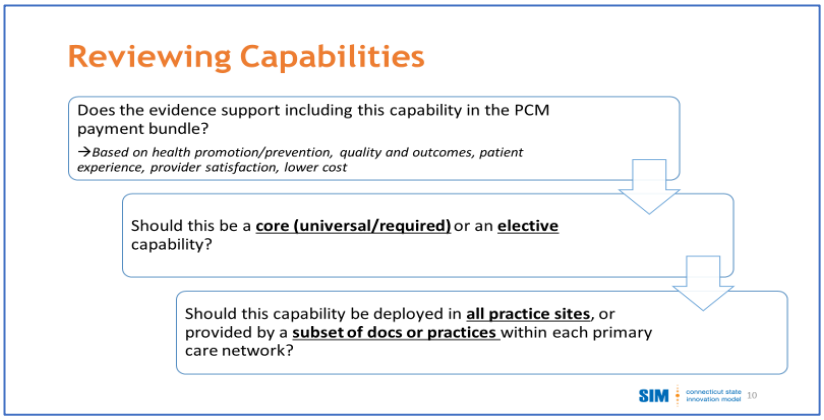
CT Primary Care Payment Reform
Draft Capabilities Skeleton: *Genomic Screening for CDC Priority Conditions*
This Draft: 07-30-2018

Scope and Purpose of the Design Group

Thank you for joining the conversation about Primary Care Modernization in Connecticut. The Practice Transformation Task Force is currently reviewing the capabilities that should be incorporated into a primary care payment model. Each capability will be evaluated according to three questions noted in Figure 1. This document provides background, evidence and experience to inform Design Group members and set a baseline for discussion.

Figure 1: Task Force Capability Review Questions



Understanding the Need

The Problem:

Screening in healthcare is used to identify pre-symptomatic health risks which would otherwise go unrecognized until it was too late. Blood pressure screening followed by blood pressure control has been effectively used to lower the incidence of stroke. Newborn screening has existed for over 50 years as a method of finding the 1 in 300 newborns with risk for serious health problems related to approximately 30 different conditions that can be identified prior to any symptoms in the first few days of life and then managed pre-emptively.

A conservative estimate is that, unbeknownst to them and their healthcare providers, between 1-2% of the U.S. population has an identifiable genetic risk for cancer or heart disease that could be detected and clinically managed via a genomic screening approach. These risks in 1-2% of the population are associated with three conditions that the CDC's Office of Public Health Genomics (OPHG) has labeled as "Tier One" conditions (see table below). CDC Tier 1 Conditions are conditions where clear and accepted strategies to diminish the disease risk can be applied once an at-risk case is identified. The list of conditions that meet these Tier One criteria are expected to grow in the decades ahead as our genomic knowledge grows.

CDC Office of Public Health Genomics - Tier One Genomics Applications

Condition	Genes	Disease Risk
Hereditary Breast and Ovarian Cancer Syndrome (HBOC)	*BRCA1, BRCA2*	Cancer of the: breast, ovary, prostate, pancreas, other
Lynch Syndrome (LS)	*MSH6, MSH2, MLH1, PMS2, EPCAM*	Cancer of the: colon, uterus, other
Familial Hypercholesterolemia (FH)	*LDLR, APOB, PCSK9*	Heart attack, stroke, other

Until recently two issues have been stumbling blocks to genomic screening implementation for these three conditions: the cost of DNA sequence testing and limitations to DNA sequence variant interpretation. For instance, in 2015 it cost between $3,000-4000 to sequence just two of the 10 genes (*BRCA1/2*), however in 2018 laboratories can sequence all 10 genes for between $300-400. In this same

period, investments by the federal government (i.e. the NIH) have made available a robust public database (ClinVar https://www.ncbi.nlm.nih.gov/clinvar/) containing verified "pathogenic" variants in these genes which allows for more uniform data interpretation.

Prior to these favorable recent changes in cost and variant data interpretation tools, the healthcare system had defaulted to the weak proxy of family history to identify who is eligible for the expensive testing. Recent data demonstrates that for one of these three conditions, namely *BRCA1/2* associated cancer risk, over 80% of those identified through genomic screening had not been otherwise identified in the course of their normal healthcare (i.e. through family history or other strategies). Genomic screening of adults is a safe, effective, and efficient way to identify the at-risk population.

Identifying the 3 to 4 million Americans with these risks via screening and then effectively mitigating the potentially life-threatening risk in follow-up care are worthy goals. A programmatic demonstration of this work in action to identify and improve the health of the estimated 30,000 to 40,000 at-risk citizens in Connecticut will provide the exportable model for the rest of the country. Such a program would be in line with the Genomics and Population Health Action Collaborative Population Screening model (from the US National Academy).

Achieving these short-term goals is made even more attractive by the promise of a broader population benefit (beyond the 1-2%) once the stage is set with an established genomic screening infrastructure that stands ready to implement screening for a growing list of genomic conditions in the decades ahead.

A program in genomic screening for the CDC priority conditions could be set up in a manner that allows for participant's initial sample to later be used to generate pharmacogenomic and other screening results at a later date if the funding for this were allocated.

Proven Strategy:

Name: Genomic Screening for CDC Priority Conditions

Definition: Adult patients (ages 18 to 65) will be offered genomic screening through primary care practices. Those who choose to be screened will provide a DNA sample that will undergo DNA sequencing and interpretation of a ten-gene panel looking for evidence of risk for: HBOC, LS, or FH. Those who screen positive will then be offered support to (1) understand their result, (2) take clinical steps to reduce risk, and (3) get at-risk family members screened. A central care support team (composed of geneticists, specialists, genetic counselors, and others) will be created as a single central resource for the state in order to answer questions for patients or providers, guide decision making as needed, carry out consultation (telemedicine or in person) as needed.

Intended Outcomes:

- Identify among patients who are interested in screening those with detectable risk for cancers (including breast, ovarian, prostate, pancreatic, colon, and uterine) and cardiovascular disease (including heart attack and stroke).
- Offer effective interventions to lower the risk of morbidity and mortality in these patients and their families.

Consumer Needs:

- Need for optimized preventive care for cancer
- Need for optimized preventive care for cardiovascular disease

Health Equity Lens:

- Genomic screening is currently available as a "concierge" opportunity for those who seek it and can self-pay. This screening would offered to a more diverse and representative population.

Implementing the Strategy

Example Scenario: An adult seen for routine care within a primary care practice in Connecticut will have the opportunity to opt in to genomic screening after reviewing informational materials (e.g. brochures, videos, other). They will give a DNA sample (blood or saliva) which will be sent to a central laboratory for sequencing and analysis. 1-2% will screen positive for a pathogenic DNA variant for one of the three conditions. The result will be returned to both the provider and directly to the patient within 4 weeks time. Patients and providers will be offered detailed support in (1) understanding the result, (2) planning the next clinical steps, (3) informing and supporting at-risk relatives. A central care support team will be available to support patients and providers with phone discussions, telemedicine support, or traditional face to face consultations.

HIT Requirements:

- Secure electronic portals for patient and provider to results and support materials (including provider CME opportunity).
- Capacity to securely deliver "positive result report" and "negative screening message" directly to EHRs, and to default to secure FAX or mail for patients and providers without EHR.
- Secure telemedicine platform for multiparty consultation (e.g. patient, primary care provider, cardiologist, central care support team).

Implementation Concerns:

- False reassurance of a negative screen. Genomic screening does not look for or rule out all risk for cancer or heart disease. Careful messaging to both patients and their providers is needed to not give the false impression that a negative screen rules out all risk.
- Some with risk will not ultimately develop disease. The identified risk is not "a diagnosis", and not all of those with these risks (or any health risk) will develop disease. The support materials will make this clear to patients and providers.
- Programmatic Costs. In context, total budget is expected to be $\leq$ two preventive medicine visits for each participating patient:
  - Test costs
  - Central care support team costs
  - Outcomes monitoring costs
  - HIT costs

Impact

Aim	Summary of Evidence
Health promotion/prevention	Patients who choose to participate will have the opportunity to identify an otherwise invisible risk for themselves and their family, and then take actions to moderate that risk.

Improved quality and outcomes	Patients have experienced life saving interventions following genomic screening and preventive interventions.
Patient experience	Screening is optional, patient choice is a priority. For those with concerns about cancer and cardiovascular risk there is an opportunity to be proactive.
Provider satisfaction	Improving preventive care in order to reduce morbidity and mortality is a strong driver of provider satisfaction. In addition, most providers do not currently screen their patients for BRCA in compliance with the USPSTF this screening will replace that risk assessment. (https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/brca-related-cancer-risk-assessment-genetic-counseling-and-genetic-testing)
Lower Cost	Management of cardiovascular and cancer risk and detection of early stage cancer, leads to improved outcomes and lower costs.

Please complete the survey on this capability **here.

APPENDIX

Learning from Others

State and National Scan:

Case Study #1 Genomic Screening within a Large Regional Healthsystem. The Geisinger Healthsystem in Pennsylvania initiated genomic screening on a group of 200,000 health system volunteers in 2015. This screening program was designed and established under the direction of Dr. Michael Murray, and has proven effective at identifying risk and managing care for the three CDC Tier 1 conditions, as well as 24 other conditions where the data is not yet mature enough to suggest for this demonstration project. A number of the references below detail the findings in the Geisinger work.

Case Study #2 Genomic Screening in Individual Practices through a Commercial Testing Company. The InVitae Laboratories is a commercial genetic testing company that launched a concierge-style genomic screening effort; namely an effort wherein an informed provider can order a screen for patients who agree to self-pay coverage of the testing. InVitae has reported the success of these efforts in the first 1300 patients. Similar to the Geisinger experience, this screening identified individuals with genetic risk for cancer and heart disease that could not have been identified via implementation of existing identification strategies (i.e. family and personal medical history analysis).

Why Demonstrate Genomic Screening in Connecticut:

Connecticut is a small state, however in terms of racial and ethnic diversity it is representative of the country as a whole (see Table below). With a population of just over 3.5 million, Connecticut is approximately 1% of the U.S. population and is representative of country at large. This demonstration project in Connecticut is expected to be valuable for the whole country.

2010 US CENSUS (RACE AND HISPANIC ORIGIN)	CONNECTICUT	US

White alone	**80.60%**	**76.90%**
Black or African American alone	**11.80%**	**13.30%**
American Indian & Alaska Native alone	**0.50%**	**1.30%**
Asian alone	**4.70%**	**5.70%**
Native Hawaiian, & Other Pacific Islander alone	**0.10%**	**0.20%**
Two or More Races	**2.30%**	**2.60%**
Hispanic or Latino	**15.70%**	**17.80%**
White alone, not Hispanic or Latino	**67.70%**	**61.30%**

Additional Reading:

A list of resources such as publications in peer-reviewed journals and articles from respected trade and popular press.

Genomic Screening Models:

1. Genomics and Population Health Action Collaborative of the National Academies of Sciences, Engineering, and Medicine http://nationalacademies.org/hmd/Activities/Research/GenomicBasedResearch/Innovation-Collaboratives/Genomics-and-Population-Health.aspx?page=5
2. Trivedi BP. Medicine's future? Science. 2017;358:436-40. [PMID: 29074750]
3. The Center for Disease Control and Prevention's (CDC) Office of Public Health Genomics (OPHG) Tier One Toolkit. https://www.cdc.gov/genomics/implementation/toolkit/tier1.htm

Genomic Screening Results:

1. Buchanan AH, Manickam K, Meyer MN, Wagner JK, Hallquist MLG, Williams JL, et al. Early cancer diagnoses through BRCA1/2 screening of unselected adult biobank participants. Genet Med. 2018;20:554-8. [PMID: 29261187]
2. Manickam K, Buchanan AH, Schwartz M, Hallquist M, Williams J, Rahm AK, et al. Ascertainment of BRCA1/2 Expected Pathogenic Variants in 50,726 Adult Biobank Participants. (publication in press).
3. Abul-Husn NS, Manickam K, Jones LK, Wright EA, Hartzel DN, Gonzaga-Jauregui C, et al. Genetic identification of familial hypercholesterolemia within a single U.S. health care system. Science. 2016 Dec 23;354(6319). [PMID: 28008010]

Disparities in Genomic Screening:

1. Amrock SM, Duell PB, Knickelbine T, Martin SS, O'Brien EC, Watson KE, et al. Health disparities among adult patients with a phenotypic diagnosis of familial hypercholesterolemia in the CASCADE-FH™ patient registry. Atherosclerosis. 2017 Dec;267:19-26. PMID: 29080546

2. Newman LA. Consideration of Population-Based BRCA Testing as a Strategy to Reduce Disparities in Genetic Counseling Referrals: The Importance of Stating (and Proving) the Obvious. JAMA Surg. 2018 Jul 3. PMID: 29971430

Stories of Patients who tested positive in Genomic Screening for CDC Tier 1 Conditions:

1. BRCA1/2: https://www.youtube.com/watch?v=An9Z-fEOvgU and https://www.youtube.com/watch?v=wT3KaAqvn-s
2. Lynch Syndrome: https://www.youtube.com/watch?v=KlHNKM0pYmY and https://www.youtube.com/watch?v=PkNUhxtipM0
3. Familial Hypercholesterolemia: http://www.dailyitem.com/news/lifestyles/health/geisinger-study-finds-potentially-fatal-condition-is-underdiagnosed/article_15ee1b8e-ee30-11e6-9f62-db486fab95c5.html