 30 CSAs, 9 clinical sites involved
- 19 agencies actively participating
- Model identifies core steps in care process, and points where agencies can connect
- Does not replace internal CSA workflows

Pilot test of 2-1-1 Navigator referrals

- 95 referrals from medical CMs
- 240 needs – financial > housing, food, insurance > transportation
- PLUS 67 discovered needs – financial > medical, insurance
- Working through boundary issues
Pilot Agency and Data/IT ad-hoc groups

Co-design of community IT infrastructure

- Configuration of SS Nav application and connecting infrastructure (‘hub’)
- 12 agencies actively participating
- Active partnership with RiverStar, JCMR (Epic), Michigan 2-1-1, MiHIN
- Coordination with DHHS and MIBridges portal

Functionality

- SDOH screener, ASSM assessment
- Link to 2-1-1 through taxonomy
- Closed-loop referral tracking
- Data exchange (SDOH, referrals) with Epic
- Hub, outcome tracking in progress