Genetic Companion Testing in Oncology

The Importance of Genetic Counseling and Testing For Hereditary Cancer Syndromes

Gayle Patel, MS, CGC
Texas Oncology

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About Me

20 YEARS
UNCG GENETIC COUNSELING

Texas
Home Sweet Home

FIGHT CANCER
TEXAS ONCOLOGY

I have no disclosures

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Importance of Diagnosis of Hereditary Cancer Syndromes

Enhanced Surveillance

Treatment Options

Cascade Testing

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https://www.nccn.org/professionals/physician_gls/pdf/genetics_bop.pdf

The Problem

- 2023 Study: 1.4 million cancer patients from 2013-2019 in Georgia & California
- ***6.8%*** of cancer patients received germline genetic testing
- Highest rates
  - 50% males breast cancer
  - 28% ovarian cancer

Low rates of genetic testing 'a missed opportunity' to reduce cancer burden

Nick Paul Taylor
Jun 5, 2023

Latest in Molecular Diagnostics

Illumina names new CEO
SEPTEMBER 8, 2023

Actome outlines sequencing expansion plans as EU funding kicks...
SEPTEMBER 7, 2023

SPONSORED
At-home or Lab-based STI

Kurian et al 2017 & 2019, 2023
Childers et al 2017
Farmer et al 2021
Armstrong et al 2015
https://www.labpulse.com/diagnostic-technologies/molecular-diagnostics/article/15539929/low-rates-of-genetic-testing-a-missed-opportunity-to-reduce-cancer-burden

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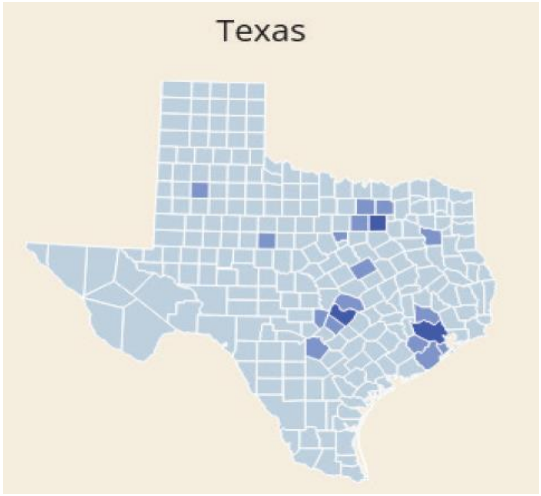
Why is this happening?

Access?

Reimbursement considerations?

Knowledge?

CGCs across Texas



Source: NSGC PSS 2022

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TX Oncology Solution: The GREAT Program

1. CGCs train TXO Providers to offer Genetic Evaluations & Testing in office

2. Build & Expand Genetics Services within the TXO Virtual Care Clinic

3. Other Novel Options?

Improved Access to Genetic Services

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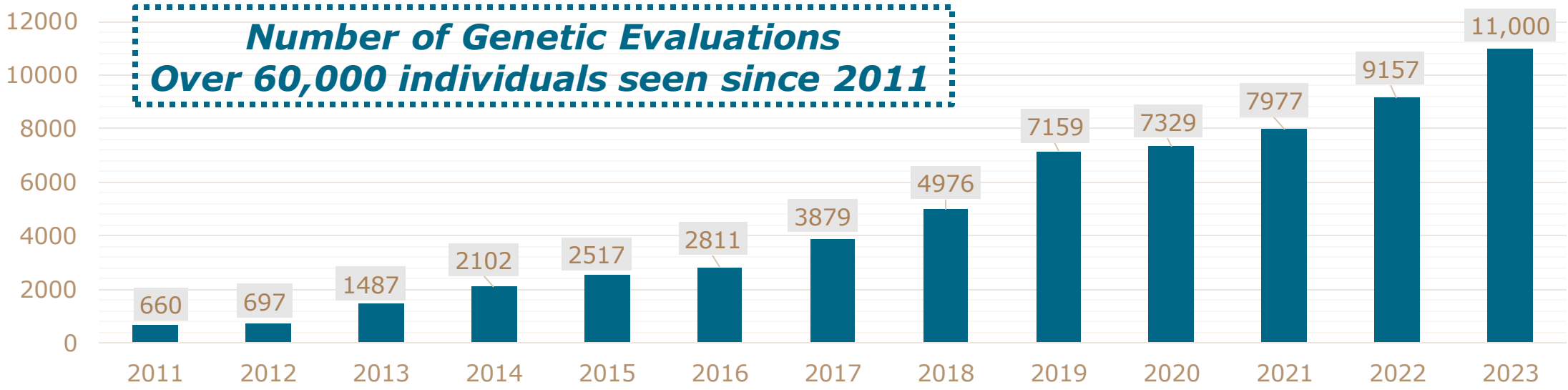
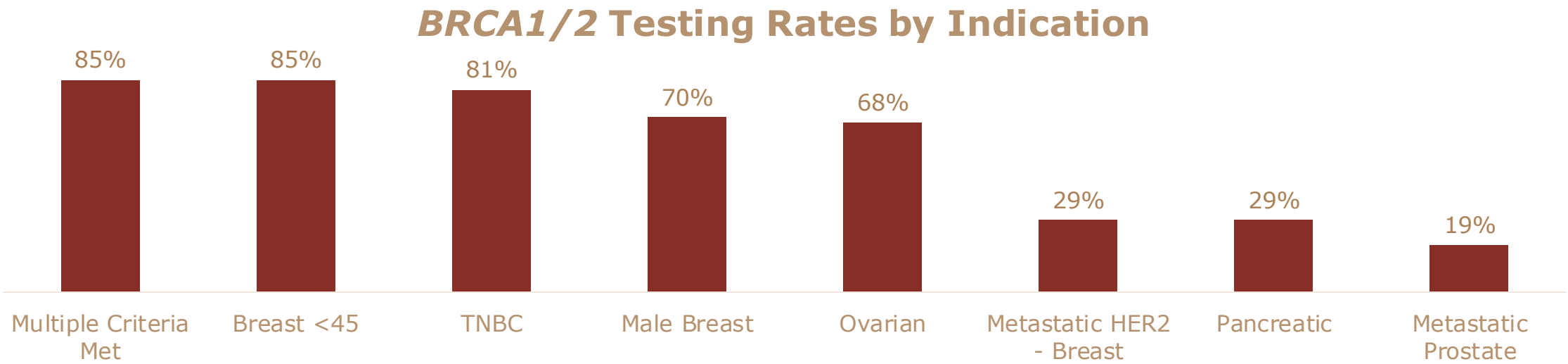
https://ascopubs.org/doi/abs/10.1200/JCO.2019.37.27_suppl.123
https://ascopubs.org/doi/pdf/10.1200/EDBK_238937?role=tab

How is it going?

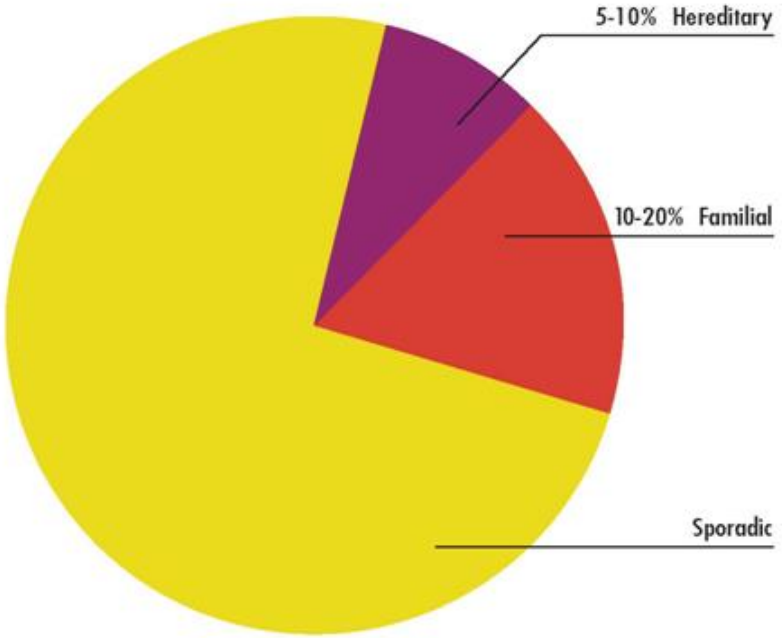




https://ascopubs.org/doi/abs/10.1200/JCO.2023.41.16_suppl.e22533

We Still Have Work to Do!

All Cancer is Genetic, but Most Cancer is NOT Inherited



Cancer Type	Prevalence of Pathogenic or Likely Pathogenic Variants
Epithelial Ovarian Cancer	18.1-23.6%
Metastatic Prostate Caner	11.8%
Colon Cancer	9.9%
Breast Cancer	9.3%
Pancreatic Cancer	3.8-8.4%
All Solid Tumors	12.5%

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7326311/pdf/nihms-1595967.pdf
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7600058/

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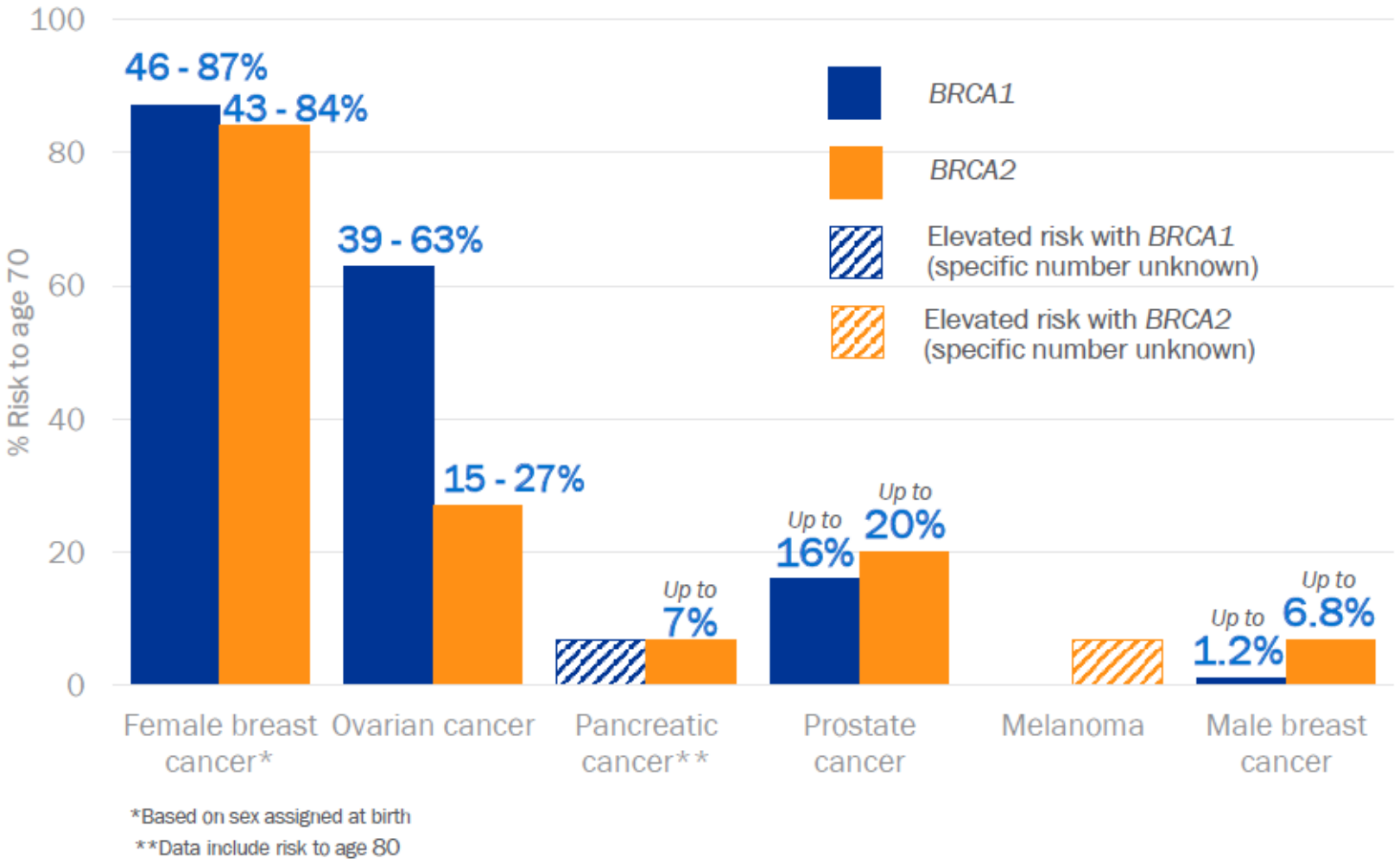
Hereditary Breast & Ovarian Cancer Syndrome



- *BRCA1 & BRCA2*
- 1 in 190 people
- Critical for HRR pathway

1. Manickam et al 2018
2. Ferla et al 2007
3. Image credit: Myriad Genetics

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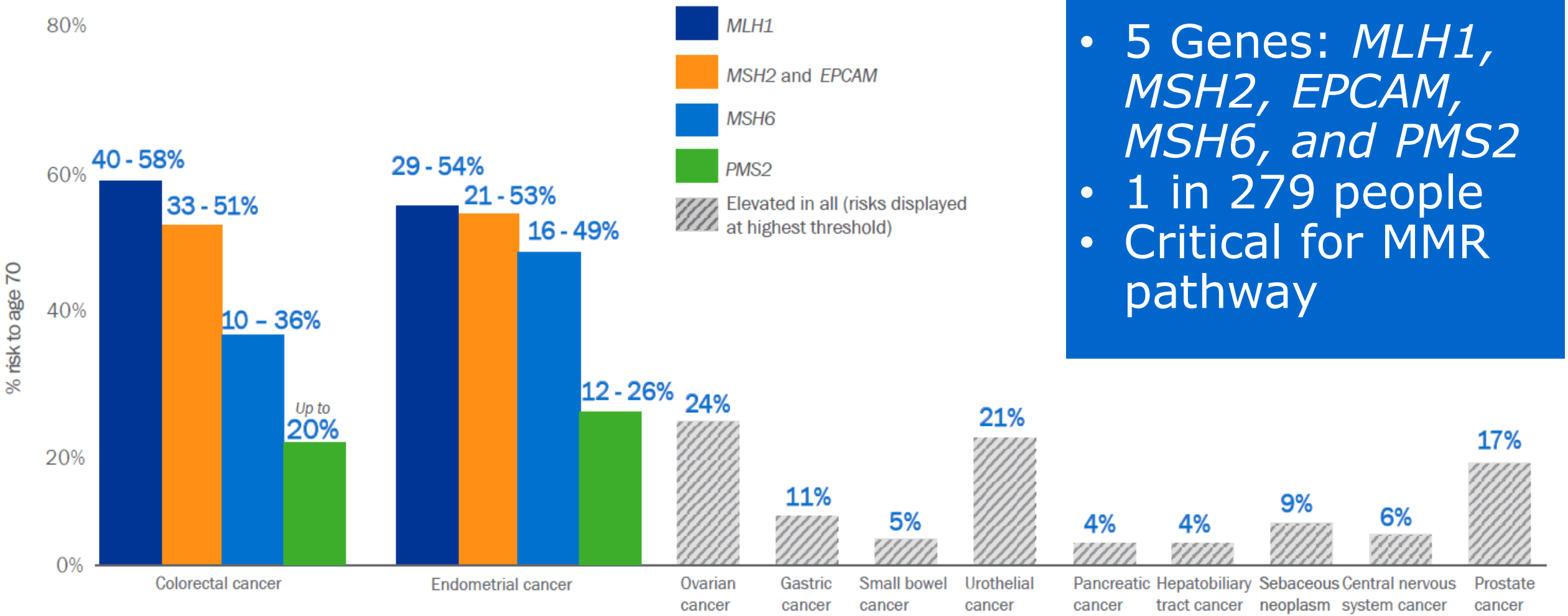
Lynch Syndrome



- 5 Genes: *MLH1, MSH2, EPCAM, MSH6, and PMS2*
- 1 in 279 people
- Critical for MMR pathway

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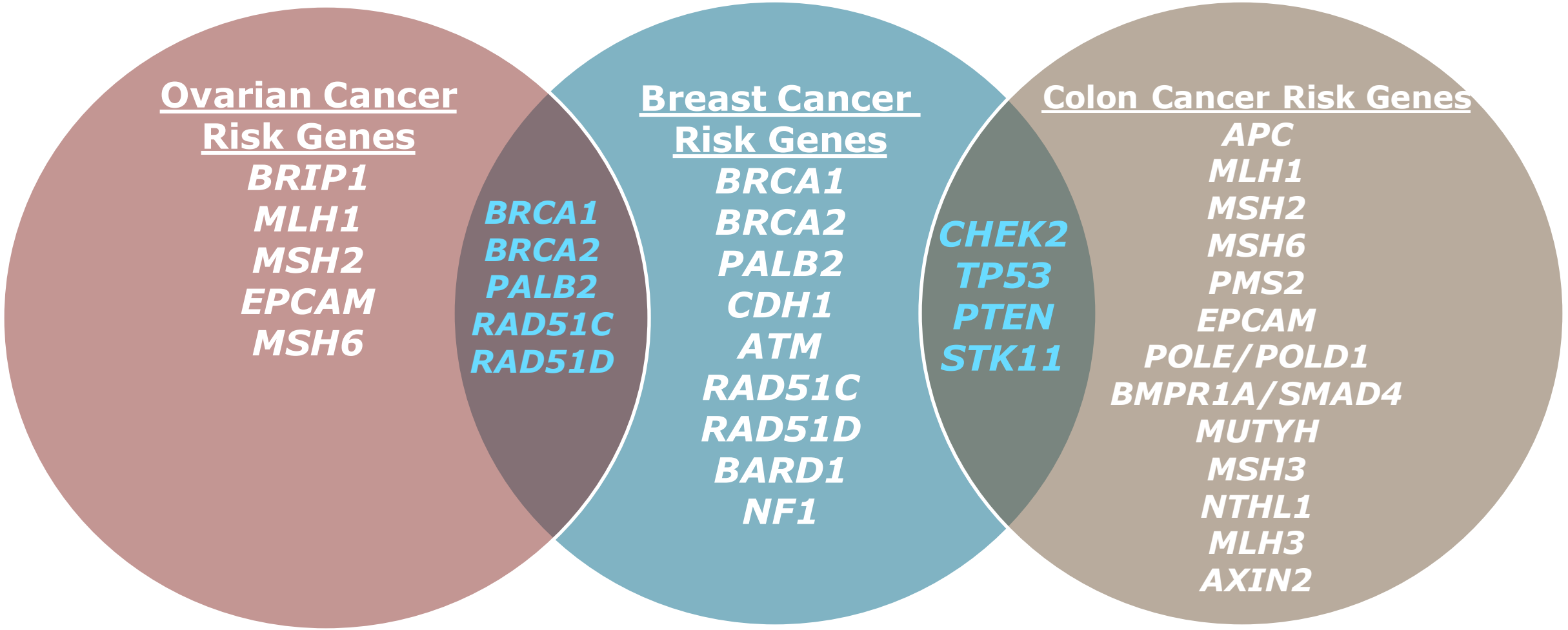
Win CRC Genes 2017

Can’t Stop at BRCA or Lynch Anymore!



www.nccn.org/professionals/physician_gls/pdf/genetics_bop.pdf
www.nccn.org/professionals/physician_gls/pdf/genetics_colon.pdf

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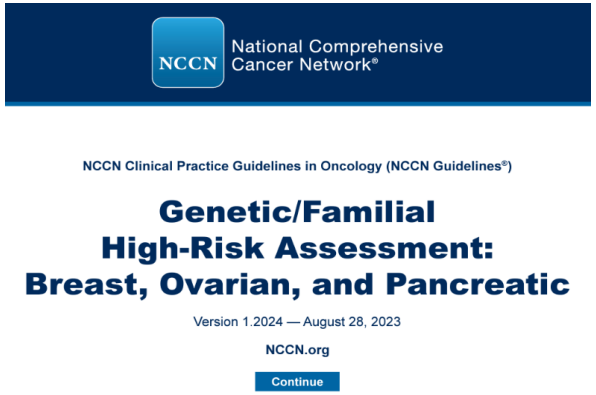
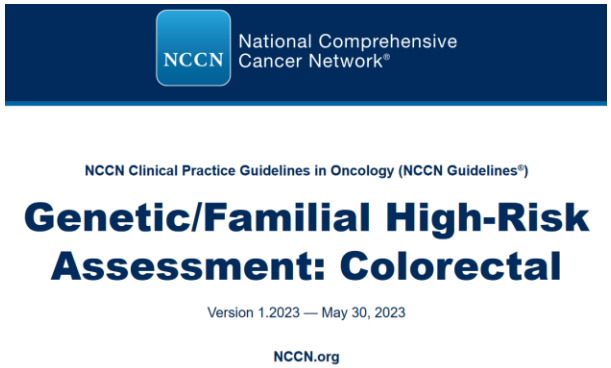
Who Needs Genetic Counseling and Testing?

Red Flags for Hereditary Cancer

- **Early Age of Onset**
- **Multiple Cancers**
- **Rare Tumor or Histology Types**





www.nccn.org/professionals/physician_gls/pdf/genetics_bop.pdf

www.nccn.org/professionals/physician_gls/pdf/genetics_colon.pdf

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Slam Dunk Referrals

WHEN IN DOUBT REFER!

- Breast Cancer
  - 50 or younger
  - Triple negative
  - Metastatic
  - Male breast cancer
- Epithelial ovarian cancer
- Pancreatic cancer
- Metastatic, high risk, very high-risk prostate cancer
- Colon Cancer
- Ampullary Cancer
- Endometrial under 51
- Any Lynch cancer under 51
- 10+ adenomatous colon polyps (cumulative)
- Renal under age 47
- Medullary Thyroid Cancer
- Paraganglioma or Pheochromocytoma
- Ashkenazi Jewish Ancestry
- Tumors with abnormal MSI/IHC (deficient MMR)
- Somatic mutations in a known hereditary cancer gene

www.nccn.org/professionals/physician_gls/pdf/genetics_bop.pdf

www.nccn.org/professionals/physician_gls/pdf/genetics_colon.pdf

Things to Remember

Family History

- Maternal & Paternal
- 1st, 2nd and 3rd degree
- ANY cancer
- Relationship, type of cancer, age at diagnosis

Meeting Criteria ≠ Testing

- Person in front of you may not be BEST person to test
- When possible, test family member with cancer (person most likely to be positive)
- However, sometimes reasonable to test unaffected relatives

Not Meeting Criteria ≠ NO Testing

- Criteria continue to evolve
- Ok to test outside of criteria if informed consent obtained
- Self-pay cost $250

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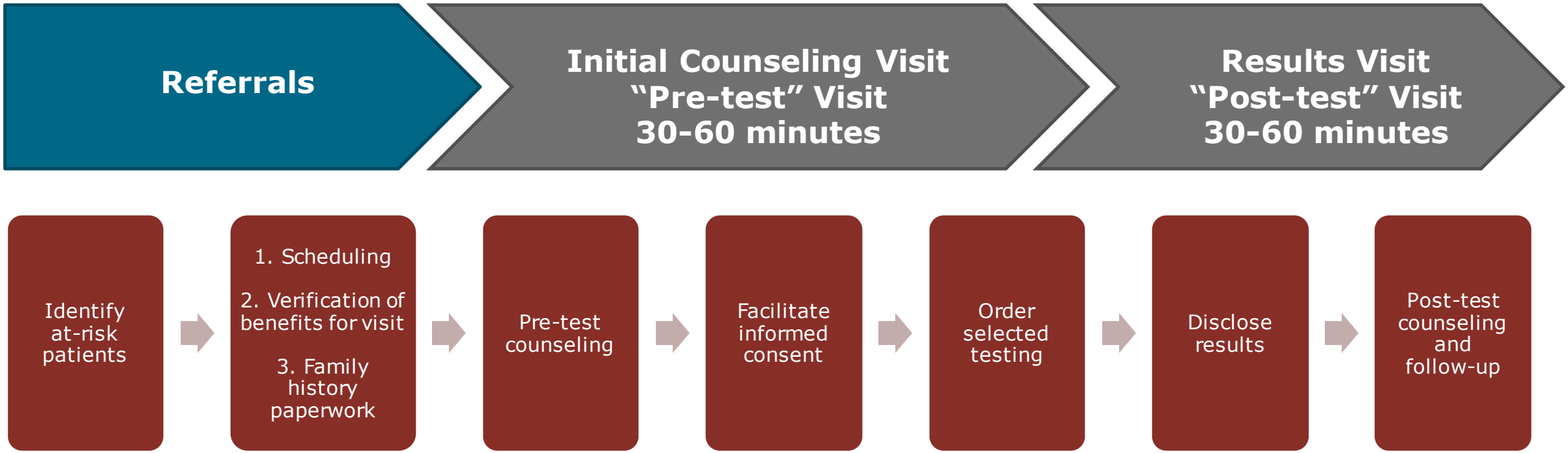
What Happens at a Genetics Visit?

Anatomy of a Genetic Evaluation



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Genetic testing is NOT one size fits all!

There are *77k* genetic tests currently listed in the NIH Genetic Testing Registry. 10 tests added DAILY

- Multi Gene Panel Testing
  - Initial Panel Testing
  - Update Panel Testing (previous limited testing)
    - High Risk Panels
    - STAT Panels
    - Organ Specific Panels
    - Pan Cancer Panels
    - Custom Panels

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Test Selection Critical

- What cancers are in my patient/their family?
- What genes need to be included (or not)?
- How quickly do I need this information?
- What is the cost or will insurance cover?
- What does this lab offer me that others don’t?
- What are the logistics for each lab?

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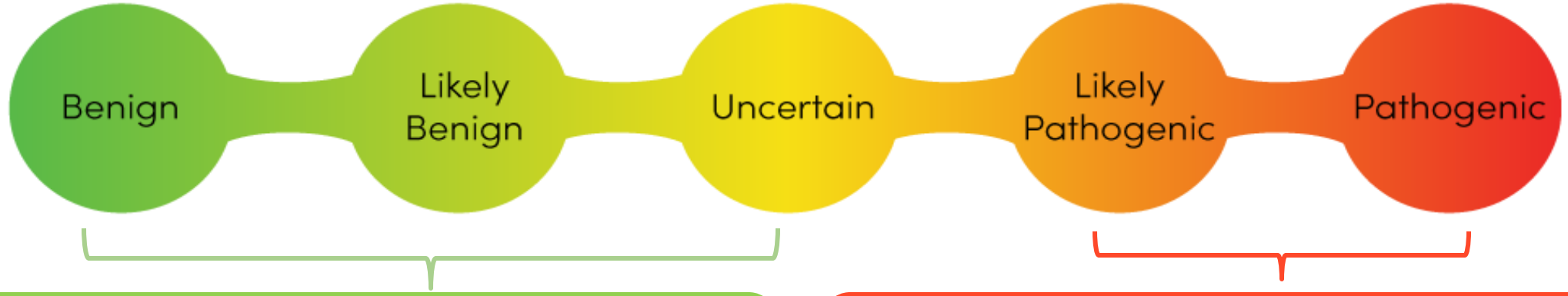
Management Based on Variant Classification



- Management based ONLY on personal/family history
  - Resist managing based on test results alone
- Negative results do not eliminate the possibility of a hereditary cancer predisposition syndrome in the family
  - e.g., the person tested may not have inherited the familial variant
- Consider testing other at-risk family members
- Familial VUS testing should not be offered outside of research or VUS resolution studies through the laboratory

- Cancer risks increased over general population
  - Management based on NCCN or consensus guidelines and family history
- Identify at-risk relatives who would benefit from genetic testing & help facilitate cascade testing
- Management may include:
  - Increased Surveillance
  - Surgery
  - Chemoprevention
  - Treatment Options (Ex: PARP inhibitors)

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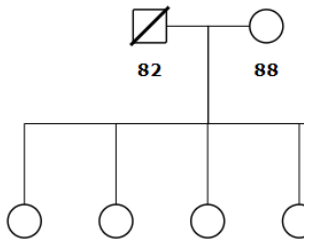
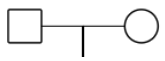
https://www.genome.gov/sites/default/files/media/files/2020-04/Guide_to_Interpreting_Genomic_Reports_Toolkit.pdf

Is a Genetic Evaluation REALLY Needed?

Cautionary Tale – Choosing the right test





Reason for testing

Diagnostic test for a personal history of disease

Test performed

Sequence analysis and deletion/duplication testing of the gene listed in the Genes Analyzed section.

RESULT: POSITIVE

One Pathogenic variant identified in SMARCA4. SMARCA4 is associated with autosomal dominant rhabdoid tumor predisposition syndrome, type 2, hereditary small cell carcinoma of the ovary and Coffin-Siris syndrome.

GENE	VARIANT	ZYGOSITY	VARIANT CLASSIFICATION
SMARCA4	c.657_661del (p.Leu220Serfs*65)	heterozygous	PATHOGENIC

About this test

This diagnostic test evaluates 1 gene(s) for variants (genetic changes) that are associated with genetic disorders. Diagnostic genetic testing, when combined with family history and other medical results, may provide information to clarify individual risk, support a clinical diagnosis, and assist with the development of a personalized treatment and management strategy.

GENETIC RESULT: NEGATIVE - NO CLINICALLY SIGNIFICANT MUTATION IDENTIFIED

Note: "CLINICALLY SIGNIFICANT," as defined in this report, is a genetic change that is associated with the potential to alter medical intervention.

[redacted]E RISK 10.3%

NAGEMENT GUIDELINES IDENTIFIED

SMARCA4 missing

variants), and most variants do not increase an cance (VUS) are reported. Likely benign variants able data indicate that these variants most likely do significant variant findings be used to modify patient d any other clinically significant findings.

ongoing evaluations of variant classifications. In certain ange family testing to aid in variant classification. When cance and management change, that information will port.

[redacted]

lyses were performed on the following genes:

A, CHEK2, EPCAM (large rearrangement only), ortions of exon 1), *MSH6, MUTYH, NBN, NTHL1,* uencing was performed for select regions of *POLE GREM1* (see technical specifications).

testing due to a personal or family history suggestive

CLINICAL HISTORY

Pelvic mass

FINAL DIAGNOSIS

A. LEFT OVARY AND FALL
- SMALL ROUND BLU
HYPERCALCEMI
- THE TUMOR IS CO
- COMPLETE CROSS-

TUMOR IMMUNOHISTO

POSITIVE: CD10, CD56, CK7 (FOCAL), INI1 (INTACT), P16 (PATCHY), P53 (WILD TYPE), PANCYTOKERATIN (FOCAL), SYNAPTOPHYSIN (FOCAL), WT1.

NEGATIVE: CALRETININ, CHROMOGRANIN, CK20, EMA, INHIBIN, PAX8, S100, SALL4, SF1, **SMARCA4/BRG1 (ABERRANT LOSS OF EXPRESSION).**

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Unnecessary Surgeries?

- Unaffected 46 yo
- Maternal aunt w. breast at 50
- Lifetime risk of breast cancer 12%
- *CDH1* VUS

FINAL RESULTS SUMMARY

Negative

No known pathogenic or likely pathogenic variants were detected.

Genes analyzed on this panel

APC, ATM, AXIN2, BAP1, BARD1, BMPR1A, BRCA1, BRCA2, BRIP1, CDH1, CDK4, CDKN2A, CHEK2, EPCAM, GALNT12, GREM1, HOXB13, MEN1, MITF, MLH1, MSH2, MSH3, MSH6, MUTYH, NBN, NF1, NTHL1, PALB2, PMS2, POLD1, POLE, PTEN, RAD51C, RAD51D, RNF43, RPS20, SMAD4, STK11, TP53, VHL

ADDITIONAL FINDINGS: VARIANTS OF UNCERTAIN SIGNIFICANCE (VUS)

Variants of uncertain significance (VUS) are common and the American College of Medical Genetics and Genomics (ACMG) states that a VUS should NOT be used in clinical decision making. A VUS means that a change in the DNA was detected, but there is not enough information to determine whether or not the change increases the risk of cancer. Many VUS represent normal human variation. Medical management should be based on the patient's personal and/or family history.

Gene	Variant	Zygosity	Classification
CDH1	c.854C>T (p.T285I)	heterozygous	VUS

DATE OF OPERATION:
12/30/2022.

PREOPERATIVE DIAGNOSES:
1. Bilateral fibrocystic mastopathy (fibrocystic disease of bilateral breast).
2. Genetic predisposition to malignancy by genetic testing.

POSTOPERATIVE DIAGNOSES:
1. Bilateral fibrocystic mastopathy (fibrocystic disease of bilateral breast).
2. Genetic predisposition to malignancy by genetic testing.

PROCEDURE:
Bilateral mastectomy, simple.

CLINICAL RESUME:
Please see admission note for past medical history, admission physical examination, laboratory, and radiographic data.

PRESENTING HISTORY:
She presented to the hospital for elective bilateral mastectomy secondary to failure of conservative measures for severe intractable fibrocystic disease of the breasts and + genetic testing indicating a possible increased risk of developing breast cancer.

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Is Genetic Counseling/Evaluation *REALLY* necessary?

Benefits

- Improved patient knowledge & understanding
- Improved satisfaction
- Better outcomes

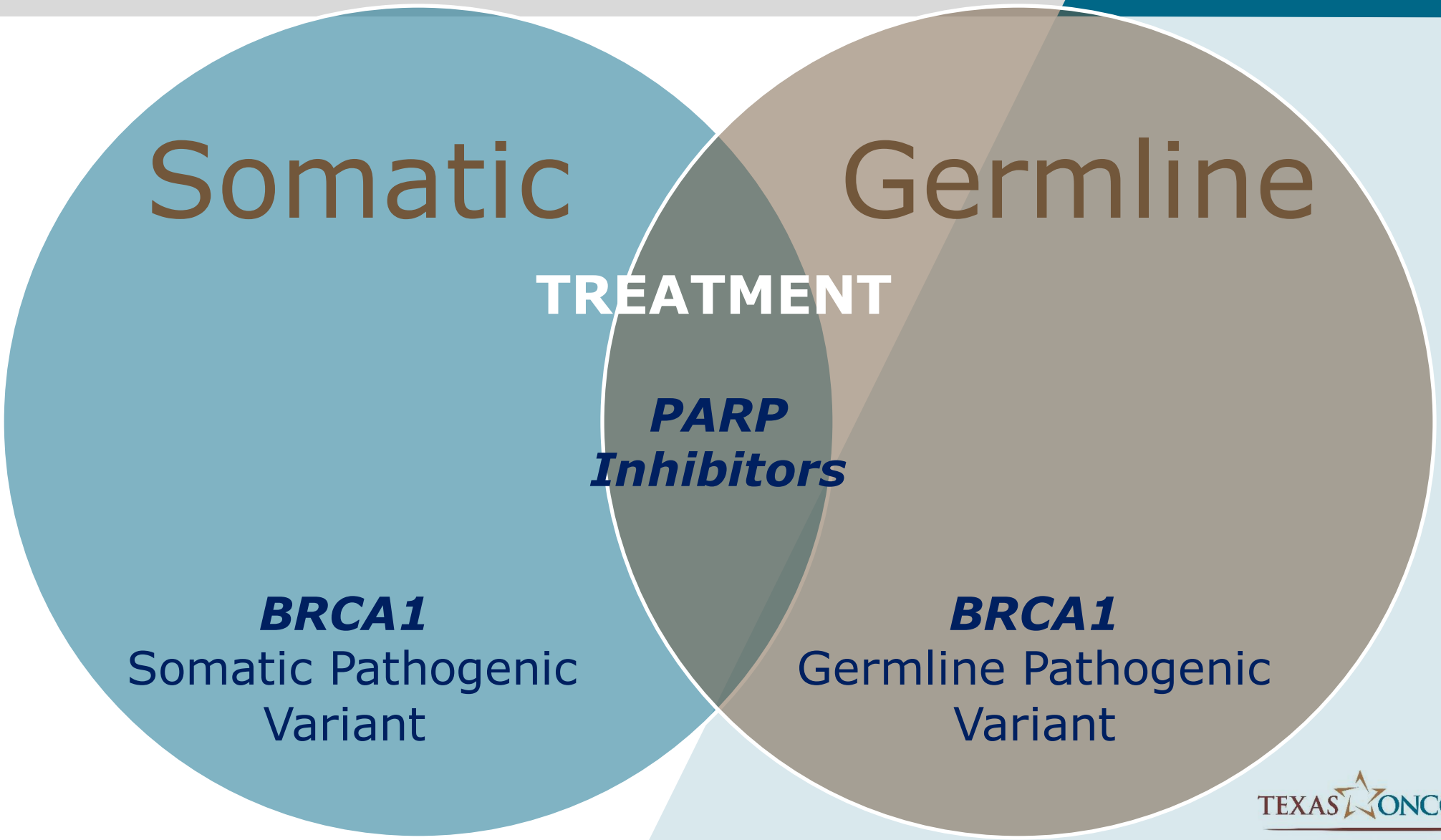
Genetic Testing w/o Counseling

- Wrong test is ordered or recommended
- Wasted healthcare dollars
- Results misinterpreted
- Inappropriate/inadequate lack of counseling and/or consent
- Inappropriate use of DTC testing

Brierly et al 2010
Brierly et al 2012
Bonaides et al 2014
Miller et al 2014
Armstrong et al 2015
Desmond et al 2015
Farmer et al 2019

But My Patient Already Had Somatic Testing?

When Worlds Collide



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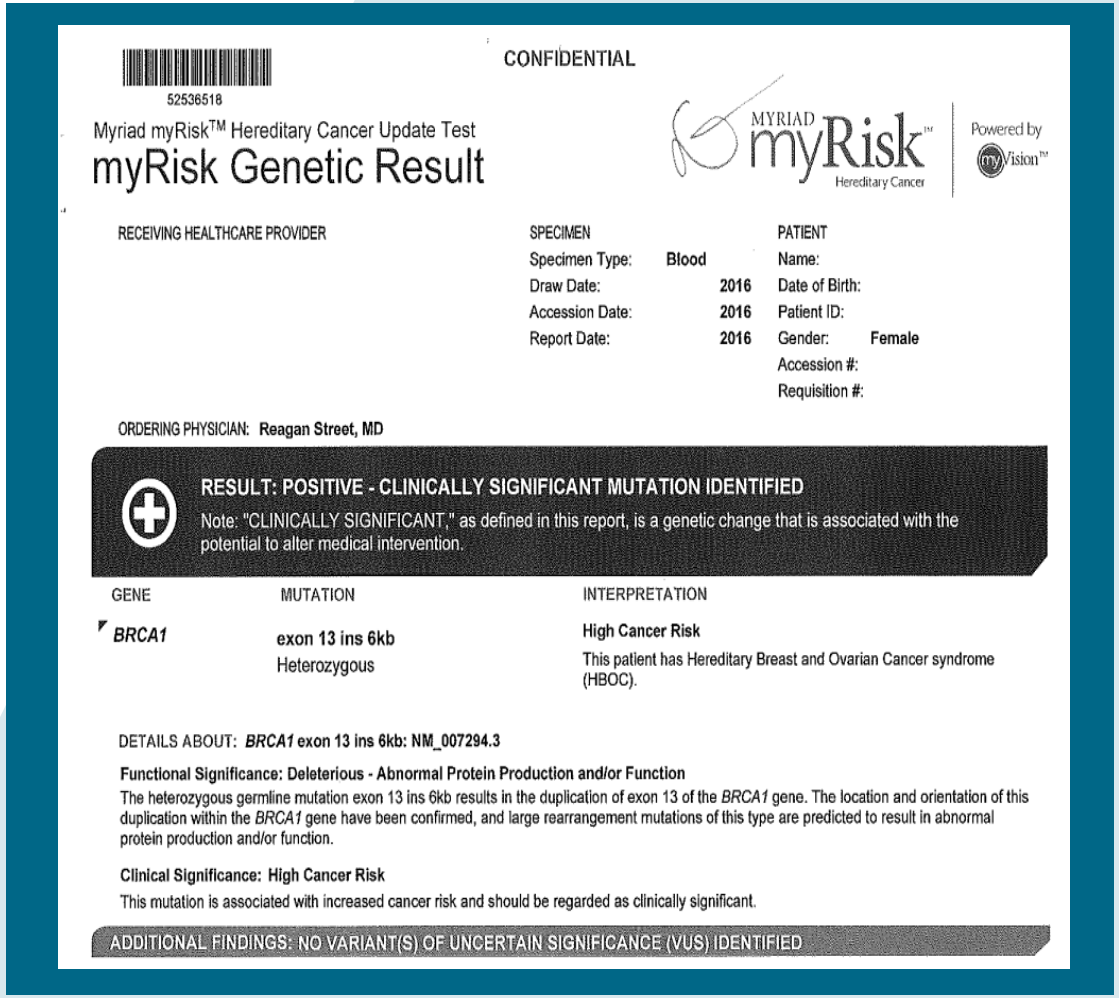
WWYD?

62-year-old with TNBC. Her oncologist already ordered a large somatic panel using one of the commercially available products. The results are negative. The patient reports no significant family history of cancer.

Does this woman need genetic evaluation & germline testing?



CONFIDENTIAL

52536518

Myriad myRisk™ Hereditary Cancer Update Test

myRisk Genetic Result

MYRIAD myRisk™ Hereditary Cancer | Powered by myVision™

RECEIVING HEALTHCARE PROVIDER

SPECIMEN
Specimen Type: Blood
Draw Date: 2016
Accession Date: 2016
Report Date: 2016

PATIENT
Name:
Date of Birth:
Patient ID:
Gender: Female
Accession #:
Requisition #:

ORDERING PHYSICIAN: Reagan Street, MD

RESULT: POSITIVE - CLINICALLY SIGNIFICANT MUTATION IDENTIFIED

Note: "CLINICALLY SIGNIFICANT," as defined in this report, is a genetic change that is associated with the potential to alter medical intervention.

GENE	MUTATION	INTERPRETATION
BRCA1	exon 13 ins 6kb Heterozygous	**High Cancer Risk** This patient has Hereditary Breast and Ovarian Cancer syndrome (HBOC).

DETAILS ABOUT: ***BRCA1* exon 13 ins 6kb: NM_007294.3**

Functional Significance: Deleterious - Abnormal Protein Production and/or Function

The heterozygous germline mutation exon 13 ins 6kb results in the duplication of exon 13 of the *BRCA1* gene. The location and orientation of this duplication within the *BRCA1* gene have been confirmed, and large rearrangement mutations of this type are predicted to result in abnormal protein production and/or function.

Clinical Significance: High Cancer Risk

This mutation is associated with increased cancer risk and should be regarded as clinically significant.

ADDITIONAL FINDINGS: NO VARIANT(S) OF UNCERTAIN SIGNIFICANCE (VUS) IDENTIFIED

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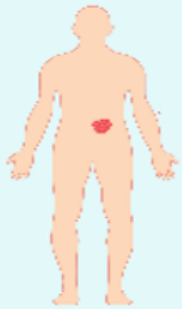
Tumor & Germline Testing Differ



Somatic

Tumor

- Indication: Typically metastatic, advanced or recurrent cancer
- Aim: Identification of tumor-specific variants with potential diagnostic, prognostic, or predictive therapeutic implications
- Goal: Tailored management of current disease
- Specimen: Tumor tissue (may or may not include normal tissue (ex: blood)
- Variant Classification: Actionability
- Gene Coverage: Less comprehensive
- Incidental Findings: Germline Variants (12%)

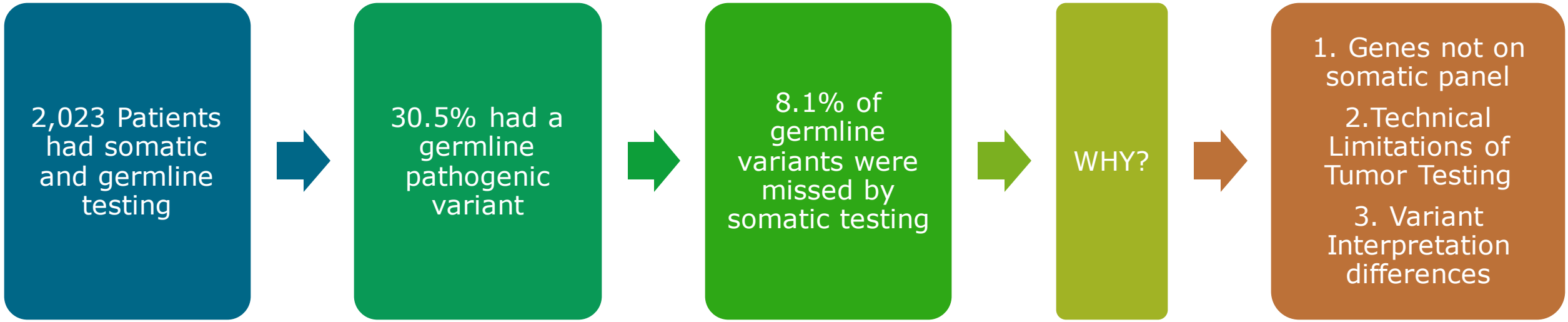
Germline

- Indication: Personal/family history of cancer (eg NCCN guidelines)
- Aim: Identification of inherited variants associated with elevated lifetime cancer risks that can also affect relatives
- Goal: Early detection, reduction of increased cancer risks
- Specimen: Blood, saliva, skin ("normal" tissue)
- Variant Classification: Susceptibility to cancer
- Gene Coverage: More Comprehensive
- Incidental Findings: Somatic variants

Germline

Mahon et al 2020
Forman et al 2020
DeLeonardis Et al 2019

Normal Somatic Genetic Testing ≠ Normal Germline Testing



Lincoln et al 2020

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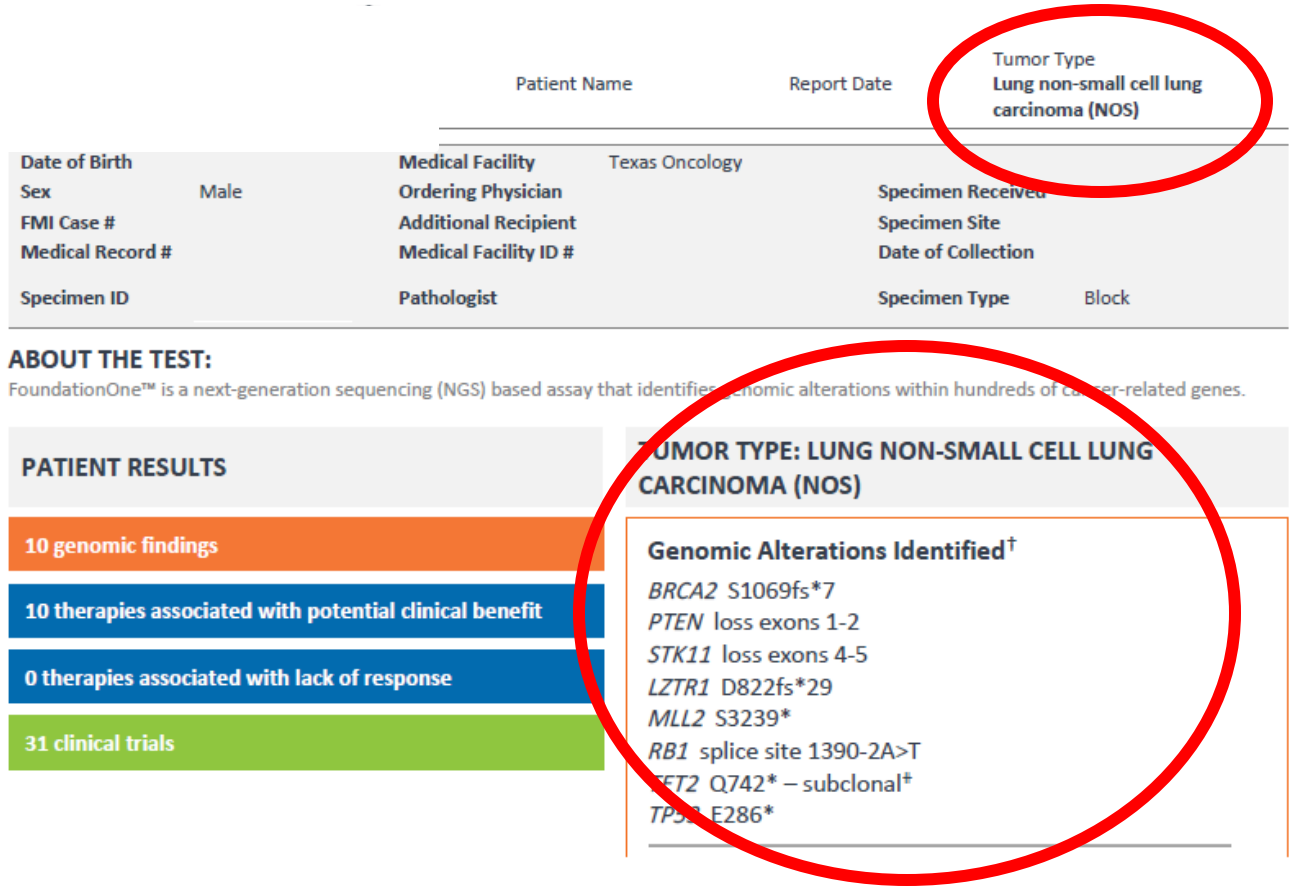
WWYD?

75-year-old man with metastatic NSCLC has NGS testing.

A *BRCA2* variant is found in his lung cancer. His chart indicates his paternal grandmother had breast cancer in her 70's.

WWYD?



Patient Name | Report Date | Tumor Type: Lung non-small cell lung carcinoma (NOS)

Date of Birth		Medical Facility	Texas Oncology		
Sex	Male	Ordering Physician		Specimen Received	
FMI Case #		Additional Recipient		Specimen Site	
Medical Record #		Medical Facility ID #		Date of Collection	
Specimen ID		Pathologist		Specimen Type	Block

ABOUT THE TEST:

FoundationOne™ is a next-generation sequencing (NGS) based assay that identifies genomic alterations within hundreds of cancer-related genes.

PATIENT RESULTS

- 10 genomic findings
- 10 therapies associated with potential clinical benefit
- 0 therapies associated with lack of response
- 31 clinical trials

TUMOR TYPE: LUNG NON-SMALL CELL LUNG CARCINOMA (NOS)

Genomic Alterations Identified†

BRCA2 S1069fs*7
PTEN loss exons 1-2
STK11 loss exons 4-5
LZTR1 D822fs*29
MLL2 S3239*
RB1 splice site 1390-2A>T
TET2 Q742* – subclonal‡
TP53 E286*

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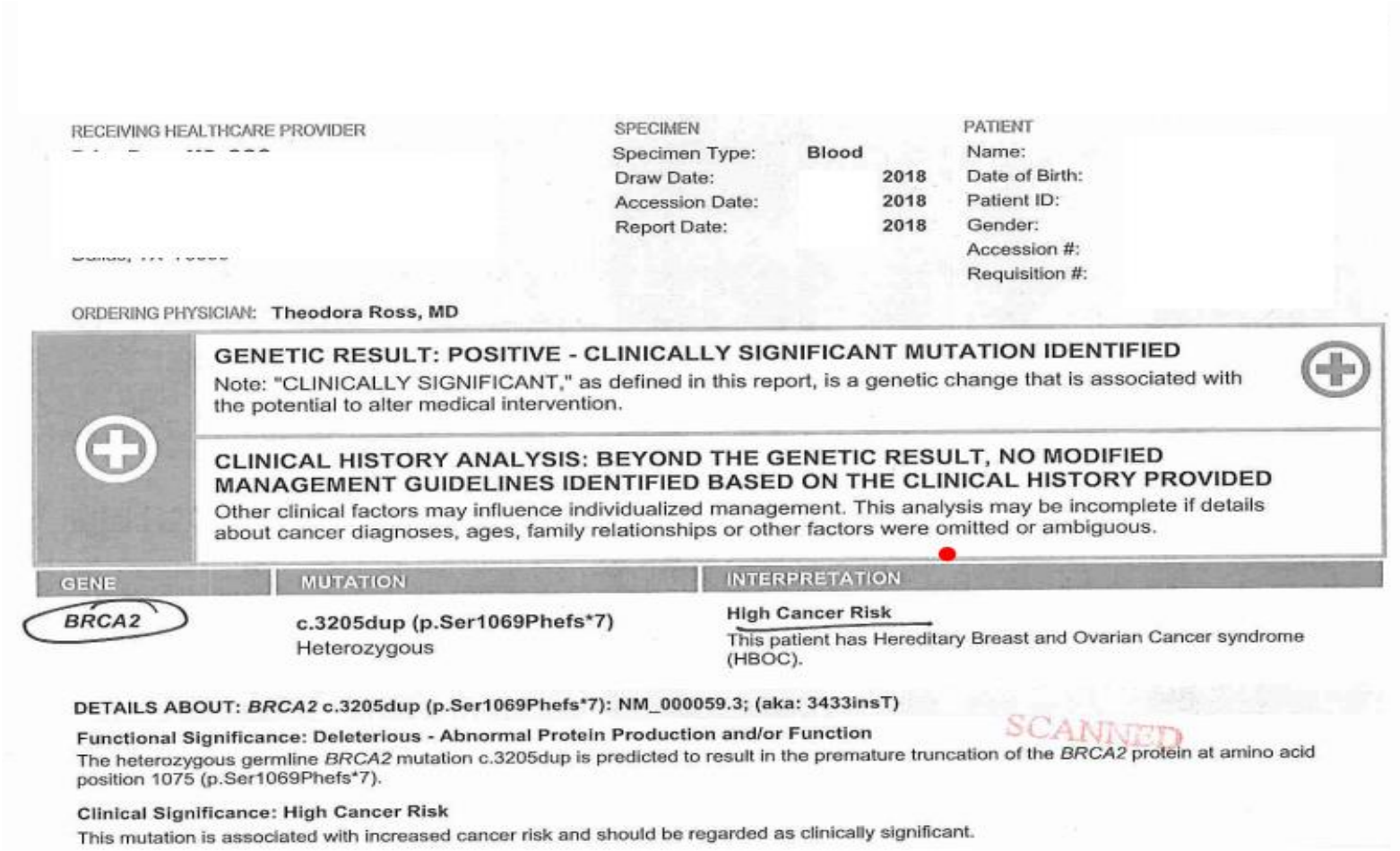
WWYD?

Germline testing is indicated; refer for a genetic evaluation. Confirmation testing found *BRCA2* variant to be germline

Only 31% of cancer patients w. a somatic BRCA1/2 mutation had germline confirmation if they did NOT meet traditional testing criteria.



RECEIVING HEALTHCARE PROVIDER

SPECIMEN
Specimen Type: Blood
Draw Date: 2018
Accession Date: 2018
Report Date: 2018

PATIENT
Name:
Date of Birth:
Patient ID:
Gender:
Accession #:
Requisition #:

ORDERING PHYSICIAN: **Theodora Ross, MD**

GENETIC RESULT: POSITIVE - CLINICALLY SIGNIFICANT MUTATION IDENTIFIED
Note: "CLINICALLY SIGNIFICANT," as defined in this report, is a genetic change that is associated with the potential to alter medical intervention.

CLINICAL HISTORY ANALYSIS: BEYOND THE GENETIC RESULT, NO MODIFIED MANAGEMENT GUIDELINES IDENTIFIED BASED ON THE CLINICAL HISTORY PROVIDED
Other clinical factors may influence individualized management. This analysis may be incomplete if details about cancer diagnoses, ages, family relationships or other factors were omitted or ambiguous.

GENE	MUTATION	INTERPRETATION
BRCA2	c.3205dup (p.Ser1069Phefs*7) Heterozygous	High Cancer Risk This patient has Hereditary Breast and Ovarian Cancer syndrome (HBOC).

DETAILS ABOUT: *BRCA2* c.3205dup (p.Ser1069Phefs*7): NM_000059.3; (aka: 3433insT)

Functional Significance: Deleterious - Abnormal Protein Production and/or Function
The heterozygous germline *BRCA2* mutation c.3205dup is predicted to result in the premature truncation of the *BRCA2* protein at amino acid position 1075 (p.Ser1069Phefs*7).

Clinical Significance: High Cancer Risk
This mutation is associated with increased cancer risk and should be regarded as clinically significant.

SCANNED

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https://ascopubs.org/doi/abs/10.1200/JCO.2021.39.15_suppl.1523

WWYD?

Is this *BRCA2* variant germline?

TEMPUS

Diagnosis
Metastatic prostatic adenocarcinoma

Accession No.

xF

Date of Birth

Sex
Male

Physician

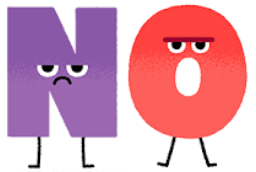
TEMPUS | xF
105 gene liquid biopsy

cfDNA specimen:
Peripheral Blood
Collected
Received

GENOMIC VARIANTS

Potentially Actionable		Variant Allele Fraction
BRCA2	p.V323fs Frameshift - LOF	34.0%
PIK3CA	p.E545A Missense variant (exon 9) - GOF	1.3%
PIK3CA	p.P539R Missense variant (exon 9) - GOF	1.3%
Biologically Relevant		
TP53	p.S183* Stop gain - LOF	2.3%
AR	p.H875Y Missense variant - GOF	0.3%
PTEN	p.E150* Stop gain - LOF	0.2%

70 yo, fhx of hepatobiliary cancer (mom)



Myriad myRisk® Hereditary Cancer Update Test

myRisk Genetic Result

myRisk Hereditary Cancer

RECEIVING HEALTHCARE PROVIDER

SPECIMEN
Specimen Type:
Draw Date:
Accession Date:
Report Date:

PATIENT
Name:
Date of Birth
Patient ID:
Gender:
Accession #:
Requisition #:

ORDERING PHYSICIAN:

GENETIC RESULT: NEGATIVE - NO CLINICALLY SIGNIFICANT MUTATION IDENTIFIED

Note: "CLINICALLY SIGNIFICANT," as defined in this report, is a genetic change that is associated with the potential to alter medical intervention.

CLINICAL HISTORY ANALYSIS: NO ADDITIONAL MANAGEMENT GUIDELINES IDENTIFIED BASED ON THE CLINICAL HISTORY PROVIDED

Other clinical factors may influence individualized management. This analysis may be incomplete if details about cancer diagnoses, ages, family relationships or other factors were omitted or ambiguous.

ADDITIONAL FINDINGS: NO VARIANT(S) OF UNCERTAIN SIGNIFICANCE (VUS) IDENTIFIED

Details About Non-Clinically Significant Variants: All individuals carry DNA changes (i.e., variants), and most variants do not increase an individual's risk of cancer or other diseases. When identified, variants of uncertain significance (VUS) are reported. Likely benign variants (Favor Polymorphisms) and benign variants (Polymorphisms) are not reported and available data indicate that these variants most likely do not cause increased cancer risk. Present evidence does not suggest that non-clinically significant variant findings be used to modify patient medical management beyond what is indicated by the personal and family history and any other clinically significant findings.

Variant Classification: Myriad's myVision™ Variant Classification Program performs ongoing evaluations of variant classifications. In certain cases, healthcare providers may be contacted for more clinical information or to arrange family testing to aid in variant classification. When new evidence about a variant is identified and determined to result in clinical significance and management change, that information will automatically be made available to the healthcare provider through an amended report.

ADDITIONAL INFORMATION

GENES ANALYZED

Unless otherwise noted sequencing and large rearrangement analyses were performed on the following genes:

APC, ATM, BARD1, BMPR1A, BRCA1, BRCA2, BRIP1, CDH1, CDK4, CDKN2A, CHEK2, EPCAM (large rearrangement only), *MLH1, MSH2, MSH6, MUTYH, NBN, PALB2, PMS2, PTEN, RAD51C, RAD51D, SMAD4, STK11, TP53*. Sequencing was performed for select regions of *POLE* and *POLD1*,

Indication for Testing: It is our understanding that this individual was identified for testing due to a personal or family history suggestive of a hereditary predisposition for cancer.

Associated Cancer Risks and Clinical Management: Please see the "myRisk Management Tool" associated with this report for a summary of cancer risk and professional society medical management guidelines that may be useful in developing a plan for this patient based on test results and reported personal/family history, if applicable. Testing of other family members may assist in the interpretation of this patient's test result.

Analysis Description: The Technical Specifications summary (https://www.myriadpro.com/documents-and-forms/technical-specifications/) describes the analysis method

Cheat Sheet: Somatic Variants that Warrant Germline Confirmation

Germline testing indicated, regardless of age and tumor type:

- *ATM*
- *BRCA1*
- *BRCA2*
- *BRIP1*
- *CHEK2*
- *MLH1*
- *MSH2*
- *MSH6*
- *PMS2*
- *PALB2*
- *RAD51C*
- *RAD51D*
- *RET*
- *SDHA*
- *SDHAF2*
- *SDHB*
- *SDHC*
- *SDHD*
- *TSC2*

Germline testing indicated if MMR abnormality detected in ANY tumor type:

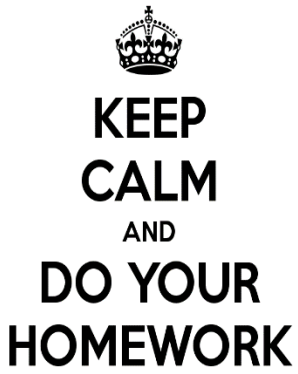
- MSI-high tumors
- Abnormal IHC: Absent staining of ANY of the Mismatch Repair genes
  - *MLH1*
  - *MSH2*
  - *MSH6*
  - *PMS2*

For the following genes, see specific details for when germline testing is indicated:

- *APC*: only if patient is under age 30 (any tumor type)
- *BAP1*: in uveal melanoma, mesothelioma, melanoma, or renal tumors
- *FH*: in renal tumors
- *FLCN*: in renal tumors
- *MUTYH*: if two variants are detected (any tumor type)
- *NF1*: in breast patients under age 30, or patients with gliomas or nerve sheath tumors
- *POLE*: in colon cancers
- *RB1*: only if patient is under 30 (any tumor type)
- *TP53*: if seen in any breast cancer tumor or sarcoma or a NON-BRAIN tumor under 30
- *VHL*: if seen in any NON-RENAL tumor

Mandelker D, Donoghue M, Talukdar S, et al. Germline-focussed analysis of tumour-only sequencing: recommendations from the ESMO Precision Medicine Working Group. Ann Oncol. 2019;30(8):1221-1231.

Take Home Points



- More patients qualify for genetic testing than you think! Know the slam dunks! When in doubt refer!
- Locate a genetics provider in your community
- There is not a one-size fits all test
- Cost should NOT be a barrier
- Management should NOT be based on VUSs
- Somatic Genetic Testing ≠ Germline Genetic Testing
- If you like genetics, make a plan to learn more!

Cancer Genetic Resources

Online Resources

- NCCN www.nccn.org
- GeneReviews http://www.ncbi.nlm.nih.gov/books/NBK1116/
- Familial Cancer Database http://www.familialcancerdatabase.nl/
- Genetic Testing Registry http://www.ncbi.nlm.nih.gov/gtr/
- Ask2Me www.ask2me.org
- JAX (Free genetics education): https://www.jax.org/
- ASCO (genetics education): https://education.asco.org/product-details/principles-of-genetics-and-genomics

Texas Oncology GREAT Program

- Multiple sites of service across state by multiple providers
- http://www.texasoncology.com/services-and-treatments/genetic-risk-evaluation-and-testing

Online Patient Resources

- Sharsheret https://sharsheret.org/
- FORCE http://www.facingourrisk.org/index.php
- HCC Takes Guts www.hcctakesguts.org
- UTSW Patient Fact Sheets https://utswmed.org/conditions-treatments/genetics-and-hereditary-cancers/hereditary-cancer-syndromes/
- Mass General Patient Fact Sheets https://www.massgeneral.org/cancer-center/treatments-and-services/cancer-genetics/fact-sheets

Find a Genetic Counselor

- www.nsgc.org
- https://www.tsgc.org/

Questions?

Gayle.patel@usoncology.com
512-736-8766

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