Multilevel Interventions for Improving Health Equity

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April 28, 2017
CDF adaptation of the social ecological model (SEM) of health promotion.
http://www.cdc.gov/cancer/crccp/sem.htm &
“Interventions with multiple components designed to affect factors in two or more levels of the local ecology which contribute to wellness and illness, with the goal of effecting changes **within and between levels.**”

[Re. healthy equity], MLIs **must target the contextual or SDoH at multiple ecological levels that create and maintain inequities**

Trickett & Beehler, 2013
“Simplified” conceptual map of interdependent determinants of obesity

Finegood et al., 2010
Active commuters to school “were fitter, but fatter”

Energy balance?

30 minutes = 360 Cals

5 minutes = 360 Cals
Community engagement in MLIs can improve:

- Identification of problems and factors that matter
- Participation rates
- Validity & reliability of research instruments
- Cultural, social acceptability of interventions
- Interpretation of findings and policy, practice relevance
- Sustainability of MLI over time

Chinese Immigrant workers health & safety study and MLI: Correcting researchers’ assumptions; improving policy relevance and outcomes
Chang et al., 2014; Minkler et al., 2011
Challenges in conducting & evaluating MLIs

- **Most MLIs = Multi target interventions**

- **Insufficient focus on:**
  - Conceptual frameworks
  - Group, organization, or community levels
  - Measurement issues
    - reliability and validity
    - power and sample size

- **Measurement issues specific to MLIs**
  - lack of independence
  - complexity of analyzing cross-level interactions

Add refs
MLI promise and challenges: Transforming “food swamps” in SF
Healthy Retail MLI levels of engagement

CDC adaptation of the social ecological model (SEM) of health promotion.

http://www.cdc.gov/cancer/crcrp/sem.htm &
Community context: Tenderloin District

73 corner stores, no full serve grocery

Highest tobacco outlet density
Organizational level*
local healthy retail coalitions

- Engage local NGOs, DPH, merchants & residents
- Determine goals, strategies/ work collectively in research and action components
- Hire, train FJLs re. food systems, research methods, outreach & advocacy
- Build trust with merchants, leverage interpersonal networks, exercise community leadership and lived experience
- Resident and store level data collection (intercept, door to door surveys, store assessments)

* with caveat!
• 69-item “corner store retail standards for health and sustainability”

• ~ 66% participate (n= ~ 52/ year) 2013-2015
Healthy Retail MLI levels of engagement

CDC adaptation of the social ecological model (SEM) of health promotion.
http://www.cdc.gov/cancer/crccp/sem.htm &
Policy level: Healthy Retail SF

“Laws are like sausages– it is better not to see them being made”

-Otto von Bismarck
Three Streams in Policy Making

**Problem stream**
- convincing decision makers a problem exists

**Politics stream:**
- propose feasible, politically attractive solutions

**Policy stream**
- negotiate politics to get approval of the proposal

Successful Policy Making

Kingdon, 2003
Problem stream

"Stories and statistics" re. food insecurity, revenue base

City supervisor’s tour of food swamp

Media advocacy

Proposing feasible, politically attractive solution

Pilot store: 10% drop in tobacco sales 4mo → 4 + years; 12% increase produce sales & profits; to 17% before Great Recession.

Hennessey-Lavery et al., 2005: Breckwich Vasquez et al., 2007
Politics stream

- Win over key opponent
- More media advocacy
- Testimony at hearings
- Demonstrate wide support
- Low cost to gov. <$60,000/yr.
- Strong accountability
- Public private partnerships

Land Use Committee hearing, 8, 2013

Flood et al., 2015
Politics stream: accountability

Healthy Retail Agreement

No outdoor tobacco or alcohol advertising or indoor near children.

Stock low-fat or skim milk.

Stock 2-6 varieties of high-fiber cereal

Stock at least 2 additional varieties of frozen vegetables and/or fruit.

Stock 5-10 more varieties of "no salt added" canned vegetables or soup.

Put low-fat, low-sodium, low-sugar and healthier food products in high visibility locations throughout the store, with easy-to-read signage and eye-level placement.

Agreements, checklists, work plans, to clarify roles and expectations.
Policy Level Healthy Retail SF

City Ordinance

Incentive-based, voluntary program for corner stores

Healthy Food Retailer*

- ≥35% selling space to fresh produce, whole grains, lean proteins, and low-fat dairy
- ≤20% selling space to tobacco and alcohol
- *Removes/reduces tobacco, alcohol advertising
- Pays minimum wage

Passed Sept. 2013
Interdisciplinary partnership
Healthy Retail SF 3-legged stool

COMMUNITY ENGAGEMENT
Community Food Advocates (CFAs)

REDESIGN & PHYSICAL ENVIRONMENT
Consultants & CFAs

BUSINESS OPERATIONS
Office of Economic & Workforce Development and Consultants
Community level

- **Community as target:**
  - large community meetings, edu, input & celebrations

- **Community as level:**
  - % shopping for groceries outside neighborhood
  - ripple effect in % with healthy offerings
  -- increased sense of community control (Israel et al., 2012)
  -- increased community cohesion; ID
  - increased gentrification and perceived contributions of intervention
Cooking Demos, Taste Testings & Shopping Healthy on a Budget
Before and after
Radman’s Produce Market

BEFORE

AFTER
Daldas Grocery
Mid City Market

BEFORE

Add photo

AFTER
Evaluating *impact of Healthy Retail SF* on store sales and availability of fresh produce & tobacco

- **Store assessments:** 2 group comparison design with pre/post tests using data from ~52 stores’ assessments over 4 years
- **Sales data:** Monthly POS (point-of-sale) data from participating stores
- **Qualitative data:** Merchant interviews, focus groups

Flood et al., 2015
Changes in overall store ratings 2013-2015

Note: Total number of stores each year ranged from 52-56. Stars refer to percent of standards met: 1 star: 20-39.9%; 2 stars: 40-59.9%; 3 stars: 60-79.9%; 4 stars 80-100%.
Monthly “report card” store visits re. adherence to IDPs

<table>
<thead>
<tr>
<th>Store: Daldas Grocery</th>
<th>CFA:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2. Alcohol &amp; Tobacco</strong></td>
<td><strong>Score (scale of 1-5)</strong></td>
<td><strong>Comments</strong></td>
</tr>
<tr>
<td>15. No resources from this project (including schematics, technical assistance, shelving or refrigeration) may be used to introduce or expand any alcohol or tobacco products or product displays in the store.</td>
<td></td>
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</tr>
<tr>
<td>16. No displays of any exterior alcohol or tobacco ads to covering over 30% of windows/storefront. No alcohol/tobacco ads near kids (below 5 feet). Healthy promotional posters/ads and other materials (i.e. shelf talkers, wobblers, price tags, etc.) are still up to replace these alcohol and tobacco ads. Over time, agree to take down all tobacco and alcohol ads and replace with positive healthy promotion posters/materials.</td>
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</tr>
<tr>
<td>17. No alcohol/tobacco on credit. Put clear signage stating this policy.</td>
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</tbody>
</table>

**Rating Key:**

- 1: Does not meet standards
- 2: Partially meets standard
- 3: Meets standard
Point-of-Sale data collected in participating stores

Track sales in 6 depts./categories

- Produce
- Water
- Alcohol
- Tobacco
- Sugary Drinks/Soda
- Healthy Snacks/Grab & Go?

For each category per mo:
- # items, pieces, units sold
- Total sales
- % total sales for each category
Produce Sold - Pilot Stores

**Store I**

From zero to consistent ~2000 produce/mo

**Store A**

Increase produce sales from baseline of ~1500 produce
% change in produce sold/mo.

Store H & D are selling at least 2-3x more produce
Tobacco v, produce unit sales*

Sample HRSF Store in the Tenderloin

Before large increase in state tobacco tax (time series analyses etc.)
Methods:

- Policymaker interviews
- In-depth stakeholder interviews
  - Merchant focus groups
- Archival review
- Participant observation

Flood et al., 2015
Measurement challenges

Random Forests– tool for identifying meaningful interactions across levels R packages developed to consider fixed hierarchical structures
Breiman, 20??

Other? HLM??
Individual:
• Low-income Residents
• Food Justice Leaders (FJL)

Community:
• Corner stores

Institutions & Organizations:
• TL Healthy Corner Store Coalition

Interpersonal: family, friendship networks
• FJL-Merchant Relationships

Policies & Systems:
• SF Healthy Retail Ordinance
• New Tobacco Legislation
• Soda tax

Sallis et al., 2008
Community level

- Community as target:
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- Community as level:
  - % shopping for groceries outside neighborhood
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  -- increased sense of community control (Israel et al., 2012)
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  - increased gentrification and perceived contributions of intervention
Contributions to gentrification?

- Policymaker quote
HRSF Evaluation Framework

Impact
- Community Resiliency, Cohesion, Power & Health

Outcomes
- Community Access to Healthy Foods
- Store Business Development & Growth

Outputs
- Community Engagement
- Redesign & Physical Environment
- Business Operations

Input
- Healthy Retail SF Program & City-wide Partnership
Radman's Produce Market

BEFORE

AFTER
Inventory, Merchandising & Resetting the store
Cooking Demos, Taste Testings & Shopping Healthy on a Budget
Vouchers for produce that are distributed in TL/Soma and redeemed at HRSF stores and others...

- 83% redemption rate at stores (of vouchers distributed)
- ~ 6k vouchers at $5 each.
- Or $28k of produce purchased by community
Store Launches, Marketing, Media ….

Outreach Assessments IDP

Implementation
Community Engagement
Evaluation
HRSF Evaluation Framework

Impact

Community Resiliency, Cohesion, Power & Health

Outcomes

Community Access to Healthy Foods

Store Business Development & Growth

Outputs

Community Engagement

Redesign & Physical Environment

Business Operations

Inputs

Healthy Retail SF Program & City-wide Partnership
Is HRSF meeting community needs?

SECRET SHOPPER SURVEYS

Resident input integrated into neighborhood store planning & store offerings.
Are Stores Complying with Program Deliverables?

Monthly Store Report Cards

SEFA Corner Store MONTHLY Progress Report

<table>
<thead>
<tr>
<th>Healthy Retail Goal</th>
<th>Mo 1</th>
<th>Mo 2</th>
<th>Mo 3</th>
<th>Mo 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score each of the following from 1-5</td>
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<tr>
<td><strong>Food</strong></td>
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</tr>
<tr>
<td>1. Stock low fat or skim milk: include a lactose-free or non-dairy option if possible.</td>
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<tr>
<td>2. Has at least 2 varieties of high-fiber cereal: Cereal with &gt;10% DV of fiber/serving. Ideally, this cereal is also low-sugar (&lt;7 g/serving).</td>
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<tr>
<td>3. Has 100% whole wheat bread</td>
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<tr>
<td>4. Has at least 2 types of frozen vegetables/fruit: Frozen veggies and fruit with no added fat or sugar</td>
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<tr>
<td>5. Has 5 options of fresh fruit available: Top quality; not including lemons and limes</td>
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<tr>
<td>6. Has 5 options of fresh vegetables available: Top quality, not including potatoes and onions. At least one vegetable must be a dark leafy green (not including iceberg lettuce).</td>
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<tr>
<td>7. Stocks at least one type of dried whole grain such as brown rice, oatmeal, etc.</td>
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<tr>
<td>8. Reduced presence of candy at the checkout counter: Goal is to remove 30% of candy items away from checkout counter, either by reducing stock or moving to a less visible location</td>
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</tr>
<tr>
<td>9. Variety of non-sugar sweetened beverages available (water, 100% juice, unsweetened teas, etc.)</td>
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</tr>
<tr>
<td>10. Healthy food items above are well merchandised: Healthier food products in high visibility locations throughout the store, with easy-to-read signage and eye-level placement, such as healthier snacks next to checkout stands and water at eye level in the beverage coolers.</td>
<td></td>
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</tr>
</tbody>
</table>

CFA Point: ___

FG Point: ___
Are merchants satisfied & benefiting?
Point-of-Sale data collected in participating stores

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For each category per mo:

- # items, pieces, units sold
- Total sales
- % total sales for each category
From zero to consistent ~2000 produce/mo

Increase produce sales from baseline of ~1500 produce
Store H & D are selling at least 2-3x more produce
Gradual decrease in tobacco unit sales are

Sample HRSF Store A in the Tenderloin
% change in total sales

Combined Total Sales continue to be greater than Baseline Sales
Results: Produce sales

Change in produce sales ($)

Months since store conversion

- Store 1
- Store 2
- Store 3
- Store 4
Stay tuned!

www.healthyretailsf.org
www.healthyTL.org
Store B

# produce and tobacco items sold per month

- 16874.16
- 18004.25
- 19440.65
- 19057.92
- 17641.88
- 17830.52
- 17127.06
- 18159.66
- 19597.21

- 2447.6
- 2125
- 2016
- 1738
- 1446
- 1410
- 1437
- 1713
- 2050
Summary: Multilevel interventions

- May improve the “precision, efficacy & effectiveness” of interventions targeting different levels

- Demonstrated promise for reducing burden of cancer, other diseases, in communities of color
  
  Gorin et al., 2012 Holmes et al., 2008

- Still focus overwhelmingly on innermost levels of SEM
  
  Trickett, 2009

- Seldom use measures that truly capture intra- inter-level interactions ( HLM, Random forests, v. measures of Individual level change)
  
  add ref

- Community engagement in MLIs appears to increase effectiveness and sustainability
“I don’t think outside the box. I think outside the warehouse.”

Frank Rose, late community leader & partner