Connecting Health Systems and Community-Based Organizations to Improve Outcomes
Today’s Presenters

Ruben Amarasingham, MD
Founder & CEO
Pieces Technologies, Inc.

Matthew Warrens
Vice President, Innovation Partnerships
OSF HealthCare
How can we embrace change and create better value for our patients?

For 140 years, the Sisters of OSF have been serving their communities with compassion and humility. The Sisters have never been afraid of taking on the hardest challenges and providing care to all those who needed it. It’s no surprise, then, that when the pace of change in health care is faster than ever, when technological and scientific innovation are enabling so much, that we would take a step back to examine how we can leverage these advances for the benefit of our patients.

OSF launched OSF Innovation as a means to embrace change and take on the largest health care challenges; the ones that require innovation and a different way of thinking to solve.

“In the spirit of Christ and the example of Francis of Assisi, the Mission of OSF HealthCare is to serve persons with the greatest care and love in a community that celebrates the Gift of Life.”
Connecting Health Systems and the Community

Healthier Communities
- Education
- Housing & Utilities
- Food Security
- Family & Social Support
- Employment & Income
- Health Behaviors
- Transportation

Pieces Iris
Referral, connection, & case management platform for CBO’s

Pieces DS
Real-time Clinical NLP, Clinician-in-the-Loop, SDOH

Health System Decision Support
- Readmissions
- Length of Stay
- Hospital Associated Infections
- Early Warning System | Sepsis
Our Approach to Addressing Social Determinants

Pieces Iris
Referral, connection, & case management platform for CBO's

- Employment & Income
- Family & Social Support
- Food Security
- Health Behaviors
- Transportation
- Housing & Utilities
- Education
- Health
- Employment & Income
- Food Security
- Family & Social Support
- Health Behaviors
- Transportation
- Housing & Utilities
- Education
- Family & Social Support
- Food Security
- Health Behaviors
- Transportation
- Housing & Utilities
- Education
We define innovation as...

“The process of translating ideas that align with our vision of transforming health care into value for the benefit of the patients and communities we serve.”
We are focusing on four innovation priority areas

Clear focus and direction are essential for successful innovation. We have four focus areas of innovation for our Mission Partners, external partners, and innovators. These areas guide our investments and activities in innovation, ensuring they serve the most important needs of our community. These four areas demand innovation; we will not advance our Mission here without it.

**Advancing Simulation**
How can OSF use simulation beyond education to transform health care?

**Aging in Place**
How can OSF deliver care to the elderly without disrupting where and how they live?

**More for Those with Less**
How can OSF best serve its most disadvantaged populations?

**Radical Access to Care**
How can OSF radically democratize access to care, regardless of setting or context?
Community Care Coordination in Dallas

147,796 clients enrolled in community based services

818,064 documented encounters across 95 agencies

8,061 inter-agency referrals

26% relative reduction in readmissions for Medicare patients

Iris CBO’s care for patients 2X as likely to be a high risk

Previously hospitalized patients are in Iris CBOs

27% DM
51% HTN
17% CHF
26% COPD
In the Spirit of Christ and the example of Francis of Assisi

Owned and operated by the Sisters of the Third Order of St. Francis, Peoria, Illinois, OSF HealthCare serves nearly 3 million people in our communities.

Mission
In the spirit of Christ and the example of Francis of Assisi, the Mission of OSF HealthCare is to serve persons with the greatest care and love in a community that celebrates the gift of life.

Vision
Embracing God’s great gift of life, we are one OSF Ministry transforming health care to improve the lives of those we serve.

115 OSF Locations Including Hospitals
738 Employed Providers
335 Advanced Practitioners
18,127 Employees
200,381 Home Health Annual Visits
1,483,714 Outpatient Visits
1,626,748 Physician Enterprise Office Visits
63,501 Inpatient Admissions
2,652 Hospice Patients Served
700,316 Number of Persons Served
$2.3B Net Revenue
The Pieces Approach

 PIECES™ DS

ReLOS

Readmit

HAI

Iris

Custom

EWS

Sepsis

Proprietary & Confidential © 2017 Pieces Technologies, Inc.
Clinician-in-the-Loop™ Enables Pieces DS to achieve extremely high levels of model performance in areas of clinical ambiguity.
Addressing Social Determinants

**Hospital**

- Known patient, flag shows patient is in social determinant population
- Care Team updates & confirms screening
- Care Team completes new patient screening
- Pieces work-list shows patient and follow-up needs

**Community**

- Did patient make it to CBO for appointment?
- CBO updates its patient visit in Pieces Iris

**Pieces DS is continuously monitoring**

- Is patient at risk for readmission or over utilization ED?
- Is patient at risk for excessive LOS while in hospital?
- Does patient have social determinants likely to affect outcomes?
- Is care team able to make follow up referrals?
- Did patient achieve expected outcome?
- How, overall, is this population of patients doing?
Labs/Imaging reviewed, notable for
*ABG 7.3/49/76.
Increased RR from 18 to 20
Hgb 6.9->repeat 6.8.
VIDIs remarkable for BP 90s/60s with HR 78

A/P: 55 y/o F w/ h/o diabetes, obesity, homeless who presents with 2 days of confusion and fever (101.9 Tmax) secondary to long-term incontinence. Pt appears to be septic and will treat empirically with broad-spectrum antibiotics and 2L fluid bolus.

<table>
<thead>
<tr>
<th>Disease / Symptom</th>
<th>Time</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confusion</td>
<td>Current</td>
<td>--</td>
</tr>
<tr>
<td>Fever</td>
<td>Current</td>
<td>--</td>
</tr>
<tr>
<td>Homeless</td>
<td>Historic</td>
<td>--</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Historic</td>
<td>incontinence</td>
</tr>
<tr>
<td>Obesity</td>
<td>Historic</td>
<td>--</td>
</tr>
<tr>
<td>Sepsis</td>
<td>Current</td>
<td>sepsis awareness</td>
</tr>
<tr>
<td>Anemia</td>
<td>Current</td>
<td>Hgb 6.8</td>
</tr>
</tbody>
</table>
Surface & Assess

Pieces identifies clinical factors, concepts & **social determinants** from free text notes, structured data, and images.

**Accuracy** is key to end-user action. **PPV 90-95%; Sensitivity 80-95%** with clinical NLP.
Addressing Social Determinants

Hospital

- Known patient, flag shows patient is in social determinant population
- Care Team updates & confirms screening
- Pieces work-list shows patient and follow-up needs

Community

- Patient referral received at Community Based Organization
- Did patient make it to CBO for appointment?
- CBO updates its patient visit in Pieces Iris

Unknown patient, caregiver ID’s social determinant needs
- Care Team makes referrals prior or at patient discharge in Pieces Iris community portal

Unknown patient, Pieces ID’s social determinant needs
- Care Team completes new patient screening

Pieces DS is continuously monitoring

- Is patient at risk for readmission or over utilization ED?
- Is patient at risk for excessive LOS while in hospital?
- Does patient have social determinants likely to affect outcomes?
- Is care team able to make follow up referrals?
- Did patient achieve expected outcome?
- How, overall, is this population of patients doing?
### PIECES ALERT
**Severe Sepsis / Sepsis Shock Order Set**

#### Precision Alerts

**Identify & Connect**

#### Best Practice Advisory - Test, Sepsis

This patient’s lab values and vital signs are suggestive of sepsis as determined by a risk score. Click here for model information and disclaimer.

** Acknowledge reason:**

- Sepsis for 60min
- Decline for this visit
- Not a part of treatment team
- Already being treated

**Open Order Set:** SEVERE SEPSIS / SEPSIS SHOCK ORDER SET

(last done by Ruben Amarasingham, MD on 05/12/2017 at 12:30 PM)
<table>
<thead>
<tr>
<th>MRN</th>
<th>Patient Name</th>
<th>Room</th>
<th>Attending Physician</th>
<th>Admitting</th>
<th>Current LOS</th>
<th>Intervention</th>
<th>Note Excerpt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Insurance Related Issues</td>
<td>waiting for insurance approval from Medicaid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Post Discharge Placement</td>
<td>awaiting homeless shelter placement</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>discharge referral needed to weight management</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>transportation to shelter needed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Social Vulnerability</td>
<td>she is homeless</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>food insecurity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Acute pancreatitis</td>
<td>45 Consultation Feedback</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pending Test and Procedure</td>
<td>check 2-view</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>consider Hepatitis panel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>may need anemia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>repeat ct abd pelvis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wound Check / Supplies - Other</td>
<td>52 Insurance Related Issues</td>
</tr>
</tbody>
</table>
Community Collaborative

- Healthy Village
  - LaSalle County Health Department – WIC
  - North Central Behavioral Health
  - American Cancer Society – Resource Center
  - Others
- YMCA Collaborative
- Streator High School Collaboration
- Community Garden Collaborative
- Pieces Iris - 10 Community Based Organizations
  - A Servant’s Heart
  - ADV & SAS
  - BEST, Inc.
  - Health Department
  - North Central Behavioral Health
  - St. Vincent De Paul Society
  - Salvation Army
  - Streator Township High School
  - Tri-County Opportunities Council
  - YMCA
- Patient Wisdom (Implemented July 7, 2017)
- Community Benchmarking and Blue Zones
- Rural Care Delivery Playbook

Responsibilities
- Develop goals, objectives, and timelines for work plans
- Guide the implementation of initiatives
- Identify community needs and gaps
- Advocate for policy
- Actively attend and participate in meetings

OSF Support: Innovation, Marketing, Government Relations, Healthcare Analytics

Technology to enable closed loop referrals on social determinants that impact health!
Addressing Social Determinants

Hospital

Known patient, flag shows patient is in social determinant population

Care Team updates & confirms screening

Pieces work-list shows patient and follow-up needs

Care Team makes referrals prior or at patient discharge in Pieces Iris community portal

Community

Patient referral received at Community Based Organization

Did patient make it to CBO for appointment?

CBO updates its patient visit in Pieces Iris

Pieces DS is continuously monitoring

- Is patient at risk for readmission or over utilization ED?
- Is patient at risk for excessive LOS while in hospital?
- Does patient have social determinants likely to affect outcomes?

- Is care team able to make follow up referrals?
- Did patient achieve expected outcome?
- How, overall, is this population of patients doing?
<table>
<thead>
<tr>
<th>Name</th>
<th>Referred To</th>
<th>Referred By</th>
<th>Referral Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jones, Kathy</td>
<td>Bed Shelter</td>
<td>County General Hospital Referrals</td>
<td>10/30/2017</td>
</tr>
<tr>
<td>Jones, Kathy</td>
<td>Nutrition &amp; Weight Management</td>
<td>County General Hospital Referrals</td>
<td>10/30/2017</td>
</tr>
<tr>
<td>Murphy, Lisa</td>
<td>Food Pantry</td>
<td>County General Hospital Referrals</td>
<td>10/27/2017</td>
</tr>
<tr>
<td>Smith, Lily</td>
<td>Emergency Food</td>
<td>County General Hospital Referrals</td>
<td>10/27/2017</td>
</tr>
<tr>
<td>Bean, Charles</td>
<td>Career Services</td>
<td>Wellness</td>
<td>10/30/2017</td>
</tr>
<tr>
<td>Billings, Bath</td>
<td>Turkey Give Away</td>
<td>WFAA Santa's Helpers Toy Drive</td>
<td>09/11/2017</td>
</tr>
<tr>
<td>Norris, Chuck</td>
<td>Housing Assistance</td>
<td>Career Services</td>
<td>09/10/2017</td>
</tr>
<tr>
<td>Pagan, Angel Manuel</td>
<td>Housing Assistance</td>
<td>Career Services</td>
<td>09/10/2017</td>
</tr>
<tr>
<td>Arnold, Maleck</td>
<td>Referral Program</td>
<td>Career Services</td>
<td>09/08/2017</td>
</tr>
<tr>
<td>Posey, Gerald Dempsey</td>
<td>Emergency Shelter</td>
<td>Career Services</td>
<td>08/28/2017</td>
</tr>
<tr>
<td>Mathis, Antonio</td>
<td>SNAP Enrollment</td>
<td>Reentry Brokerage - Dallas County</td>
<td>08/28/2017</td>
</tr>
</tbody>
</table>
The Streator Journey: Focusing on Four Innovation Priority Areas

**Past**
- Decision to close the hospital
- Unsustainable healthcare model
- Community needs for services unfulfilled
- Integration with OSF Healthcare
- Engagement through initial Steering Team and Community Advisory Committee
- Feedback on building redesign

**Present**
- Implementing new rural healthcare model
- Co-location strategy
- Focus on innovation
- Addressing social determinants of health
- Launching digital solution (Iris) to connect OSF and CBOs
- Kick-off of Healthier Streator Steering Committee
- Focus on community health and wellness

**Future**
- Health and wellness goals established for the Community
- Engaged community stakeholders
- Action Teams assembled to drive policies and programs
- Measurement of key outcomes
- Healthy village model bringing essential services to one location
How Pieces Is Different

- Community Commitment
- Real-Time Value Insights
- Holistic Approach
- Passion
Thank You
5 Steps

IDENTIFICATION

PREDICTION

ACTIVATION

MONITORING

LEARNING

PIECES™ DS

Admission

Discharge

Post Discharge

Proprietary & Confidential © 2017 Pieces Technologies, Inc.
5 Steps

**IDENTIFICATION**
Surface patient insights: patients known or unknown to have social needs

**PREDICTION**
Assess patient’s needs: using insights to determine risk and nature of risk

**ACTIVATION**
Identify hospital & community resources: enable connections

**MONITORING**
Closing the loop: was the plan of care executed and was it successful?

**LEARNING**
Collect & aggregate data: learn and improve outcomes

Admission
Discharge
Post Discharge

 PIECES™ DS
What We’ll Discuss Today

- Creating a data-sharing ecosystem between healthcare systems and community-based organizations
- Following a patient through the journey and identifying social determinants of health
- Using machine learning and clinical natural language processing (NLP) to create actionable insight leading to better health outcomes
- OSF HealthCare’s vision for partnering with social service organizations in their community