Ambry Genetics®

Clinician Management Resource for *PTEN* (PTEN hamartoma tumor syndrome)

This overview of clinical management guidelines is based on this patient's positive test result for a *PTEN* gene mutation. Unless otherwise stated, medical management guidelines used here are limited to those issued by the National Comprehensive Cancer Network® (NCCN®)[1] in the U.S. Please consult the referenced guideline for complete details and further information.

Clinical correlation with the patient's past medical history, treatments, surgeries and family history may lead to changes in clinical management decisions; therefore, other management recommendations may be considered. Genetic testing results and medical society guidelines help inform medical management decisions but do not constitute formal recommendations. Discussions of medical management decisions and individualized treatment plans should be made in consultation between each patient and his or her healthcare provider, and may change over time.

SCREENING/SURGICAL CONSIDERATIONS[1]	AGE TO START	FREQUENCY
Female Breast Cancer		
Breast awareness ▪ Women should be familiar with their breasts and promptly report changes to their healthcare provider	18 years old	Periodic and consistent
Clinical Breast Exam	25 years old, or 5-10 years before the earliest known breast cancer in the family (whichever is first)	Every 6-12 months
Breast Screening* ▪ Mammography ▪ Breast MRI with and without contrast	30 years old, or 10 years before the earliest known breast cancer in the family (whichever is first)	Every 12 months
	>75 years old: individualized management	Individualized
Discuss option of risk-reducing mastectomy	Individualized	N/A
Endometrial Cancer**		
Encourage prompt response to symptoms *(e.g.*, abnormal bleeding)	35 years old	N/A
Patients are encouraged to keep a calendar in order to identify irregularities in their menstrual cycle	35 years old	Periodic and consistent
Consider endometrial biopsies	35 years old	Every 1-2 years
Transvaginal ultrasound may be considered in postmenopausal woman^	Post menopause	Clinician's discretion
Discuss option of hysterectomy upon completion of childbearing^^	35 years old	N/A
Thyroid Cancer		
Comprehensive physical exam, with particular attention to thyroid exam	18 years old, or 5 years before the youngest age of diagnosis of *PTEN* hamartoma tumor syndrome-related cancer in the family (whichever is first)	Every 12 months
Thyroid ultrasound	7 years old	Every 12 months
Colorectal Cancer		
Colonoscopy	35 years old unless symptomatic, or if close relative with colorectal cancer before age 40, then start 5-10 years before the earliest known colorectal cancer in the family	Every 5 years, or more frequently if patient is symptomatic or polyps found
Kidney Cancer		
Consider renal ultrasound	40 years old	Every 1-2 years

SCREENING/SURGICAL CONSIDERATIONS[1]	AGE TO START	FREQUENCY
Melanoma		
Dermatologic examinations	At time of diagnosis	Annual
Other Cancers		
Consider psychomoter assessment in children and brain MRI if there are symptoms	In childhood (at diagnosis)	Clinician's discretion

* Women treated for breast cancer who have not undergone bilateral mastectomy: fo

** Endometrial cancer screening does not have proven benefit in individuals with Cowden Syndrome/PTEN hamartoma tumor syndrome.

^ Transvaginal ultrasound to screen for endometrial cancer in postmenopausal individuals has not been shown to be sufficiently sensitive or specific as to support a positive recommendation, but may be considered at the clinician's discretion. Transvaginal ultrasound is not recommended as a screening tool in premenopausal individuals due to the wide range of endometrial stripe thickness throughout the normal menstrual cycle.

^^ Risk of ovarian cancer is not elevated; therefore, ovaries can be left *in situ*.

1. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Genetic/Familial High-Risk Assessment: Breast, Ovarian, and Pancreatic. V2.2024. © National Comprehensive Cancer Network, Inc. 2023. All rights reserved. Accessed September 27, 2023. To view the most recent and complete version of the guideline, go online to NCCN.org. NCCN makes no warranties of any kind whatsoever regarding their content, use or application and disclaims any responsibility for their application or use in any way.

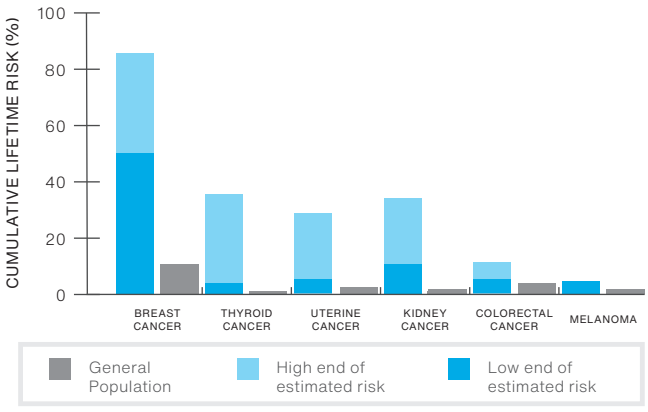
Understanding Your Positive *PTEN* Genetic Test Result

INFORMATION FOR PATIENTS WITH A PATHOGENIC MUTATION OR VARIANT, LIKELY PATHOGENIC

6 Things To Know

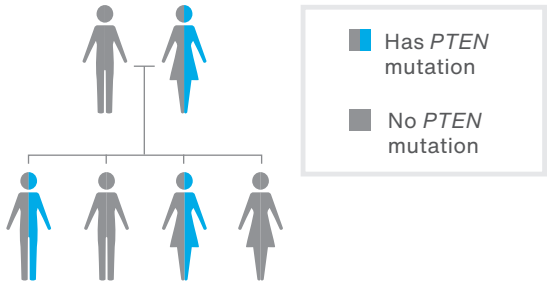
1	*PTEN* mutation	Your testing shows that you have a pathogenic mutation or a variant that is likely pathogenic in the *PTEN* gene.
2	*PTEN* hamartoma tumor syndrome (PHTS)	People with *PTEN* mutations have *PTEN* hamartoma tumor syndrome (PHTS). There are several syndromes that are a part of PHTS: Cowden syndrome (CS), Bannayan-Riley-Ruvalcaba syndrome (BRRS), *PTEN*-related Proteus-like syndrome, adult Lhermitte-Duclos disease (LDD), and autism spectrum disorders with macrocephaly.
3	Cancer risks	You have an increased chance to develop female* breast cancer, thyroid cancer, uterine cancer, kidney cancer, colorectal cancer, and possibly other types of cancer.
4	Other medical concerns	People with *PTEN* mutations may have other medical concerns, including: ▪ A larger head size ▪ Colorectal polyps (non-cancerous growths) ▪ Lipomas (fatty bumps under the skin) ▪ Other non-cancerous lumps and bumps ▪ Autism ▪ Thyroid nodules/goiter
5	What you can do	Risk management decisions are very personal. There are options to detect cancer early or lower the risk to develop cancer. It is important to discuss these options with your doctor and decide on a plan that works for you.
6	Family	Family members may also be at risk – they can be tested for the *PTEN* mutation that was identified in you. It is recommended that you share this information with your family members so they can learn more and discuss with their healthcare providers.

PTEN Mutation Lifetime Cancer Risks**



PTEN Mutations in the Family

There is a 50/50 random chance to pass on a *PTEN* mutation to each of your children. The image below shows that everyone can carry and pass on these mutations, regardless of their sex at birth.



* Refers to sex assigned at birth
** Because risk estimates vary in different studies, only approximate risks are given. Cancer risks will differ based on individual and family history.

RESOURCES

- Ambry's hereditary cancer site for families patients.ambrygen.com/cancer
- Bright Pink brightpink.org
- Cleveland Clinic's "The PTEN Study" lerner.ccf.org/gmi/research/pten.php
- FORCE facingourrisk.org
- Imerman Angels imermanangels.org
- PTEN Foundation ptenfoundation.org
- Susan G. Komen Foundation komen.org
- Genetic Information Nondiscrimination Act (GINA) ginahelp.org
- National Society of Genetic Counselors nsgc.org
- Canadian Association of Genetic Counsellors cagc-accg.ca

Please discuss this information with your healthcare provider. The cancer genetics field is continuously evolving, so updates related to your *PTEN* result, medical recommendations, and/or potential treatments may be available over time. This information is not meant to replace a discussion with a healthcare provider, and should not be considered or interpreted as medical advice.

MKT-ONCO-FLYR-10029-EN v2 | 10.24.23
7 Argonaut, Aliso Viejo, CA 92656 USA Toll Free +1 866.262.7943 Fax +1 949.900.5501 ambrygen.com