Clinical Genomics in Cancer Care
Pathways Forum
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Leslie Manace MD MPhil FACMG
Kaiser Permanente Oakland Genetics
KP Northern California Genetics Screening & Tracking
KP Northern California Precision Medicine & Genomics
Disclosure of Relevant Financial Relationships

- Leslie Manace Brenman and the planners of this activity have no relevant financial relationship(s) with ineligible companies to disclose.

- Ineligible companies are those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

- Financial relationships of any dollar amount are defined as relevant if the educational content is related to the business lines or products of the ineligible company.
Cost per Genome

Moore's Law

National Human Genome Research Institute

genome.gov/sequencingcosts

$100M $10M $1M $100K $10K $1K

Progress in science depends on new techniques, new discoveries and new ideas, probably in that order."  - Sydney Brenner

- Single gene analysis
  - Individual gene sequencing, dosage analysis (PCR, MLPA)
- Chromosome microarray
  - Chromosome microdeletion/ duplication detection
- Next generation
  - Multiple gene panels
  - Whole exome / genome
Timeline

- Sanger single gene sequencing
- Human genome mapped
- GINA law
- $5000 genome

- 1995
- 2001
- 2008
- 2009
Inflection Curve of Disease Development

Role for Personalized and Precision Medicine Tools

- Quantify baseline risk
- Monitor progression
- Refine risk prediction
- Identify disease phenotype
- Define disease mechanisms
- Personalize therapy
- Monitor response

Health Enhancement  Primary Prevention  Personalized Health Planning  Disease Management

Source: Duke Center for Research on Personalized Health Care
NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society
multifactorial vs. mendelian
“Hi doctor,
As you know I want to be as proactive as possible given my family history.
My aunt was just diagnosed with breast cancer—since this also affected my mother, and there are other cancers on that side, should I have any specific testing?”
Common complex breast cancer

Familial breast cancer

Hereditary predisposition syndrome breast cancer

Bernsetin-Mohllo, R et al. Breast Can Rad Therapy 2022
Public health genomics: “CDC3” priorities

> Hereditary breast and ovarian cancer syndrome
> Lynch syndrome
> Familial hypercholesterolemia

Genetic testing to become a regular part of cancer care

Up to 15 percent of cancers are caused by a hereditary gene change. It can be helpful to know if you have a mutation.

Elizabeth Scheinbaum
November 7, 2023

Kaiser Permanente is making it easier and more convenient for cancer patients to uncover genetic information that can affect their treatment and possibly prevent family members from developing cancer.

The change started two years ago with ovarian cancer patients. Instead of making a separate appointment with the Genetics Department, ovarian cancer patients are offered genetic testing early in their regular cancer care. Usually, 5 to 15% of cancers are a result of a hereditary gene change.
When using a negative screening examination, AI algorithms performed better than the Breast Cancer Surveillance Consortium (BCSC) risk model for predicting breast cancer risk at 0 to 5 years. Combined AI and BCSC models further improved prediction.

Arasu, V et al. Radiology Jun 2023

On the horizon

Cell-free DNA screening: "liquid biopsy"

Polygenic risk Pharmacogenetics

Cisneros-Villanueva, M et al. Brit J Can 2022
Genomics logistics

Practice support
- Streamlined pathways
- Screening & tracking

Stewardship
- Clinical decision support
- Interpretation and data storage

Translational research
- Delivery science
- Strategic alliances
Thank you! Stay well
leslie.manace@kp.org
## Appendix: A Medical Genetics Department

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Genetics Services

Talking to a genetics specialist can help you understand how your genes and genetic variants may affect you and your family and help you get the care you need.
Hereditary Cancer Program

Hereditary Cancer Program

About Our Program
Our Care Team
What to Expect During an Appointment
Creating a Care Plan
Hereditary Cancer Program Locations
Patient Advisory Board
Research Opportunities
Resources and Support

About Our Program
Spanish: Programa de cancer hereditario
Chinese: 家族遗传性癌症计划

The Kaiser Permanente Hereditary Cancer Program (HCP) is for our members who have an inherited cancer risk. The program serves people who have had cancer, as well as people who have not had cancer. Our goal is to help reduce the risk of future cancers. The Hereditary Cancer Program was awarded the Sydney R. Garfield Exception Contribution Award in 2019.

Click here to watch the 5-minute video about this unique program.

The first step is to talk with a genetic counselor to determine your cancer risk. After your Genetics visit, you may be referred to an HCP center:

1. If you carry a genetic variant that increases your risk for cancer.

OR

2. If there appears to be an inherited cancer risk in your family (even without genetic testing).

Our Care Team

Our program has a care team of experts in many areas of medical care, including genetic counselors, breast surgeons, gynecologic surgeons, plastic surgeons, and other support staff. This program lets you get answers

Our Mission Statement

The Kaiser Permanente Northern California Hereditary Cancer Program offers coordinated multidisciplinary expert care for KP members with inherited cancer risk with equal access throughout the region.

We deliver personalized and excellent patient care experiences, optimal outcomes and provide care for the entire family that is based on evidence and national guidelines for best practice.

We hope to empower and educate our members with resources to make informed decisions in their care and provide access to new research and clinical trials.