



NANTHEALTH

# Health Heritage



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POWERED BY NANTWORKS

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Health Heritage is a **patient-facing, web-based** application that empowers consumers to collect, analyze and share their detailed personal & family health histories. Health Heritage establishes a “living legacy” for children and future generations and can also be a vital and unique addition to research consortiums and biobanks.



# Health Heritage: History

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- Developed as NCI-funded research project at University of Virginia: 2010-11
  - Analytic validation published in *Public Health Genomics* 2010;13:477–491 demonstrating that Health Heritage consistently outperformed PCPs in the completeness and accuracy of family health history collection.
- Launched at NorthShore University HealthSystem: May, 2014
  - 4 hospitals & 2,000 clinicians in northern Chicago suburbs; Epic EMR; Available to all patients through a [link in their patient portal](#)
  - Clinical validation published in *Familial Cancer* 2015; 15:331-339 demonstrating agreement (97%) between Health Heritage's referral for genetic evaluation versus a genetics team relying on guidelines and expertise.
  - Patients are now independently scheduling appropriate genetic evaluations and other preventative services based on Health Heritage recommendations.



- Acquired by NantHealth, a precision cancer care company: Sept, 2015

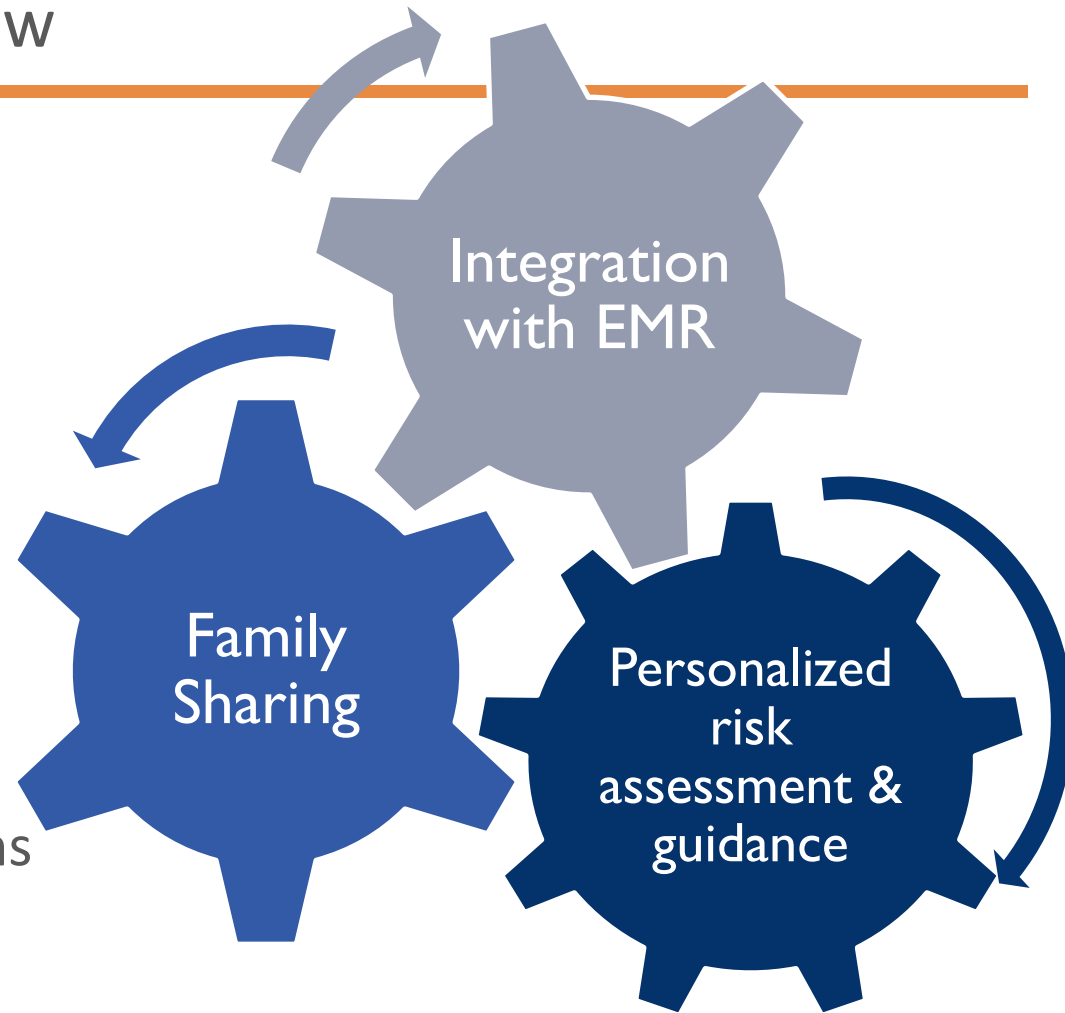
Founded and led by Dr. Patrick Soon-Shiong [www.nanthealth.com](http://www.nanthealth.com)

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# Health Heritage: Overview

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1. Automatic transfer and interpretation of detailed personal data from EMR & return of risk reports to PCPs
2. Sharing of accurate info between family members
3. Continuously updated and personalized recommendations based on guidelines and evidence



**Easy for patients to collect, maintain, and share their family health history.**

# Health Heritage: EMR Integration & Family Sharing

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- Data pulled from EMR using SQL queries to Clarity database
- Discrete data translated to and from other coding schemes (e.g. SNOMED, ICD-9)
- Pathology reports processed using our Natural Language Processing (NLP) solution (e.g. number/type of colon polyps, specific cancer diagnoses)
- Risk assessment reports are sent back to the patient's medical record (at patient discretion) as an HL7 ORU message
- Global family tree modeled as a directed acyclic graph using mother and father links; allows for family sharing using “scoping” and “permissions”



# Health Heritage: Personalized risk assessment

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## Current Conditions:

Breast Cancer  
Colorectal Cancer  
Melanoma  
Ovarian Cancer  
Pancreatic Cancer  
Prostate Cancer  
Uterine Cancer

## Planned:

*Lung Cancer*  
*Thyroid Cancer*  
*Cardiovascular Disease*  
*Diabetes*  
*Hypertension*  
*Stroke*  
*Alzheimer's/Dementia*

**Risk engine based on guidelines where available (e.g., NCCN & ACS), extensive literature review, and open source quantitative risk models**



# Health Heritage:

Each risk factor (algorithm) is linked to a risk level and evidence-based recommendations:

1. Genetic/Specialty Services
2. Cancer Screening
3. Risk Reduction



## Your Cancer Risk Analysis

[Update](#) generated Mar 15, 2016 [Print](#) [Send to Medical Record](#) last sent M

### Summary

**INCREASED RISK FOR**

- Melanoma
- Colorectal Cancer**
- Breast Cancer
- Ovarian Cancer
- Pancreatic Cancer

**AVERAGE OR LOWERED RISK FOR**

- Uterine Cancer
- Gall Bladder Cancer

**RISK FACTORS & WHAT YOU CAN DO**

- History of Melanoma
- 1st Degree Relative with BRCA
- Adenomatous Polyps
- Inflammatory Bowel Disease

### Summary

#### Risk Factors & Analysis

We look at 102 factors in your personal health history and family history that scientists say are predictors of 7 common types of cancer in women. Based the information you've provided as of March 15, 2016:

You are at **high risk** for

**Melanoma**  
because you have a [history of melanoma](#), and you have [1st degree relative with the BRCA1 or BRCA2 gene mutation](#)

You are at **moderate risk** for

**Colorectal Cancer**  
because you've had [adenomatous polyps](#) in your colon, and you've been diagnosed with [inflammatory bowel disease](#), and you have [1st degree relative with the BRCA1 or BRCA2 gene mutation](#)

You **potentially have increased risk** for

**Pancreatic Cancer**  
because you have [1st degree relative with the BRCA1 or BRCA2 gene mutation](#)

**Ovarian Cancer**  
because you have [1st degree relative with the BRCA1 or BRCA2 gene mutation](#)

**Breast Cancer**  
because you have [1st degree relative with the BRCA1 or BRCA2 gene mutation](#)

You are at **average risk** for

**Uterine Cancer**

# Health Heritage: Current (*future*) development

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- Cloud-native architecture; improved performance and scalability
- Modern responsive web app to enable phone/tablet use
- Use in CancerMoonshot2020 research data collection with over 20,000 participants anticipated ([www.cancermoonshot2020.org](http://www.cancermoonshot2020.org))
- Integration with clinical warehouses and bio-banking initiatives at large integrated health systems & integration with other apps (HL7 v3 Pedigree?)
- *Disease risk coverage beyond cancer to include common cardiovascular, neurologic, and metabolic conditions.*
- *Enable consumers to upload data from other sources (e.g., Blue Button/NATE)*
- *Connecting/sharing with family members via Facebook®*

