



# Data-driven Community-based Care for Patients with Complex Health and Social Needs

## Venture Charter

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*Authors: Michael Matergia, MD & Julius Bogdan, MBA*

*Date: June 4, 2018*

## Venture Definition:

- What we are working on:
  - A data-driven, intense, multidisciplinary, community-based care program targeting our most complex patients.
    - We propose to change the care experience for high complexity patients by combining a novel data tool with a restructured multidisciplinary care team to meet these patients where they are and deliver intense clinical and social support.
- The problems we are having:
  - Patients with complex health and social needs experience poor outcomes despite extreme patterns of hospitalizations and/or emergency care.
- The impact to the SCL Health community if we don't find a solution to these problems:
  - Our most vulnerable patients will continue to experience poor health outcomes, while remaining disconnected from the coordinated primary care, behavioral health services and social support that they desperately need.

Ultimately, this will result in diminished quality of life and our mission to the community will remain unfulfilled.
  - Our most complex patients frequently become high-utilizers of acute care services and account for a disproportionate share of healthcare costs. These costs impair effective stewardship of our charity funds and reduce the ability to grow our healing ministry.

## Clear, Compelling Goal:

The aim of our program is to improve the lives of vulnerable patients with complex health and social needs. We will accomplish this by:

- Achieving a mean increase in quality of life of 25%
  - As measured by WHOQOL-BREF administered to participating patients at the beginning and end of the intervention pilot.
- Achieving a 30% reduction in emergency department visits and hospital admissions among patients receiving the intervention
  - As compared to a control cohort during the year following the pilot intervention.<sup>1</sup>

## Metrics:

To assess progress towards achievement of these goals, we have mapped an evaluation framework to our Theory of Change (**Figure 1**). Key metrics include:

1. Increased access to care as measured by mean number of community based touches and alternative visits<sup>2</sup> per patient receiving the intervention.

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<sup>1</sup> By the end of the intervention pilot our goal is to detect an initial trend towards reduced healthcare utilization that, if extrapolated over time, would yield the expected result.

2. Improved patient experience & patient satisfaction as measured by the Clinician and Group Consumer Assessment of Healthcare Providers and Systems (CG CAHPS) survey.
3. Improved self-efficacy as measured by the Generalized Self-Efficacy Scale.
4. Increased access to social support as measured by the Personal Resource Questionnaire.

For full details of our evaluation framework and metrics please see the attached document “*Innovation Venture Metrics.*”

## Alignment with Strategic Priorities:

### Person-centered & Ministry excellence

We will achieve ‘patient-centered’ care and ‘ministry excellence’ for our most complex patients by designing and deploying a care system that is designed to ‘meet the patient where they are’ and address the unique combination of medical challenges and social determinants of health that are negatively impacting their lives. We will develop authentic healing relationship by intensely engaging with the patients. These relationships will form the basis for improving the patient experience and delivering high-quality, safe, and effective care.

This person-centered model of care will achieve one of SCL’s 2018 strategic priorities: “**Community Benefit:** Identify and Pilot an Access to Care Initiative That May Be Implemented System-wide in 2019.”

### Provider partnership

We will enhance ‘provider partnership’ through re-orientation of an existing multidisciplinary care team to provide high-touch community-based care. Patients will be assigned to a care team comprised of a community health worker, clinical social worker, registered nurse, clinical psychologist, and family physicians. By intensely engaging with the patient this team will meet both their individual needs and improve the community health in a broader sense.

## Scope:

- In Scope:
  - Patients considered for the venture pilot must be:
    - Empaneled to a PCP at Bruner Family Medicine
    - Had at least one visit in the past 24 months
    - Live within a 15 mile radius of Saint Joseph Hospital
    - Have capacity to consent to the intervention
- Out of Scope:
  - Patients considered outside the scope for the venture pilot include those with:
    - Active malignancy
    - Severe mental illness (including schizophrenia, psychotic disorder, schizoaffective disorder, and psychiatric hospitalization within the past 180 days)
    - Major surgery within the past 30 days
    - End-stage renal disease in patients lacking access to health insurance

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<sup>2</sup> Alternative visits as defined by CMC for CPC+ include any “alternative to traditional office visits to increase access to increase access to care team and clinicians in a way that best meets the needs of the population.”

Anticipated Venture Start Date: November 1, 2018

Anticipated Venture End Date: May 31, 2019

## Innovation Playbook

- **Shift:** Our venture innovation seeks to transform the customer experience for high complexity patients.
- **Type:** We will shift the customer experience for high complexity patients by redesigning how we connect and engage with them.
- **Ambition:** We strive to develop a complementary care system that operates adjacent to our existing clinical operations and changes the game for our most complex patients.

## Concept

At Sr. Joanna Bruner Medicine we serve a socially disadvantaged patient population. To meet the needs of our patients, we have evolved as a patient-centered medical home that leverages team-based care to deliver comprehensive primary care. This care includes integrated behavioral health, coordinated care management, population health, and chronic disease management.

We feel that for the majority of our patients this care adequately addresses their needs. However, we have observed that for a subset of particularly complex patients we struggle to meet their needs in clinic. This failure frequently results in avoidable hospitalization and emergency department visits.

In problem solving how we could best redesign care for these patients we have sought inspiration from the “hot-spotting” approach pioneered by Dr. Jeffrey Brenner and the Camden Coalition. We have also engaged with our colleagues at the University of Colorado who replicated this program and achieved a significant (30%) reduction in acute care utilization.

We have combined this evidence-based with our insight and experience gained through home visits by our care team. In conducting home visits, our providers have witnessed a powerful response from our patients and a strong desire for more engagement at this level from our patients. In interviewing patients, we were struck by one particular patient who noted:

“One time Ms. Karyn [Bruner care manager] came to see me because I didn’t have no food, no way to get to the hospital. I didn’t even have a way to get my prescriptions. And she made it a point to come to where I was at. And assist me with getting food and as far as getting back and forth to the doctors.”

## Point Of View

From the point of view of this patient, we began to conceptualize a different type of care system for complex patients. One that would re-orient our multidisciplinary to meet patients ‘where they are at’ and address their underlying social needs.

Through our design process, we have developed an intervention that will leverage the addition of a community health worker<sup>3</sup> to our existing multidisciplinary care team to intensely engage with the patient over a 90 day period (**Figure 2**). Over this period, the care team will conduct a series of home- and community-based visits, accompany patient to primary care and specialty care visits, and assist the patient in accessing social services and supports. As illustrated by **Figure 3**, these interactions will utilize 1) authentic healing relationships, 2) motivational interviewing, 3) accompaniment, and 4) health coaching to deliver services and break the cycle of poor outcomes.

## Venture Tribe

- **Venture Sponsor:** SCL Health via the 2018 Innovation Challenge
- **Innovation Partner:** Peter Kung, VP - Innovation and Virtual Health; Theresa Casterton, Director - Innovation and Virtual Health
- **Venture Team**

Name	Role
Michael Matergia, MD	Clinical Faculty, SJH Family Medicine Residency
Julius Bodgan, MBA	Director of Analytics & Data Innovation
Blaine Olsen, MD	Program Director, SJH Family Medicine Residency
Jean Cunningham	Practice Administrator, Sr. Joanna Bruner Family Medicine
Karyn Moore, MSW	Manager of Care Management Services, Sr. Joanna Bruner Family Medicine
Huy Ly, MD	Clinical Faculty, SJH Family Medicine Residency
Jon Burdick, MD	Medical Director, Sr. Joanna Bruner Family Medicine
Sally Abell, RN	Registered Nurse, Sr. Sr. Joanna Bruner Family Medicine

## Risks

Key risks identified by our team include:

- Ineffective integration of CHW with existing multidisciplinary care team
- Insurmountable social barriers to improving patients' lives and healthcare utilization
- Safety of care team members in the community
- Legal exposure for providers delivering care in non-traditional settings.

For full details of our risk assessment please see the attached document "*Innovation Venture: Pilot Risks.*"

## Technical Requirements

Our venture requires data-driven identification of appropriate patients. To accomplish this, we will develop a novel socioeconomic health score. We will build this risk-scoring model by integrating external data on social determinants of health from LexisNexis with our existing clinical and socioeconomic data. By applying this risk score to the patient panel at Bruner Family Medicine we will be able to identify a cohort of high-utilizers with modifiable risk factors that we can target through our venture.

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<sup>3</sup> We envision that in our venture pilot one of our existing bilingual Medical Assistants will be trained and re-deployed as a Community Health Worker. In conceptualizing our venture, we broadly define a community health worker as a trusted, knowledgeable frontline health aide who has an exceptionally strong understanding of the community served.



## Innovation Challenge: Venture Milestones and Timing

<b>Venture Name</b>	Data-driven Community-based Care for Patients with Complex Health and Social Needs	<b>Date</b>	June 4, 2018
<b>Venture Lead</b>	Michael Matergia, MD & Julius Bodgan, MBA		
<b>Location</b>		<b>Venture Timing</b>	
<b>Region</b>	Colorado - Front Range	<b>Start Date</b>	November 1, 2018
<b>Care Site/Department</b>	Sr. Joanna Bruner Family Medicine	<b>Completion Date</b>	May 31, 2019

<b>Venture Milestones, Accountability &amp; Schedule: Please identify milestones for 3 phases of work</b>		
Phase 1: Setup and Prepare for Venture Launch Things to consider: <ul style="list-style-type: none"> <li>● Contract negotiations (if needed)</li> <li>● Defining scope of work</li> <li>● Identify stakeholders and decision makers</li> <li>● Assess current state and gaps to address</li> <li>● Develop goals and metrics</li> <li>● Communication strategy</li> <li>● Training strategy</li> <li>● Define testing approach</li> </ul>		
<b>List the Key Milestones and Activities</b> <i>If applicable, include IRB milestones, including target date for IRB approval</i>	<b>Responsible Lead</b>	<b>Due Date</b>
Identify external training partner (University of Colorado's Patient Navigator Training Collaborative) and complete contracting and logistics.	Sally	July 30th
Procure CHW training curriculum ( <i>Foundations of Community Health &amp; Impact Manuals</i> )	Sally	July 30th
Define job description, scope of work, and recruitment and interview plan for Community Health Worker (CHW)	Jean	July 30th
Procurement of external databases (Lexis Nexis) for SDOH risk score	Julius	July 30th
Submit protocol to SJH IRB for ethical approval	Mike	July 30th
Finalize training schedule including internal training sessions and trainers for CHW.	Sally	August 31st
Plan, schedule, and block clinic schedules for care team members to ensure appropriate availability during Phase 2.	Huy	August 31st



## Innovation Challenge: Venture Milestones and Timing

Complete recruitment and hiring process for CHW.	Blaine	August 31st
Define scope of work for interdisciplinary care team roles (social worker, registered nurse, psychologist, medical doctor)	Karyn	September 15th
(If CHW is an external hire), complete initial onboarding activities including orientation and training, contracting, and security access.	Jean	September 15th
Develop SOPs & decision support tools for treatment and care coordination activities	Huy	September 30th
Develop and coordinate approval (as required) for risk reduction tools including protocols for safety and reporting potential risk of self-harm or abuse.	Jean	September 30th
Finalize contracting with external consultants and qualitative evaluator	Mike	September 30th
Finalize all quantitative and qualitative data tools; develop data dashboard for utilization.	Mike	September 30th
Finalize SDOH risk model	Julius	September 30th
Finalize data system for monitoring and tracking process outcomes on ongoing basis during Phase II.	Mike/Julius	September 30th
Complete provider and staff education at Bruner Family Medicine	Huy	October 15th
Secure IRB approval	Mike	October 15th
Ensure implementation of training of CHW and multidisciplinary care team	Sally	October 15th
Phase 2: Launch and Testing Things to consider: <ul style="list-style-type: none"> <li>● Testing your solution</li> <li>● Training those affected by the change</li> <li>● Cutover from old to new processes or tools</li> <li>● Measuring effectiveness of your change</li> <li>● Go-live support</li> </ul>		
List the Key Milestones and Activities	Responsible Lead	Due Date
Stratify Bruner patient population by utilization	Julius	November 7th
Apply SDOH risk score to Bruner patient population	Julius	November 7th
Review risk score; discussions with patient's CM & PCP; final determination for enrollment into project or control group	Karyn	November 15th



## Innovation Challenge: Venture Milestones and Timing

Patient enrollment	Project Manager	December 7th
Initial data collection	Mike	December 15th
Completion of key care activities for each patient including: <ul style="list-style-type: none"> <li>● Community-based touches</li> <li>● Clinic based touches</li> <li>● Care coordination &amp; case conference</li> <li>● Individual action plan</li> <li>● Engagement of long-term supports</li> <li>● Accompaniment</li> <li>● Graduation</li> </ul>	Project Manager  December - May	
Ongoing/Continuous data collection & data review	Mike	December - May
End-line data collection including qualitative interviews	Mike	May 31st
Phase 3: Report Out <ul style="list-style-type: none"> <li>● Assemble performance metric data</li> <li>● Summarize findings</li> <li>● Define pivot and/or expansion plan</li> </ul>		
List the Key Milestones and Activities	Responsible Lead	Due Date
Quantitative data analysis	Mike	July 30th
Qualitative data analysis	Mike	July 30th
Summarize findings and learning for SCLH leadership	Huy	August 15th
Develop sustainability & expansion plan for SCLH leadership	Blaine	August 15th



## Innovation Venture Metrics

<b>Venture Name</b>	Data-driven Community-based Care for Patients with Complex Health and Social Needs	<b>Date</b>	June 4, 2018
<b>Venture Lead</b>	Michael Matergia, MD & Julius Bodgan, MBA		
<b>Location</b>		<b>Venture Timing</b>	
<b>Region</b>	Colorado - Front Range	<b>Start Date</b>	November 1, 2018
<b>Care Site/Department</b>	Sr. Joanna Bruner Family Medicine	<b>Completion Date</b>	May 31, 2019

<b>Performance Metric Description</b>						
<i>Identify outcome and process measure results that address the health of the individual, the care provided and/or the reduction in cost of care. Identify the target, the quarter the target will be achieved and any baseline measurement currently available</i>						
<b>Metric</b>	<b>Metric</b>	<b>Metric</b>	<b>Metric</b>	<b>Metric</b>	<b>Metric</b>	<b>Metric</b>
Alternative visits	P	C	Baseline:unknown Period: Pilot intervention phase	400	Continuous monitoring	End of pilot phase
Completion of 1st visit	P	C	Baseline:unknown Period: Pilot intervention phase	100%	Continuous monitoring	End of pilot phase
Completion of intervention	P	C	Baseline:unknown Period: Pilot intervention phase	90%	Continuous monitoring	End of pilot phase
Graduation	P	C	Baseline:unknown Period: Pilot intervention phase	75%	Continuous monitoring	End of pilot phase
Patient touches	P	C	Baseline:unknown Period: Pilot intervention phase	10 per patient	Continuous monitoring	End of pilot phase
Accompaniment	P	C	Baseline:unknown Period: Pilot intervention phase	2 per patient	Continuous monitoring	End of pilot phase
Individualized action plans	P	C	Baseline:unknown Period: Pilot intervention phase	90%	Continuous monitoring	End of pilot phase
Action plan goal achievement	O	C	Baseline:unknown Period: Pilot intervention phase	3 per patient	End of intervention period	End of pilot phase



## Innovation Venture Metrics

<b>Performance Metric Description</b>						
<i>Identify outcome and process measure results that address the health of the individual, the care provided and/or the reduction in cost of care. Identify the target, the quarter the target will be achieved and any baseline measurement currently available</i>						
Metric	Metric	Metric	Metric	Metric	Metric	Metric
Self-Efficacy	O	H	Baseline:unknown Period: Pilot intervention phase	mean change +20%	Pre & Post	End of pilot phase
Social Support	O	H	Baseline:unknown Period: Pilot intervention phase	mean change +20%	Pre & Post	End of pilot phase
Quality Metrics	O	H	Baseline: Bruner Clinic CPC+ score by metric Period: Pilot intervention phase	125% of Bruner Clinic score	End of intervention period	End of pilot phase
Patient Satisfaction	O	C	Baseline: SJH GME Top box Scores Period: Pilot intervention phase	125% of SJH GME Top Box Scores	End of intervention period	End of pilot phase
Quality of Life	O	H	Baseline:unknown Period: Pilot intervention phase	mean difference +25%	End of intervention period	End of pilot phase
ER Utilization	O	RC	Baseline:unknown Period: Pilot intervention phase	mean difference - 30%	Continuous	End of pilot phase
Hospital Utilization	O	RC	Baseline:unknown Period: Pilot intervention phase	mean difference - 30%	Continuous	End of pilot phase



## Innovation Venture Metrics

### ADDENDUM (INNOVATION VENTURE METRICS)

#### Introduction & Theory of Change

The aim of our program is to decrease acute health care utilization while enhancing quality of life for patients with complex health and social needs.

To guide our program design we developed a Theory of Change (ToC) map (**Figure 1**). This map visually represent the key activities of the intervention and how they link together in a causal pathway to achieve impact.

Our evaluation framework is based on and mapped to this ToC. We have identified key metrics to allow for testing of each step in the causal pathway to change.

At the end of the pilot phase, this multi-tiered evaluation framework will allow us to combine process and effectiveness indicators into a single analysis and answer the following key questions:

- Whether the intervention can feasibly be implemented as designed? (Process Evaluation & Process Outcomes)
- Whether the intervention achieves measurable change for key mediators of impact? (Tier 1 & Tier 2 Outcomes)
- Whether there is a trend towards change in key impact outcomes of healthcare utilization and quality of life? (Tier 3 Outcomes)

Additionally, such an approach will allow us to unpack the ‘black-box’ of a complex intervention and produce a story of how the intervention worked in our particular setting. Such information will help guide replication and scale across the SCL System.

#### A Note of Tier 3 Outcomes

We will embed a non-randomized, controlled evaluation of Tier 3 Outcomes within our pilot phase. However, given the constraints of the Innovation Challenge (ie. limited time and sample size), we recognize that a definitive evaluation of impact will not be feasible. Rather, our analysis will be structured to detect a trend towards impact of these downstream outcomes. This coupled with clear evidence of impact along our causal pathway will provide confidence in the success of the intervention during the initial pilot and that reduced utilization targets will be reached over the long-term.

#### Process Evaluation & Process Outcomes

*Quantitative*

<i>Metric</i>	<i>Data Source/Data Tool</i>	<i>Measurement Strategy/Frequency</i>	<i>Outcome/Expression</i>
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## Innovation Venture Metrics

Alternative visits	Monitoring data	Continuous tracking	No. (# of alternative visits completed)  Mean, SD (average number per patient of alternative visits)
Completion of 1st visit	Monitoring data	Continuous tracking	% (# completion 1st visit/ # enrolled patients)
Completion of intervention	Monitoring data	Continuous tracking	% (#completion 90-day intervention period/ # enrolled patients)
Graduation	Monitoring data	Continuous tracking	% (# of patients graduating program/ # enrolled patients)
Patient touches	Monitoring data	Continuous tracking	Mean, SD (sub-analyzed by setting and provider type)
Accompaniment	Monitoring data	Continuous tracking	Mean, SD (average number per patient of clinic visits/external appointments that include CHW participation)
Individualized action plan	Action plans	continuous tracking	% (# of patients receiving action plan/ # enrolled patients)  No./ % of action plan targets by care planning domain

### *Qualitative*

Semi-structured interviews will be conducted with select patients (n=12), members of the interdisciplinary care team, and the project manager to explore the following:

- barriers and facilitators to patient engagement
- reach of intervention
- adaptations to program implementation over time
- consistency/ difference in implementation across groups

Results will be presented as case-ordered matrix with identified themes and illustrative quotes.



## Innovation Venture Metrics

### Mediators of Impact (Tier 1 & Tier 2 Outcomes)

#### Quantitative

<i>Metric</i>	<i>Data Source/Data Tool</i>	<i>Measurement Strategy/Frequency</i>	<i>Outcome/Expression</i>
Action plan goal achievement	Action plans	At end of each patient's intervention period	No./ % (# of goals achieved/# of goals specified)  Mean, SD (average number of achieved action plan goals)
Self-efficacy	<a href="#"><u>Generalized Self-Efficacy Scale</u></a>	Pre & post	Mean change, 95% CI, P
Social Support	<a href="#"><u>Personal Resource Questionnaire (PRQ85)</u></a>	Pre & post	Mean change, 95% CI, P
Quality Metrics	CPC+ data	Pre & post	Mean difference* (sub-analyzed by individual metric)  *as compared to BFM total
Patient Satisfaction	CG-CAHPS	At each PCP visit	Mean difference* (sub-analyzed by individual metric)  *as compared to SJH GME total

#### Qualitative

Semi-structured interviews will be conducted with select patients (n=12), members of the interdisciplinary care team, and the project manager to explore the following:

- stories of success (and failure)
- deepened understanding of outcomes including how they were achieved, key drivers, perception of value, variation among patients.
- barriers to achieving action plan goals
- detect unanticipated causal pathways
- providers perceptions & experiences with the intervention.



## Innovation Venture Metrics

Results will be presented as case-ordered matrix with identified themes and illustrative quotes.

### Impact (Tier 3 Outcomes)

#### *Quantitative*

<i>Metric</i>	<i>Data Source/Data Tool</i>	<i>Measurement Strategy/Frequency</i>	<i>Outcome/Expression</i>
Quality of Life	<a href="#">WHOQOL-BREF</a>	Pre & post	mean change, 95%CI, P
ER Utilization	EMR/Claims Data	Continuous	Hazard Ratio; Kaplan-Meier Survival Curve
Hospital Utilization	EMR/Claims Data	Continuous	Hazard Ratio; Kaplan-Meier Survival Curve

#### *Methodology*

To assess the effect of the intervention on quality of life and healthcare utilization, we will conduct a controlled analysis. We anticipate that the application of the SDOH risk score to our clinic population will yield a patient population larger than can be enrolled during the pilot phase. The patients considered for but not selected for intervention will form a 'natural' control cohort. We will leverage this cohort to enhance the rigour of impact assessment.

To control for the non-random assignment into intervention and control group, we will conduct a multivariable regression analysis with important potential confounding variables included in the statistical analysis.



## Innovation Venture: Pilot Risks

<b>Venture Name</b>	Data-driven Community-based Care for Patients with Complex Health and Social Needs	<b>Date</b>	June 4, 2018
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<b>Risks</b>			
Describe Risk	What Would Be the Potential Impact on the Project & SCL Health if the risk became an issue?	Probability of Happening (Low, Med, High)	Mitigation Strategies
Ineffective recruitment strategy for CHW role	High impact	Med	<ol style="list-style-type: none"> <li>1. Target existing team members currently serving as Medical Assistants</li> <li>2. Target prospective candidates who have demonstrated interested in community well-being</li> <li>3. Target prospective candidates who demonstrate key skills including: cultural humility, bilingual, conflict resolutions skills, ability to establish trusting relationships</li> </ol>
Ineffective integration of CHW with broader care team (MD, RN, SW, BH)	High impact	Med/Low (Low if we hire internally from existing team)	<ol style="list-style-type: none"> <li>1. Attempt re-scoping of an existing team member (i.e. Medical Assistant) for CHW role</li> <li>2. Team building activities to build trust and rapport among team members</li> </ol>
Ineffective integration of project with broader clinic activities	Medium impact	Low	<ol style="list-style-type: none"> <li>1. Build upon existing framework of ongoing work in clinic related to CPC+</li> </ol>
Insufficient leveraging of care team members (i.e. over-reliance on frontline CHW)	Medium impact	Med	<ol style="list-style-type: none"> <li>1. Ensure each team members schedules protects time needed to make offsite visits</li> </ol>
Insufficient buy-in broader clinic care team.	Medium impact	Med	<ol style="list-style-type: none"> <li>1. Present findings from B2C &amp; CC programs at clinic-wide training</li> <li>2. Share out of successes/challenges and project data at existing clinic-wide meetings.</li> <li>3. Strategically minimize additional administrative burden on providers.</li> <li>4. Involvement of residents in project</li> </ol>



## Innovation Venture: Pilot Risks

			implementation
Incomplete costing - failing to account for all direct and indirect costs that will arise during pilot.	High impact	Low, more likely is failure to account for indirect (personnel) costs and time	1. Collaborative budgeting process involving clinic management and leadership.
Insurmountable patient/social barriers to improving patient's lives, care, & health care utilization.	High impact	Med, underscores importance of using the right exclusion/inclusion criteria	1. Data-driven patient identification process to enroll those most likely to benefit from program. 2. Implementation of well-considered exclusion criteria.
Insufficient project management and project supervision.	Med impact	Med to High	1. Budgeted support for project manager. 2. Data system for project tracking and supervision of care coordination activities. 3. Clearly defined management system and roles.
Uncharged/unbilled care as an "inducement."	High impact	Low	1. Collaboration with SCL Compliance Team
Legal exposure for care team members.	High impact	Low	1. Collaboration with SCL General Counsel. 2. Care activities to fall under current malpractice insurance policy.
HIPAA Compliance	High impact	Low	1. All team members to complete HIPAA training. 2. Data systems reviewed by SCL to ensure HIPAA compliance. 3. Databases to be secure, password-protected, and de-identified 4. Compliance with all existing SCL HIPAA policies and procedures.
Safety of care team members (i.e. team member feels threatened or adverse event occurs)	High Impact	Low	1. Review SCL Health policies/procedures for safety of community-based professionals (home health RN/PT/OT, etc.) 2. Develop and implement safety protocols.
IRB Clearance	Low Impact	Low	1. Completion of application by team member experienced with IRB protocol and process.
Ability to complete proposed statistical analysis	Low Impact	Low	1. Data analysis to be completed by team member with experience with multivariable regression analysis and controlled trials.



## Innovation Venture: Pilot Risks

			2. Data analysis to be completed by team member who works in partnership with and has access to PhD epidemiologist/biostatistician at University of Colorado.
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**BUDGET TEMPLATE FOR INNOVATION CHALLENGE**

Venture Name: Data-driven Community-based Care for Patients with Complex Health and Social Needs  
 Venture Lead: Michael Matergia, MD & Julius Bodgan, MBA  
 Date: June 4, 2018

<b>Detailed Funding Sources and Budget</b>								
Identify a detailed budget indicating how funds will be spent each quarter for the grant period.								
Total funding requested by innovation venture	\$129,022							
	Phase 1 - Secure Materials	Phase 2 - Live Pilot				Phase 3 - Wrap Up and Report		
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Total	
<b>INNOVATION CHALLENGE</b>								
<b>Operating Expenses</b>								
Wages and Benefits	\$16,821	\$14,173	\$14,173	\$14,173	\$14,173	\$14,173	\$14,173	\$101,857
Office Supplies	\$0	\$0	\$0	\$0	\$50	\$50	\$50	\$150
Office Expenses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Medical Supplies	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Training, Training Materials	\$0	\$1,200	\$1,000	\$1,000	\$0	\$0	\$0	\$3,200
Contract Labor	\$2,355	\$0	\$0	\$0	\$0	\$0	\$7,000	\$9,355
Other	\$0	\$0	\$0	\$0	\$160	\$170	\$180	\$510
<b>Operating Expense Subtotal</b>	<b>\$19,176</b>	<b>\$15,373</b>	<b>\$15,173</b>	<b>\$15,173</b>	<b>\$14,383</b>	<b>\$0</b>	<b>\$0</b>	<b>\$115,072</b>
<b>Capital Expenses</b>								
Equipment	\$0	\$0	\$950	\$0	\$0	\$0	\$0	\$950
Hardware	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Labor (ex: IT)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Software	\$13,000	\$0	\$0	\$0	\$0	\$0	\$0	\$13,000
<b>Capital Expense Subtotal</b>	<b>\$13,000</b>	<b>\$0</b>	<b>\$950</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$13,950</b>
<b>Total Funding</b>	<b>\$32,176</b>	<b>\$15,373</b>	<b>\$16,123</b>	<b>\$15,173</b>	<b>\$14,383</b>	<b>\$0</b>	<b>\$0</b>	<b>\$129,022</b>

**Wages & Benefits Details**

Phase 1

Personnel	Salary	FTE (Project)	Years (Project)	Wage + bene
Data Engineer Phase 1	\$ 104,000.00	\$ 0.20	\$ 20,800.00	0.33 \$ 6,864.00 \$ 8,785.92
@\$55/hr)	\$ 114,400.00	\$ 0.10	\$ 11,440.00	0.33 \$ 3,775.20 \$ 3,775.20
CHW (budgeted at Medical Assistant rate)	\$ 41,600.00	\$ 1.00	\$ 41,600.00	0.08 \$ 3,328.00 \$ 4,259.84
<b>Total</b>				\$ 16,820.96

Phase 2

Personnel	Salary	FTE (Project)	Years (Project)	Wage + bene
CHW (budgeted at Medical Assistant rate)	\$ 41,600.00	\$ 1.00	\$ 41,600.00	0.5 \$ 20,800.00 \$ 26,624.00
Registered Nurse	\$ 56,160.00	\$ 0.20	\$ 11,232.00	0.5 \$ 5,616.00 \$ 7,188.48
Psychologist	\$ 89,440.00	\$ 0.15	\$ 13,416.00	0.5 \$ 6,708.00 \$ 8,586.24
Family Physician	\$ 174,720.00	\$ 0.10	\$ 17,472.00	0.5 \$ 8,736.00 \$ 11,182.08
Practice Administrator	\$ 99,840.00	\$ 0.05	\$ 4,992.00	0.5 \$ 2,496.00 \$ 3,194.88
Social Workers	\$ 70,720.00	\$ 0.50	\$ 35,360.00	0.5 \$ 17,680.00 \$ 22,630.40
Data Engineer Phase 2	\$ 104,000.00	\$ 0.20	\$ 20,800.00	0.08 \$ 1,664.00 \$ 2,129.92
@\$55/hr)	\$ 114,400.00	\$ 0.20	\$ 7,000.00	0.5 \$ 3,500.00 \$ 3,500.00
<b>Total</b>				\$ 85,036.00

**Contract Labor Details**

Qualitative Evaluator	\$ 7,000.00	flat fee	\$ 7,000.00	\$ 7,000.00	\$ 7,000.00
Consultant (Bridges2Care)	\$ 230,000.00	\$ 0.05	\$ 11,500.00	0.16 \$ 1,840.00	\$ 2,355.20

# Multidisciplinary Care Timeline

## Intervention Timeline Beginning at Time of Patient Enrollment

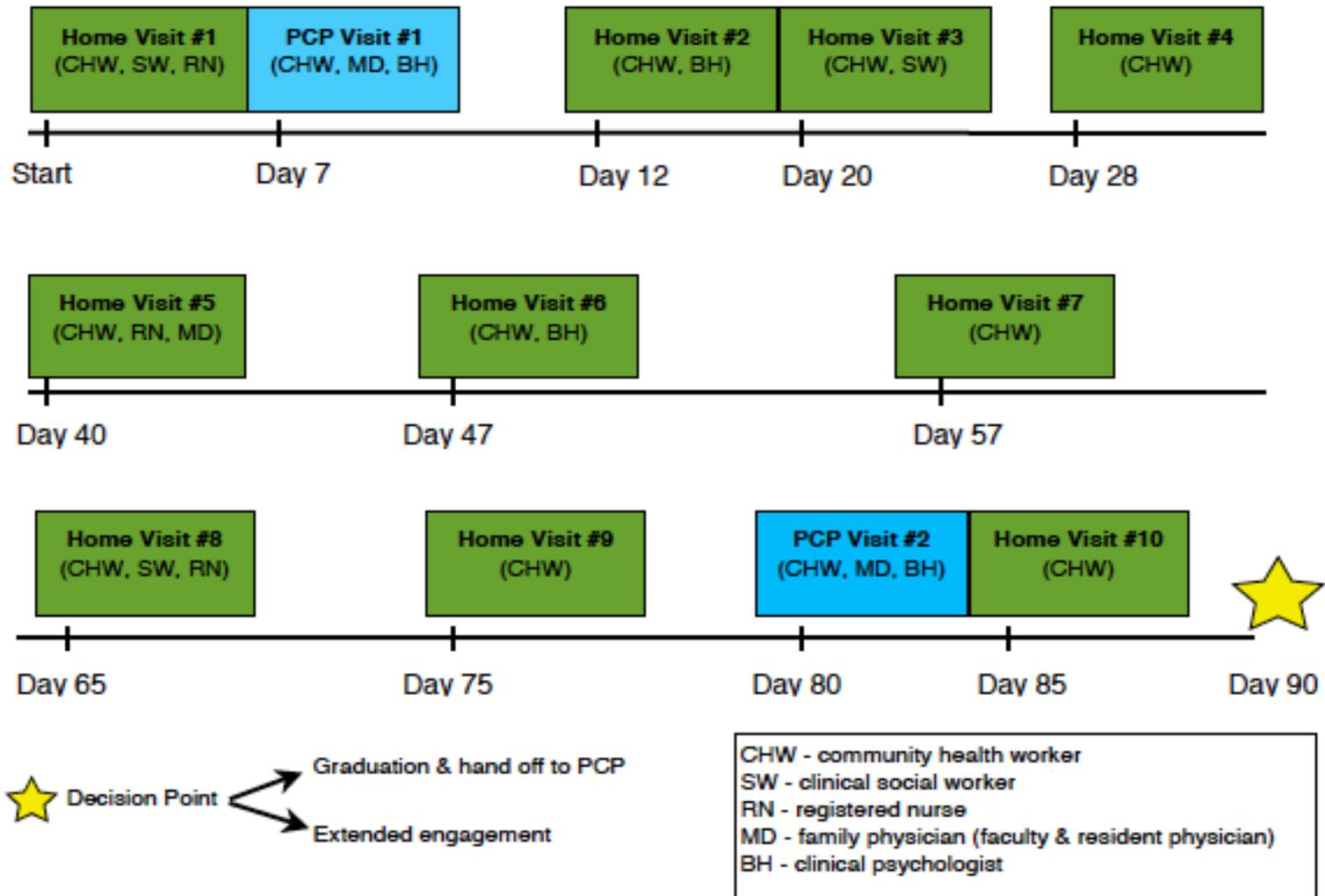


Figure 2: Multidisciplinary care timeline demonstrating intense engagement with patient over 90 day intervention period.

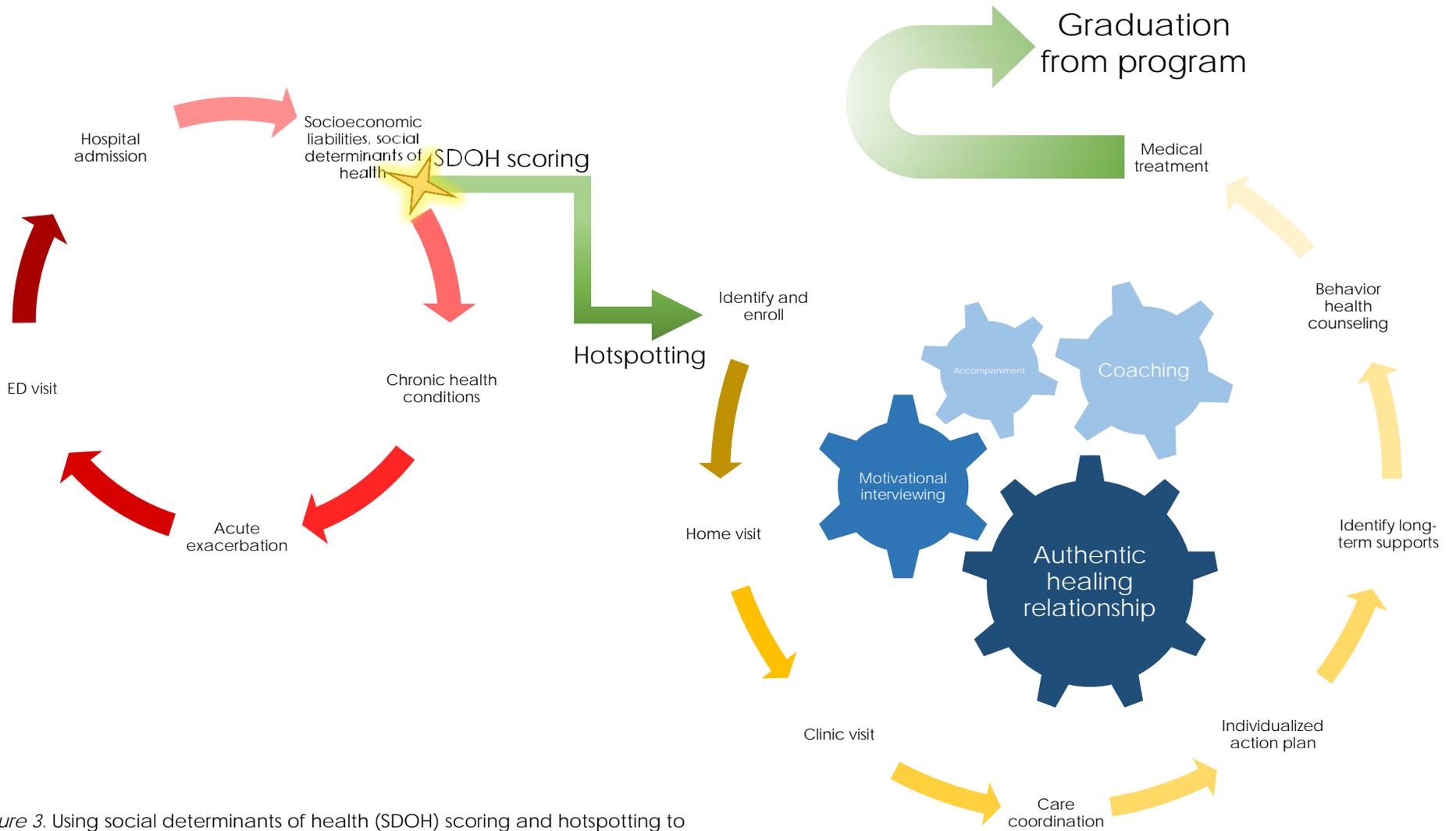


Figure 3. Using social determinants of health (SDOH) scoring and hotspotting to break the cycle of poor outcomes and acute care utilization

# Theory of Change

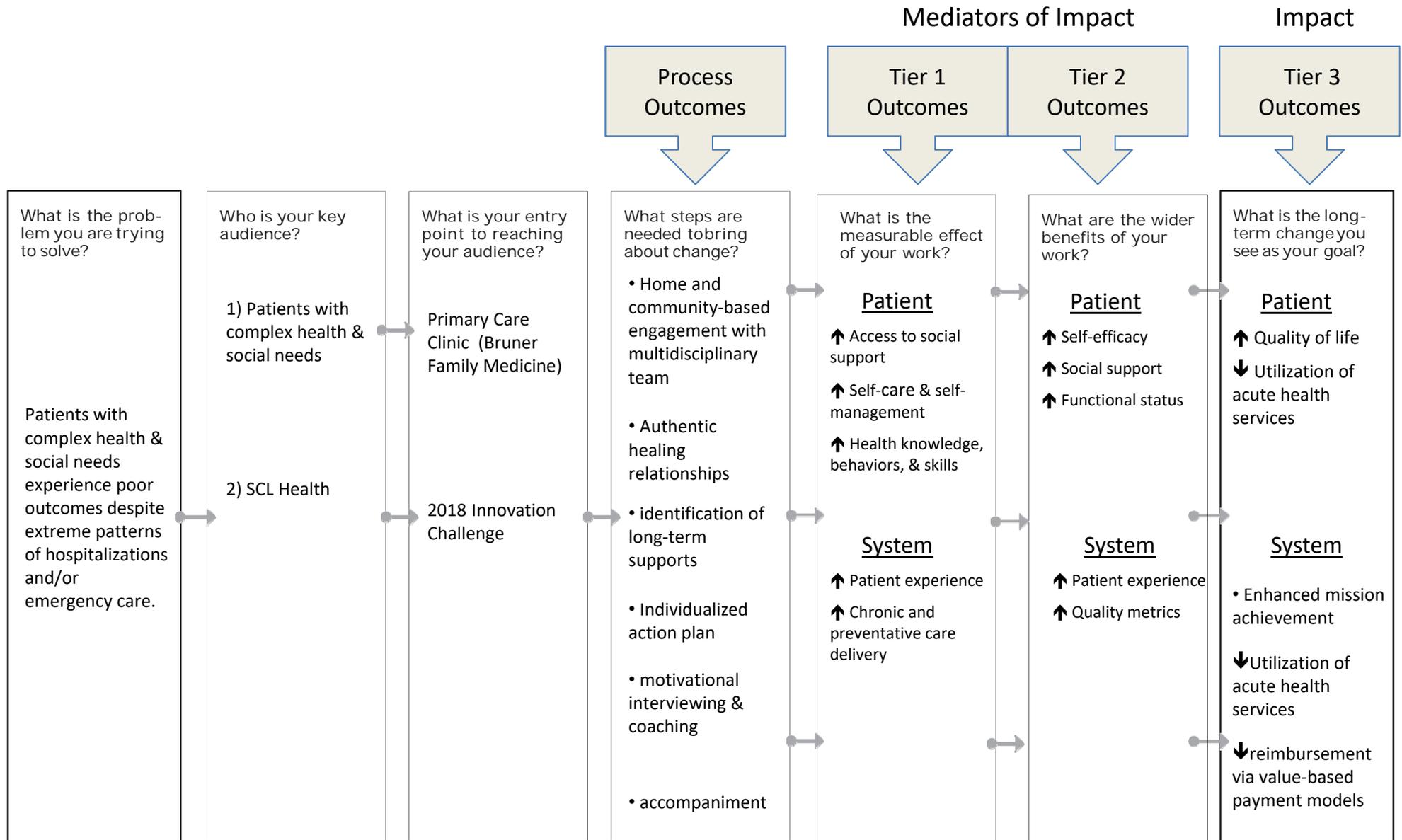


Figure 1. Theory of change demonstrating causal pathway to achieve impact.

# Innovation Challenge Semi-Finalists Submission

*Please fill out this submission form and return to Peter Kung ([peter.kung@sclhs.net](mailto:peter.kung@sclhs.net)) by end of day on **April 7th, 2018**. Submissions received after the deadline will not be considered and will not move forward in the challenge.*

**Innovation Venture Leads:**

1. **Julius Bogdan**, MBA, Director of Analytics and Data Innovation, SCL Health
2. **Michael Matergia**, MD, Clinical Faculty, Saint Joseph Hospital Family Medicine Residency Program

**Team Member Names:**

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2. Huy Ly, MD
3. Jean Cunningham
4. Karyn Moore, MSW
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**Location:**

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2. Sr. Joanna Bruner Family Medicine at Saint Joseph Hospital.

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**Innovation Venture Title:** Data-driven community-based care for patients with complex health and social needs.

**Innovation Intent:**

We propose a data-driven, intense, multidisciplinary, community-based care program to improve the lives of our most complex patients and reduce their use of acute health services.

Our innovation is two-fold. The first component will be the development of a novel socioeconomic health score. This score will allow for more meaningful analysis of hospitalizations, emergency visits, pharmacy costs, medication adherence and other aspects of a patient's interaction with the healthcare system—as well as careful examination of conditions and behaviors that depend on a person's socioeconomic environment, such as nutritional disorders, depression, anxiety, substance abuse and

unnecessary admissions. We will leverage this score to identify a cohort of super-utilizers<sup>1</sup> with modifiable health and social needs. The second component will be the re-orientation of an existing multidisciplinary care team to provide high-touch home-based care and individualized care plans. This care model will be adapted from the “hot-spotting” approach pioneered by Dr. Jeffrey Brenner and the Camden Coalition and successfully replicated by the University of Colorado. Our approach is novel as it will be the first adaptation of this evidence-based approach within the setting of a primary care graduate medical education program. A successful pilot demonstration will have broad applicability across the SCL system as GME clinics care for a large proportion of socially disadvantaged patients thus allowing for us to better care for our highest-need patients.

The aim of our innovation is to improve patient’s self-efficacy thereby allowing them to gain confidence and skills in addressing their health and social challenges. We hypothesize that this will result in a reduction in utilization of high-cost care thus improving our system’s ministry and stewardship of our resources. Based on the existing evidence for similar programs, we believe we can achieve a 30% reduction in emergency department visits and hospitalizations.

### **Innovation Shift:**

The primary focus of the intervention is to change the customer experience for high complexity patients. To achieve this we will combine a novel data tool with a restructured multidisciplinary care team to deliver intensive clinical and social support.

Each patient will be assigned to a care team which will be comprised of a community health worker, clinical social worker, registered nurse, clinical psychologist, clinical pharmacist, and two family physicians (one faculty physician and one resident physician). As demonstrated in **Figure 1**, this team will intensely engage with the patient over a 90 day period.<sup>2</sup>

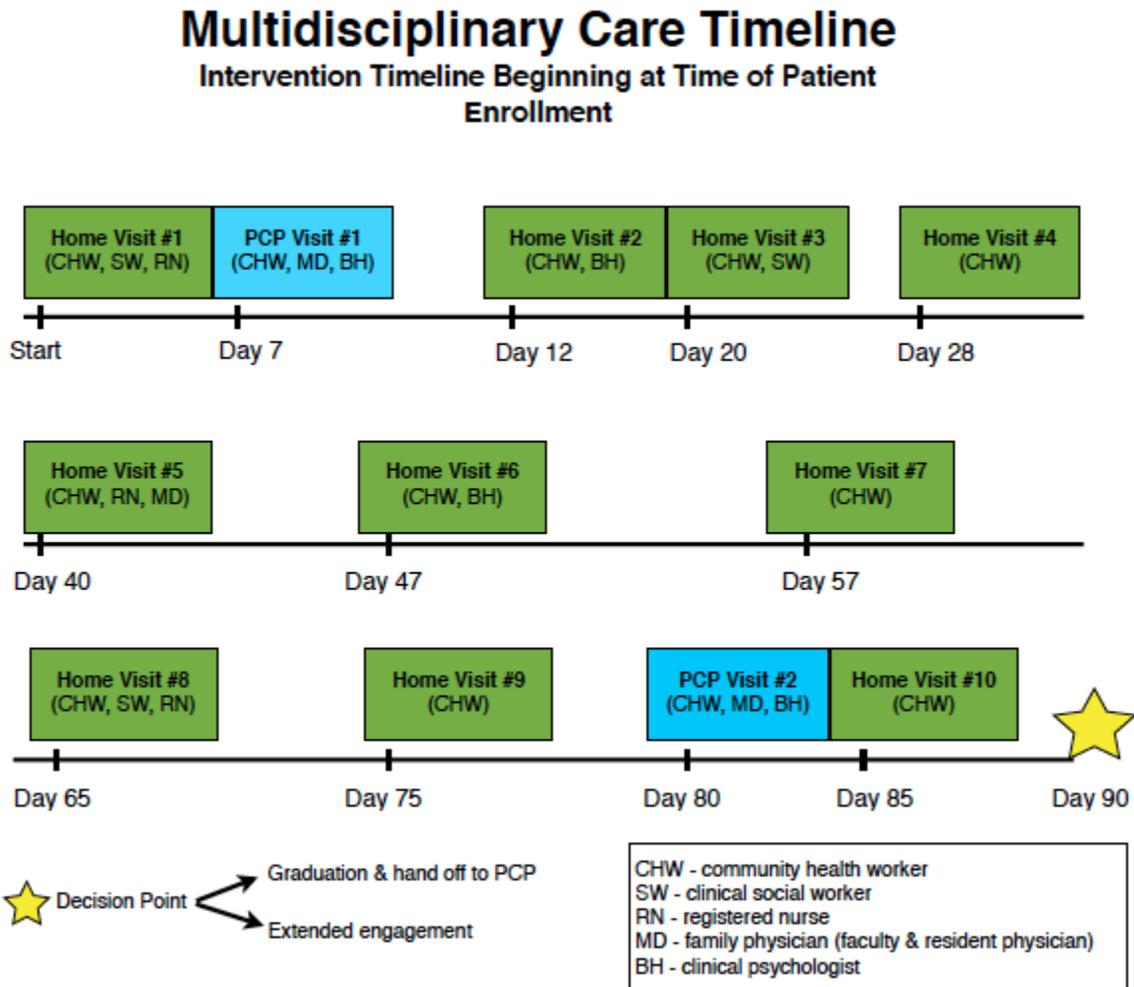
The care team will plan and conduct a series of home visits, accompany patients to primary care and specialty care visits, and assist the patient in accessing social services. During the initial home visit, the community health worker, registered nurse, and social worker will conduct an assessment of the patients needs and collaboratively set individualized goals. The second visit occurs in the primary care clinic and the patient is assessed by both the PCP and clinical psychologist and acute medical issues are addressed. Based on these encounters, the care team creates an individualized care plan. The remainder of the visits focus on enacting this care plan which, for example, may include 1) structured therapy to address behavioral health challenges, 2) health coaching to improve medication adherence, 3) assistance in enrolling in a substance abuse program, and 4) navigating social service agencies to secure housing stability. At the conclusion of the 90-day intervention, participants are assessed for readiness to have their future health needs met in their primary care clinic.

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<sup>1</sup> Super-utilizers are patients with extreme patterns of hospitalizations and emergency department use.

<sup>2</sup> A 90-day intervention period is chosen based on evidence from a similar program which demonstrated a mean time to program “graduation” of 85 days.

Figure 1: Multidisciplinary Care Timeline



**Background:**

Complex patients with unmet social and health needs frequently become high-utilizers of acute care services. Super-utilizers account for a disproportionate share of healthcare costs, while remaining disconnected from the coordinated primary care, behavioral health services, and social support that they desperately need.

To address this challenge, Dr. Jeffrey Brenner and the Camden Coalition pioneered hot-spotting, a data-drive approach to identify high utilizers and provide them with intensive multidisciplinary care services. In a non-randomized evaluation, this innovative approach to targeting high-complexity patients resulted in a 48% reduction in hospital use. Subsequently, the University of Colorado along with several community clinics developed Bridges to Care (B2C), an ED-initiated, coordinated care program for high-utilizers. Among patient randomized to receive the B2C intervention, a successful reduction in ED visits (27.9%) and hospital use (30.0%) was achieved.

Hot-spotting relies on the strategic use of data to identify complex patients and reorient care delivery to meet their needs. Both the Camden Coalition and Bridges to Care leverage healthcare usage and claims data to discover super-utilizers. However, such data is only a proxy for the underlying complex social and health needs that require focused intervention. A more appropriate data source would allow for increased accuracy in identifying patients most likely to benefit from our venture. Private vendors, such as LexisNexis, has developed risk assessments tools that pull together information on social determinants of health. Our venture will be able to leverage these existing tools in combination with SCL's internal data to develop a novel score to best identify and target patients in most need of intensive support.

### **Benefits:**

During the 6 month pilot of our venture we aim to:

- Deploy a data tool to generate a socioeconomic health score.
- Utilize this tool to identify and enroll 20 patients into a community-based care program.

To assess the impact of our venture on the lives of these patients, we propose 3 quantitative outcomes:

1. Patient self-efficacy as measured by the Generalized Self-Efficacy Scale
2. ED visit rates as measured by claims data
3. Hospital admission rates as measured by claims data

Additionally, in order to understand the why and how of patients' diverse experiences within this complex intervention we will conduct a qualitative analysis based on semi-structured interviews conducted with the patients and care team members.

Finally, a cost analysis will be conducted to evaluate the financial benefits to the health system.

### ***A Case Study***

To illustrate the benefits to the patient and health system, we present a case study based on a composite of real-life patients that we encounter at Bruner Family Medicine.

#### *MG, 32 year old female*

- Uninsured; receives charity care through the Saint Joseph Hospital's charity funds.
- Medical history notable for thyroid disorder, PTSD, depression, and anxiety.
- Social history notable unstable housing, substance use, and joblessness.
- Healthcare utilization includes 9 emergency department visits and 3 admissions over the past 6 months. This has primarily been driven by non-adherence with thyroid medications.

Example goals for individualized care plan for patient:

- Deliver cognitive behavior therapy to empower patient with skills to manage mental health challenges
- Connect patient with social services to assist with securing stable housing and employment
- Assist patient with enrollment in substance abuse program
- Promote compliance with prescribed medications

By delivering on these goals, we believe we will achieve the expected benefit of a 30% reduction in acute care utilizations and thereby realizing substantial financial savings (\$69,778; **Table 1**). Of particular note, in our case study the patient is uninsured and her healthcare costs are borne by the Saint Joseph Hospital Foundation. This is typical of a Brunen Family Medicine Clinic, where approximately 30% of our patients receive charity care. Improved stewardship of charity funds will allow for additional impact across our entire patient population.

**Table 1: Costs from Case Study**

	Pre-Intervention (6 months)		Post-Intervention (6 months)		Difference (\$)
	No.	Cost (\$)*	No.	Cost (\$)*	
ED Visits	9	\$13,797	6	\$9,198	\$4,599
Hospital Admissions	3	\$195,537	2	\$130,358	\$65,179
<b>Total</b>		\$209,334		\$139,556	\$69,778

\*Average ED charge = \$1533, source Medical Expenditure Panel Survey. Average hospital admission charge = \$65,179, source Colorado Hospital Association

**Technology:**

We need to build a socioeconomic risk scoring model that incorporates external data sources to augment our clinical data. To do this, we will start with a Readmission Risk predictive model, which we are currently building in Epic, to define an at risk population. To incorporate socioeconomic attributes we will use a risk scoring framework from an information vendor like Lexisnexis to augment our data with socioeconomic profiles that would augment the clinical data to give us targeted variables we can address. We also have an ED population analysis dashboard that includes geospatial mapping to be able to easily do hotspot analysis by different dimensions. Lastly, we can leverage a platform like DataRobot to build predictive models based on the readmission risk, clinical data, and socioeconomic profiles that we can train, validate and implement back in Epic.

Additionally, we will leverage technology to improve our care delivery. Building upon previously developed modules, we will use Salesforce to track program activities, capture real-time feedback, and ensure progress toward achievement of care coordination goals.

**Funding/Resources:**

*1. Describe the time required to secure resources and launch the venture.*

The development of a socioeconomic health score will be completed within the first three months. During the following three months, we will focus on dissemination and integration of this data tool throughout the SCL health system.

Following an initial design and planning phase, our targeted patients will receive intensive care and support over a 90-day period.

We will conclude the six-month pilot with completion of data analysis and evaluation. Pending demonstration of success, we will leverage this to secure resources to sustain the project at the Bruner Clinic and expand and integrate into the other GME clinics within the system.

**Figure 2: Project Timeline**

Project Activities	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7+
<b>Component 1: Socioeconomic Health Score</b>							
Determination of Components of Scoring & Scoring Framework	█						
Identification of Databases & Procurement of Databases	█						
Integration of Data into Predictive Model for Identification of Target Population		█	█				
Validation & Integration into Epic			█	█	█		
Presentation of Results to SJH & SCLH Leadership				█			
Integration & Dissemination of Data Tool Throughout SCLH					█	█	█
<b>Component 2: Intensive, multidisciplinary, community-based care.</b>							
Intervention Design & Planning	█	█	█				
Patient Selection & Enrollment			█				
Training of CHW			█				
Intervention Delivery (90 days)				█	█	█	
Real-time Data Monitoring				█	█	█	█
Extended Intervention Delivery							█
End-line Data Collection & Analysis							█
Presentation of Results to SJH and SCLH Leadership							█
Integration & Dissemination into SCLH GME Clinics							█

**2. Describe the investment needed for this solution (people, roles, technology).**

**Component 1: Socioeconomic Health Score**

The development of a socioeconomic risk score will require time investment from a skilled data engineer and access to external data and models. The necessary talent exists within SCL’s current data analytics team and potential sources of external data and models, such as LexisNexis and DataRobot, have been preliminarily identified.

**Component 2: Intensive, multidisciplinary, community-based care**

Delivery of the proposed care to complex patients requires an investment of time and energy from a multidisciplinary team. This team is already in place at Bruner Family Medicine Clinic where we have deep experience with delivering care for complex patients within the walls of our clinic. We will build on this clinical and administrative expertise to achieve the patient goals outlined above. Key to this process will be identifying and retraining a high-performing Medical Assistant to serve as a community health worker (CHW). We believe several such individuals are already members of our clinic team.

3. Lastly, 'guesstimate' and circle budget needed (the innovation project funding will not exceed a 6 month period pilot).

A) \$10,000-\$25,000

B) \$25,000-\$50,000

C) \$50,000-\$75,000

D) \$75,000-\$100,000

E) \$100,000-\$150,000

**Table 2: Draft Budget**

Description	FTE/ Units	Years	Unit Cost	Total Budget	Comments
<b>A. PERSONNEL</b>					
Community Health Worker	1	0.5	\$36,000	\$18,000	Medical Assistant who will be re-trained and re-deployed.
Clinical Social Worker	0.5	0.33	\$78,000	\$12,870	
Registered Nurse	0.2	0.33	\$78,000	\$5,148	
Clinical Psychologist	0.15	0.33	\$140,000	\$6,930	
Medical Doctor (FP)	0.2	0.5	\$216,000	\$21,600	
Practice Administrator	0.05	0.5	\$120,000	\$3,000	
Consultant	0.05	0.16	\$230,000	\$1,840	
Data Engineer	0.2	0.5	\$104,000	\$10,400	
<b>A.Total Personnel</b>				\$79,788	
<b>B. TRAVEL &amp; TRANSPORTATION</b>					
Travel for home visit	500	0.33	\$1	\$89	Based on IRS Travel Rate; Units = miles per month
<b>B. Total Travel &amp; Transportation</b>				\$89	
<b>C. EQUIPMENT &amp; OTHER INTERVENTION COSTS</b>					
Laptop	1		\$800	\$800	For CHW
Training	1		\$5,000	\$5,000	For CHW
External Data & Models	1		\$10,000	\$10,000	

C. Total Equipment & Other Intervention Costs				\$15,800	
D. TOTAL PROJECT COSTS				\$95,677	