Streetcoin: integrating place-based social landscape with healthcare risk models through the electronic health record

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Healthy City International 2019
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Alan Waxman, MLA
Landscape Architecture
Urban Design

Chethan Sarabu, MD
Paediatrics
Clinical Informatics
20th century model

Landscape
- Municipalities
- City Planning
- Landscape Architecture
- Streets, Parks, Buildings
- Maps

Medicine
- Healthcare system
- Doctors
- Nurses
- Hospitals & clinics
- Electronic health records
Landscape medicine:

A place-based framework for valuing community assets through the healthcare system
Landscape Medicine

A place-based framework for valuing community assets through the healthcare system

Electronic Health Records/Maps

Cipher/streetcoin

Patients/Community

Social determinants of health/Environment
The time is ripe to connect landscape and medicine; particularly in the United States but globally as well.

As costs have escalated, all health systems are looking to invest in upstream preventive measures to decrease costs.

We also now have the technology and data layers to link the urban landscape, people, and health systems.

This is giving rise to a new type of healthcare/insurance system known as Accountable Care Organizations (ACOs).
Better care for healthier neighborhoods.

Health is local.

Cityblock was founded on the premise that health starts at the neighborhood level, and that everyone should have good care for what matters to them. We saw firsthand how healthcare has fallen short in providing adequate care for people living with complex health and social needs—and knew there was room for improvement.
10th Decile Project

Los Angeles, CA | September, 2015

Cost Avoidance

Figure 6: Cost Avoidance

Hospital Cost Avoidance
Pre- and Post—Enrollment
$54,406 average per person per year, n=77

12 Mos. Before
12 Mos. in Program

ER Costs
IPT Costs
Total Cost

Net Cost Avoidance: Amount saved after accounting for 10th Decile Program Costs $34,306—$39,556
ER Costs Down 67%
Inpatient Costs Down 85%
Total Costs Decreased 79%

1st Year Cost per Client

Cost without rent subsidies $3,900/yr. $1,150/mo.

Data and Oversight $2,500
Screening and Outreach $600
Temporary Housing $3,000
Case Management and Housing Navigation 1:10 $6,500/yr. $543/mo.
Patient Transporting $1,800
Move-in Costs $500

2nd Year Cost per Client

Total Cost $14,550/yr. $1,213/mo.

Rental Subsidies

Total Cost $39,800/yr. $3,250/mo.
The Benefits of Nature are Mental

There are currently more than 400 studies that demonstrate the numerous health benefits that nature provides. Below we've highlighted a few key resources that give an overview of the findings. You can also find relevant infographics in the ParkRx toolkit.

<table>
<thead>
<tr>
<th>No.</th>
<th>Health/well-being benefits</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Better sleep</td>
<td>Aestell-Burt et al. 2013; Gilgoby-Toussaint et al. 2015; Merita et al. 2011</td>
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<td>3</td>
<td>Improved mental health: 1. Reduced depression 2. Reduced anxiety</td>
<td>Aestell-Burt et al. 2014a; Beyer et al. 2014; Cohen-Cline et al. 2015; Guasco et al. 2015; Kim et al. 2009; Maas et al. 2009b; McIvor et al. 2016; Nissho et al. 2015; Sturm and Cohen 2014; Taylor et al. 2015; White et al. 2013</td>
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<td>4</td>
<td>Greater happiness, well-being, life satisfaction</td>
<td>Beyer et al. 2014; Brauman et al. 2015a; Maas et al. 2009b; Nissho et al. 2015; Song et al. 2013; Song et al. 2015</td>
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<td>6</td>
<td>Reduced ADHD symptoms</td>
<td>Bugar and Beyer 2016; Bruyas et al. 2011; Koo and Sullivan 2001a, b; Troy et al. 2012; Yoonan et al. 2016</td>
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<td>7</td>
<td>Increased prosocial behavior and social connectedness</td>
<td>Amoore et al. 2014; Faber Taylor et al. 2001; Faber Taylor and Koo 2009; Faber Taylor and Koo 2011; Koo and Faber Taylor 2004; Markovic et al. 2014b; van den Berg and van den Berg 2011</td>
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<td>9</td>
<td>Improved postoperative recovery</td>
<td>Duncan et al. 2014; Markovic et al. 2014a; Shanahan et al. 2016</td>
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<td>10</td>
<td>Improved birth outcomes</td>
<td>Park and Mattson 2008; Park and Mattson 2009; Ulrich 1984</td>
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<td>11</td>
<td>Improved cognitive heart failure</td>
<td>Reviewed by Dzhambov et al. 2014</td>
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<td>12</td>
<td>Improved child development (cognitive and motor)</td>
<td>Mao et al. 2017</td>
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<tr>
<td>13</td>
<td>Improved pain control</td>
<td>Fjellstrom 2001; Kellert 2005</td>
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<tr>
<td>14</td>
<td>Reduced obesity</td>
<td>Acuteley (Dietze et al. 2003; Lechzin et al. 2010) and chronically (Han et al. 2016)</td>
</tr>
<tr>
<td>16</td>
<td>Better eyesight</td>
<td>French et al. 2013; Guggenheim et al. 2012; He et al. 2015</td>
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<tr>
<td>17</td>
<td>Improved immune function</td>
<td>Li et al. 2006; Li et al. 2006b; Li et al. 2008; Li et al. 2010; Li and Kawada 2011</td>
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<td>18</td>
<td>Improved general health: Adults</td>
<td>Brown et al. 2016; de Vries et al. 2003; Kardan et al. 2015; Maas et al. 2006; Maas et al. 2009b; Stigsdotter et al. 2010; Wheeler et al. 2015</td>
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<td>19</td>
<td>Reduced mortality</td>
<td>Ray and Jakobiec 2014; Kim et al. 2016</td>
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<tr>
<td>20</td>
<td>Asthma and/or allergies (studies show both improvements) and exacerbations)</td>
<td>Coscuta et al. 2010; Guasco et al. 2014b; Hu et al. 2008; James et al. 2016; Takano et al. 2002; Villeneuve et al. 2012</td>
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Note: ADHD, attention-deficit hyperactivity disorder. The references in Table 1 are illustrative rather than exhaustive; they include both recent reviews and research reports and earlier, widely cited publications.
Parks are a huge asset, and we need to value them for the 21st century

Alison Benjamin

Our green spaces are shrinking, despite all the benefits they give us. If we want to save them, we need to value the ecosystem and health and wellbeing services they offer.

Newcastle uses public health cash to save city parks

Jon Unged-Thomas
February 26 2017, 12:01 am.
The Sunday Times

Leazes Park, Newcastle: the council says open spaces provide huge health benefits

Newcastle city council has become one of the first local authorities in Britain to use millions of pounds from its public health budget to help keep open its public parks.

The council says health budgets and NHS funds should be used to fund cash-strapped parks as such open spaces provide huge health benefits.
Precedent

Frederick Law Olmsted

Smohalla
Olmsted.health

https://www.olmsted.health
Stewardship

LANDSCAPE CIPHER
Various cloud ecologies overlap in the physical real-time space of shared data integration - the landscape cipher.

Changing physical space through collaborative process resonates in multiple data systems.

Health is reflected in cloud data for dynamic accountability and feedback in the ecosystem.

Risk is accommodated and resiliency improved simultaneously for multiple agencies.
Healthcare EHR
Clinician/Patient

EHR CLOUD
(Electronic Health Records)

ACO LANDSCAPE
(Accountable Care Organization)

LIVING LEDGER
(blockchain framework)
Patient – Clinician View
Physician view:
patient story

Symptoms/Concerns

- **Anxiety**
  - Active diagnosis
  - Since 2015
  - Has had long standing anxiety that seems to be getting worse increasingly due to pressures at school exacerbated by social media based peer pressure.

- **Family history of Type 2 diabetes**
  - Active diagnosis
  - Since 2015
  - Multiple family members have been diagnosed with type 2 diabetes, wonder what steps can be taken to prevent or delay condition.

- **Excessive Screentime**
  - Active diagnosis
  - Since 2015
  - Patient and mother are concerned about her excessive time on her phone and feels that this is disrupting her sleep and other activities.
Monitoring patient condition over time

Diagnoses

Active diagnosis
Generalized Anxiety Disorder
Since 2015

Notes
On June 20th 2019 visit due to increasing anxiety a decision was made to try forest bathing and bird watching as therapy instead of medication. Symptoms of anxiety measured by GAD-7 scores have been improving.

Anxiety GAD-7 scores

GAD 7 score: 14/21
Moderate Anxiety

Today's visit
Physician view: therapy selection

Therapies

**Generalized Anxiety Disorder**
Since 2015

Notes
On June 20th 2019 visit due to increasing anxiety a decision was made to participate in a nearby park stewardship group. This was effective for a few months but now her anxiety seems to be rising.

Medication

Digital Therapeutics

Landscape Medicine
Physician view:
place selection

Landscape Medicine

Active diagnosis

Generalized Anxiety Disorder
Since 2015

Stewardship Groups

Place: Betty Head Park
Condition: Anxiety prevention
2019 Activities: rap cipher, yoga group, birdwatching, tree planting
Stewardship group
Landscape doctor

DATA MINING CIPHER
Anonymous health record
data integration black box

STREETCOIN
Unique actionable insight
Landscape doctor – Stewardship group

Frampton sees the architecture of the gang beef in person.
Landscape Doctor View: Stewardship Groups
Olmsted.health: Landscape doctor – stewardship group
Olmsted.health: Landscape doctor – stewardship group
Streetcoin
Accountable Care Organization

As landscape is changed, health is reflected in EHR data and valued in cost savings.

COIN MARKETPLACE
Landscape actions valued in cloud EHR data
Accountable Care Organization view

As landscape is changed, health is reflected in EHR data and valued in cost savings.

COIN MARKETPLACE
Landscape actions valued in cloud EHR data.
Accountable Care Organization view

As landscape is changed, health is reflected in EHR data and reduced in cost savings.

COIN MARKETPLACE
Landscape actions valued in cloud EHR data.