



Precision Medicine via Pharmacogenomics Venture Charter

Author: Adam Still

Date: 05/29/18

Venture Definition:

- What we are working on:

We would like to implement a pharmacogenomics (PGx) program within SCL Health. The discipline areas primarily include: cardiology, psychiatry, and oncology, but can be applied to other areas as well. Patients that have an affordable, once-in-a-lifetime pharmacogenomics test will have access to an individualized report that will guide healthcare professionals to select the most appropriate medications. PGx removes the guesswork of which medication each patient should be prescribed. The result is precision-pharmacotherapy that will directly affect the patient journey by reducing adverse drug reactions, decreasing drug-drug interactions, increasing compliance, improving patient quality of life, and yielding better outcomes.

- The problems we are having:

SCL Health patients currently do not have any robust PGx programs available to them within our healthcare system. While there may be a handful of patients that undergo genetic testing to help guide their cancer therapy, such as HER2/neu testing for breast cancer, there is not a program in place to test an extensive patient population for a multitude of disease states for a reasonable cost.

The resulting problem is to continue to rely on trial and error practices to slowly identify a pharmacotherapy regimen that is efficacious for the patient while avoiding adverse drug reactions (ADRs). ADRs are already one of the top five leading causes of death in the United States.

- The impact to the SCL Health community if we don't find a solution to these problems:

The SCL Health community will be negatively impacted by not offering some sort of PGx program. Technology is advancing and medicine is becoming more individualized than ever before. Our patients will not be receiving the best *possible* care if we don't invest in PGx technology and adopt a concept of individualized medicine.

Some prominent institutions, such as the Mayo Clinic, University of Florida, St Jude Children's Research Hospital, Vanderbilt University, Ohio State University, and University of Chicago, have adopted PGx practices. SCL Health should be on the cutting edge of medicine instead of being left to play catch up.

Clear, Compelling Goal:

Please frame in the form of a SMART Goal (Specific, Measurable, Achievable, Realistic, Timely).

Test 75 patients by the end of the innovation challenge (6 months after initiation), and have pharmacotherapy recommendations accepted by providers 50% of the time.

Metrics:

Provide the metrics you will use to determine whether your venture is successful. The metrics should support your clear, compelling goal.

- Phase I
 - o Baseline rate of clopidogrel, SSRIs, & statin prescribing
 - Clopidogrel is an anticlotting medication that is commonly used after acute coronary syndrome (such as a heart attack)
 - SSRIs is a class of medications that is commonly used to treat depression, anxiety, and other mental health conditions
 - Statins are widely used cholesterol medications
 - o How many interventions based on PGx results are accepted
- Phase II
 - o Baseline rate of reported ADRs related to clopidogrel, SSRIs, & statins vs post-PGx
 - o Estimate the cost avoidance to the healthcare system as well as to our patients
 - # of office visits
 - # of hospital admissions

Alignment with Strategic Priorities:

Please provide an overview of which strategic priority this aligns to and how it will contribute.



This venture is in alignment with the above strategic imperatives because it offers clinical integration by delivering high-quality personalized, cost-effective care. For a minimal cost, PGx has the ability to reduce healthcare expenses by enhancing pharmacotherapy decisions. It will allow our providers to use PGx as a medication management tool to identify the best regimen for each patient. Furthermore, PGx offers a way forward for SCL Health to grow their care by adopting cutting edge technology.

Strategic Initiative	Information	Response
5	Description	Establish and pilot a population health focused "Personalized Precise Medicine" program using whole-genome sequencing or predictive biomarkers and pharmacogenomics that considers individual variability in genes, environment, and lifestyle for each person for disease treatment and prevention and medication therapy management. Implement Epic's Genomic Module.
	Expected impact - high-level (eg, volume, rate, cost, quality, etc.)	<ul style="list-style-type: none"> Primary impact: reduced readmissions and enhanced quality and continuity of care; greater market relevance Volume: strong patient volumes if marketed correctly and first to market; pharmacy volumes could be impacted but perhaps neutral from precise prescribing Quality: reduced readmissions and enhanced quality and continuity of care Cost: Genomics module ~ \$2M implementation; no additional costs for laboratories
	Relevant time period	2018-2020 (Prep work in 2018)

This venture is also in alignment with the above strategic initiative, but on a less costly scale. This venture will provide maximum value with minimal cost. Instead of spending \$2 million to learn what works and what doesn't, we can spend \$60,000 and use this pilot to take our lessons learned and apply them to expand PGx services.

Scope:

Items to consider when defining the scope of your venture include (but are not limited to) operational and technical resources, workflows, education/training, communications, technical build

- In Scope:
 - This venture would like to apply PGx to 3 areas: cardiology, psychiatry, and oncology.
 - The goal is to identify and test 75 patients that would benefit from PGx. Report interpretation for each patient will be performed and pertinent information/recommendations will be relayed to the provider.
 - PGx education, for providers as well as patients, is within the scope of this venture.
- Out of Scope:
 - While EHR integration is ideal, it is outside the scope of this 6 month pilot.
 - Processing the PGx tests in our own laboratories is out of scope, but should be a long term goal.

Anticipated Venture Start Date: 06/22/18

Anticipated Venture End Date: 03/31/19

Innovation Playbook

(Please work with the System Innovation Team to work through this portion of the document)

- Type

The type of innovation that we are proposing is a new service. Currently, there is no widely used PGx test within our healthcare system. This venture will close a gap in patient services by offering *personalized* medication therapy management.

- Shift

The customer experience is the focus on this venture. By offering a unique and superior service to our patients, we will create satisfaction and engagement. My vision is to have patients take this test then leverage an expert PGx pharmacist to go over, in detail, the results with the provider, as well as the patient, 1:1. I want to give power to the patient by educating them on medication use. Then we can create a personalized therapy plan to implement. The patient will be able to experience, first hand, the time and effort that goes into their healthcare. I believe the patient will feel cared for, special, and content to know that SCL Health is dedicated to patient-centered service.

- Ambition

The ambition of this venture should be considered as an adjacent service. By offering more personalized medication regimens, beyond the traditional considerations such as cost, ease of access, compelling indications, etc, PGx will push the boundaries of pharmacotherapy prescribing.

Point Of View

We want to empower providers to empower patients.

Concept

This venture aims to provide a PGx test to obtain patient specific results that can be applied to medication therapy management. The tool will empower our providers by offering an insight to how our patients will react to medications before taking them.

Other core concepts of this venture include:

- Less time spent on drug therapy decisions and more time spent treating patients
- Time commitment from the provider is minimal
- The test requires a 20 second cheek swab and 3 days to process and obtain a report
- Pharmacogenomic tests are available via prescription and provide decision support for drug therapy on over 160 medications
- A PGx pharmacist will receive the results and provide interpretation to the patient/provider
- Recommendations from the PGx pharmacist will be communicated directly to the provider via Epic or other means
- Some insurances may cover, otherwise the retail cost is \$350
- PGx pharmacists are available for questions

Venture Tribe

- Venture Sponsor: Adam Still
- Innovation Partners: Peter Kung & Terri Casterton
- Venture Team

Name	Role
Doug Malcolm	Planning and communications
Jayne Stich	Project planning
Rhiannon Longmore	Planning and communications
Nicole Heaton	Data analyst

Risks

Please outline the risks that this venture may incur. These could be related to compliance, technology, resources, adoption, etc.

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
Availability of baseline metrics	We would have to change our metrics or do without some of the compelling data	Low	Talk to data analyst on data availability and develop personalized reports
Lack of provider engagement	Unable to successfully identify and offer PGx test kits to pts	Low	Pursue multiple providers and multiple disciplines
Resource availability	A PGx pharmacist will have dedicated hours to work on this innovation but other resources may be stretched thin (analysts, for example). With the tight timeline of the challenge this could put our metrics at risk	Med	Include resources in the Innovation Challenge to leverage necessary labor
Slow user adoption	This could limit the # of PGx tested pts we have to collect data on	Med	Provider education, PGx pharmacist presence in clinics often

Technical Requirements

Please provide an overview of what new pieces of technology or changes to existing technology would be needed to support this venture.

- Oneome PGx test kits are required to collect genomic data. These kits are readily available and can be purchased at any time.
- An electronic calendar to keep track of appointments would be useful.



Innovation Challenge: Venture Milestones and Timing

Venture Name	Precision Medicine via Pharmacogenomics		Date	05/29/18
Venture Lead	Adam Still			
Location		Venture Timing		
Region	Colorado	Start Date	06/22/18	
Care Site/Department	Ambulatory clinics	Target Completion Date	03/31/19	

Venture Milestones, Accountability & Schedule: Please identify milestones for 3 phases of work		
Phase 1: Setup and Prepare for Venture Launch		
Things to consider:		
<ul style="list-style-type: none"> • Contract negotiations (if needed) • Defining scope of work • Identify stakeholders and decision makers • Assess current state and gaps to address • Develop goals and metrics • Communication strategy • Training strategy • Define testing approach 		
List the Key Milestones and Activities <i>If applicable, include IRB milestones, including target date for IRB approval</i>	Responsible Lead	Due Date
Statement of Work signed	Adam Still	06/22/18
Requirements Discovery	Adam Still	06/29/18
Engage stakeholders and decision makers	Adam Still	07/06/18
Define future state process flows	Adam Still	07/11/18
Create project plan	Jayme Stich	07/16/18
Contact legal dept to work through potential barriers	Adam Still, Doug	08/06/18
Communications Planning	Adam Still, Jayme, Rhiannon, Doug	08/06/18
Training Materials Development	Adam Still, Jayme, Rhiannon, Doug	08/06/18
Develop workflow with clinics	Adam Still	08/15/18



Innovation Challenge: Venture Milestones and Timing

Test plan with real clinic patients (1 or 2)	Adam Still	08/20/18
Gather baseline metics	Nicole/Adam	08/20/18
Phase 2: Launch and Testing Things to consider: <ul style="list-style-type: none"> • Testing your solution • Training those affected by the change • Cutover from old to new processes or tools • Measuring effectiveness of your change • Go-live support 		
List the Key Milestones and Activities	Responsible Lead	Due Date
Communications	Adam Still	09/10/18
Train office staff	Adam Still	09/10/18
Deployment: identify and test pts	Providers & Adam	09/11/18
Gather updated metrics	Adam Still & Nicole	10/11/18
Post go-live support	Adam Still	10/11/18
Phase 3: Report Out <ul style="list-style-type: none"> • Assemble performance metric data • Summarize findings • Define pivot and/or expansion plan 		
List the Key Milestones and Activities	Responsible Lead	Due Date
2019 Operational Budgeting to include resources needed to continue support for application	Adam Still & Doug Malcolm	10/11/18
Performance Metric Data Collection	Nicole Heaton	01/31/19
Lessons Learned	Adam, Doug, Jayme, Rhiannon	01/31/19
Continuous Improvement Opportunity Identification	Whole team	01/31/19
Expansion Planning	Adam, Doug, providers	01/31/19



Innovation Venture Metrics

Venture Name	Precision Medicine via Pharmacogenomics		Date	05/29/18
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Performance Metric Description						
<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	Process (P) or Outcome (O) Measure	Triple Aim Metrics Improve health (H) Improve care (C) Reduce costs (RC)	Baseline Performance and Measurement Period	Target Performance	Frequency Measured	Goal Date for Achieving Target
Prescribing rates of clopidogrel (anti-clotting med for pts that have had cardiac events), SSRIs (antidepressants), & statins (cholesterol medication) (baseline)	P	H, C, & RC	Unknown baseline	N/A	One time	07/30/18
Prescribing rates of clopidogrel, SSRIs, & statins post PGx-implementation	O	H, C, & RC	There are currently 0 recommendations based on PGx	50% of PGx recommendations are accepted	Biweekly or monthly	09/30/18
Baseline rates of ADRs relating to clopidogrel, SSRIs, & statins	P	H, C, & RC	Baseline, month of July 2018	N/A	One time	07/30/18
Post- PGx implementation rates of ADRs relating to clopidogrel, SSRIs, & statins	O	H, C, & RC	PGx is currently not being used	50% reduction in clopidogrel, SSRI, & statin ADRs	Monthly	09/30/18



Innovation Venture Metrics

Performance Metric Description						
<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	Process (P) or Outcome (O) Measure	Triple Aim Metrics Improve health (H) Improve care (C) Reduce costs (RC)	Baseline Performance and Measurement Period	Target Performance	Frequency Measured	Goal Date for Achieving Target
Estimated cost avoidance post-PGx	O	H, C, & RC		Successfully avoid 3 hospital admits & 10 office visits	Quarterly (every 3 months)	01/31/19



Innovation Venture: Pilot Risks

Venture Name	Precision Medicine via Pharmacogenomics		Date	05/29/18
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Care Site/Department	Ambulatory clinics	Target Completion Date	03/31/19	

Risks			
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
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Innovation Challenge Semi-Finalists Submission

Please fill out this submission form and return to Peter Kung (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 Lead(s): Adam Still

Team Member Names: Doug Malcolm, Rhiannon Longmore, Nicole Heaton

Location (Care site, Department): Lutheran Medical Center, Outpatient Pharmacy

Email: adam.still@sclhs.net

Phone Number: (303) 403-6421

Innovation Venture Title: Precision Medicine through Pharmacogenomic (PGx) Services

Innovation Intent: *This is a concise articulation of your venture's goal. Consider these two questions as you frame your intent:*

1. *How is this innovation different? Assess what others have already focused on and use this to identify types of innovation to focus on those things that are distinctive and create a shift in the patient journey.*
2. *How ambitious is this venture? How much will you be able to move the needle on your goal?*

Pharmacogenomics (PGx) combines pharmacology and genomics to determine a patient's response to medications. Patients that have an affordable, once-in-a-lifetime pharmacogenomics test will have access to an individualized report that will guide healthcare professionals to select the most appropriate medications. PGx removes the guesswork of which medication each patient should be prescribed. The result is precision-pharmacotherapy that will directly affect the patient journey by reducing adverse drug reactions, decreasing drug-drug interactions, increasing compliance, improving patient quality of life, and yielding better outcomes.

Making PGx available to SCL patients is a new and different venture because we currently do not have any PGx program in place. While there may be a handful of patients that undergo genetic testing to help guide their cancer therapy, such as HER2/neu testing for breast cancer, there is not a program in place to test an extensive patient population for a multitude of disease states for a reasonable cost.

My solution is to incorporate a low-cost, broad spectrum PGx test to enhance patient care by guiding pharmacotherapy relating to cardiology, psychiatry, and oncology. These 3 areas are the focus because they have a large patient base or incur large costs for treatment, which means they also offer the largest areas of opportunity.

This venture is ambitious because of the number of patients that will be impacted. Some of the areas that a PGx program will impact include:

- Finances for the patient as well as the healthcare system
- patient experience
- provider engagement

There is no doubt that precision medicine is rapidly expanding and is here to stay. I believe that a PGx venture through this challenge would be very helpful to demonstrate how effective precision medicine can be. The goal to implement a program like this is very achievable within the 6 month period.

Innovation Shift: *What is the primary focus of the change you want to create with your venture? Choose from one of the following three options and provide a short narrative of how your venture fits that option:*

- *Business Model: configuring assets, capabilities, and other elements of the value chain to serve our customers and generate revenue differently*
- *Platform: Focus on reinventing, recombining, or finding fresh connections across capabilities and offerings to create new value for customers.*
- **Customer Experience:** *Connects, serves, and engages customers in distinctive ways, influencing their interactions with SCL health and our offerings.*

The customer experience is the focus on this venture. By offering a unique and superior service to our patients, we will create satisfaction and engagement. My vision is to have patients take this test then leverage an expert PGx pharmacist to go over, in detail, the results with the provider, as well as the patient, 1:1. I want to give power to the patient by educating them on medication use. Then we can create a personalized therapy plan to implement. The patient will be able to experience, first hand, the time and effort that goes into *their* healthcare. I believe the patient will feel cared for, special, and content to know that SCL Health is dedicated to patient-centered service.

Background: *Identify if and how a similar solution has been tested or implemented before in either another healthcare organization or another industry. If so, identify when, where and the results that were achieved.*

PGx is not a new technology, but recent advancements in understanding PGx have led to a greater adoption rate and increased application. There are now more robust tests at lower costs than ever before. A 2016 survey showed that only 7% of all hospitals were using PGx testing. Some of the more prominent healthcare organizations that have implemented PGx practices include Mayo Clinic, University of Florida, St Jude Children's Research Hospital, Vanderbilt University, Ohio State University, and University of Chicago.

Mayo Clinic in Phoenix, for example, uses PGx as a referral service. Physicians identify patients that have struggled with pharmacotherapy and refer them to a PGx pharmacist. The PGx test is prescribed and the results are explained to the patient. From that interaction a medication plan is crafted and sent to the provider for review. The Mayo Clinic has witnessed an increased interest

from providers to offer this service to their patients and are currently looking to expand their PGx department.

The results from their PGx program have been well received by providers and patients alike. The program has also yielded a collaborative 10,000 patient study (ongoing) to measure the impact of their program. Thus far, PGx testing has demonstrated that the majority of patients have at least one PGx allele that could affect medication efficacy or toxicity.

Financial implications and other benefits have not yet been outlined in great detail, but it is easy to conceive that the results will probably be overwhelmingly positive. Several other institutions have realized the financial benefit via cost avoidance, although finding concrete numbers is difficult.

Benefits: *Identify potential patient experience, health, or financial benefits associated with the solution. Include the benefits to the patients, care givers and providers within and outside our four walls. How can those benefits be measured? Are you already measuring those benefits?*

Consider the following case:

A patient is admitted to the hospital with acute coronary syndrome and is diagnosed with NSTEMI. After treatment in the hospital the patient is released with a standard prescription for clopidogrel. After a few weeks the patient is admitted to the hospital again for the same reason. This indicates the medication did not work as intended.

The patient is now in the hospital for the second time in under a month. They are missing work & family, incurring thousands of dollars in new charges, and will have many more follow up office visits over the next few months.

So what happened? Without PGx we would be left guessing why it didn't work, or maybe we would just chalk it up to chance. Thankfully, with PGx we can have a better understanding of what went wrong and, if applied proactively, we could avoid this scenario altogether.

In this case, the PGx results show the patient has a CYP2C19*2 variant. This mutation is associated with lower exposure to active metabolite in subjects treated with clopidogrel. What does that mean? Current literature states that any subject that demonstrates a *2 variant on the CYP2C19 enzyme should be considered for alternate antiplatelet therapy (prasugrel or ticagrelor). Had we known this information before the patient was prescribed clopidogrel a second hospitalization could have been avoided.

If we were to extrapolate this case out and apply it to our patient population how many events like this could we avoid? Let's say SCL Health saw 10 patients per day presenting with NSTEMI. According to reports, there is a 30% chance, in European ancestry, to have a *2 variant and a 70% chance with Asian ancestry. Out of our 10 NSTEMI patients, this would equal about 3-5 patients per day at SCL with this particular allele that should be started on alternate antiplatelet agents to

help avoid medication-related complications. This fact is further reinforced by a US Boxed Warning: “The effectiveness of clopidogrel results from its antiplatelet activity, which is dependent on its conversion to an active metabolite by the cytochrome P450 (CYP-450) system, principally CYP2C19.” ^{Clinical Pharmacology} But unless we have PGx test results we would never know which of our patients this boxed warning is alerting us about.

To go one step further we need to recognize that patients like these are often treated by more than just one discharge medication. Another common class of medication for ACS patients include statin therapy. The PGx test I want to use can also guide us in our decision for which statin to prescribe. In fact, the OneOme test provides enough information to help guide pharmacotherapy decisions for over *160 different medications* across a variety of classes.

This is just one example of how a PGx program can impact the patient journey, improve outcomes, and reduce financial strain. There are countless other stories that can be referenced that highlight the usefulness of PGx. If interested, check out OneOme’s website: <https://oneome.com/patient-stories>

If this tool is available, and affordable, don’t we owe it to the patient to at least offer it?

Technology: *Describe the technology that will be needed to implement the solution. Identify if the technology already exists or needs to be created. If the technology already exists describe what will be tested that is unique to this solution. Explain how the new technology will enable providers or patients to create or enhance services.*

While there are several different companies that offer PGx testing, I would like to start by using OneOme’s test for a few reasons. I feel that it is one of the most robust tests, lowest cost, and therefore most beneficial to our patients. The technology needed is to purchase kits from the company and have a provider write a script for each patient that is to receive the testing. A PGx pharmacist will interpret the results and update EMR notes, as needed. A private room/phone and computer will also need to be available to document the consultation.

An electronic calendar to keep track of appointments would be useful.

EMR integration is ideal, but is beyond the scope of this venture.

Funding/Resources:

1. *Describe the time required to secure resources and launch the venture.*
2. *Describe the investment needed for this solution (people, roles, technology).*
3. *Lastly, ‘guessimate’ 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

- PGx kits are readily available. I will need to do provider education as they are the ones that will prescribe the test- several weeks will be necessary.
- Marketing/promotional materials, PGx pharmacist, scheduler (?), computer, phone, consultation room on a hospital campus, pharmacist education