

## WHAT IS GENETIC TESTING?

Genetic testing involves analyzing, or “reading”, the genetic code to look for a harmful “spelling mistake”, called a mutation. If the mutation found causes the gene to stop working properly, a diagnosis can be made or confirmed. This is done through a blood test. A person’s DNA is taken from their blood cells and is then sent to a lab for analysis of the gene in question. For Lynch syndrome, one or more MMR genes would be analyzed.

## MY FAMILY IS SUSPICIOUS FOR LYNCH SYNDROME. CAN I HAVE A GENETIC TEST?

**YES - there are a number of ways genetic testing can be done:**

1) As of October 2013, anyone in Manitoba diagnosed with colon cancer at age **70** years or younger will be screened for Lynch syndrome. Screening is done by immunohistochemistry (IHC) which looks at the proteins normally found in the colon tumor. If the IHC test is “positive”, a referral to the WRHA Program of Genetics & Metabolism is recommended to discuss the implications of the IHC result and to discuss genetic testing for Lynch syndrome.

**It is important to remember that a positive IHC result does NOT mean someone has Lynch syndrome.**

2) If a specific MMR gene mutation has already been identified in a family member (documentation is usually required), testing for that specific mutation can be done. A referral to the WRHA Program of Genetics & Metabolism can be made by your health care provider.

3) A person has a personal or family history of Lynch related cancers (i.e. parents, sibling or other relatives with colon or endometrial cancer at young ages) but no one has had genetic testing or IHC screening, a referral by a health care provider can be sent to the WRHA Program of Genetics & Metabolism to determine if testing is warranted.

## I FOUND OUT THAT I AM AT HIGH RISK FOR LYNCH SYNDROME. WHAT CAN I DO TO MANAGE MY CANCER RISK?

People with Lynch syndrome are at a higher risk for cancer than the general population, so they should be screened more closely for cancer than the average person. Screening may allow cancers, should they happen, to be found earlier. Finding cancer at an early stage may allow more treatment options and a better overall outlook.

For people who have Lynch syndrome or who meet high-risk criteria but who cannot be tested, the following cancer screening guidelines are recommended:

- Colonoscopy beginning at 20-25 years OR ten years younger than the first colorectal cancer diagnosis in the family (whichever comes first), repeating every years;
- For women: There is no evidence that screening for endometrial or ovarian cancer changes the outcome or mortality rate associated with these conditions. In women confirmed to have Lynch syndrome, a gynecologist or gynecologic oncologist can discuss surgical options to prevent these cancers.
- Screening for other cancer types, depending on family history, at the discretion of an individual’s treating physician(s).

## ARE MY FEELINGS ABOUT THIS “NORMAL”?

**YES** - The idea of being at increased risk of a first or a subsequent cancer may make you feel anxious or frightened. For some people, it helps to have a friend or family member that they can talk to about these completely normal feelings. It may also help if this person knows something about Lynch syndrome, so feel free to share this brochure.

WRHA Program of Genetics & Metabolism  
FE229-820 Sherbrook Street  
Winnipeg, MB R3A 1R9

General Inquiries: (204) 787- 4267  
Fax: (204) 787-1419  
[www.wrha.mb.ca/prog/genetics/](http://www.wrha.mb.ca/prog/genetics/)

Reviewed by the Hereditary Cancer Working Group

# LYNCH SYNDROME



**Information for Manitoba Residents**

**Provided by:  
The Hereditary Cancer Clinic  
WRHA Program of Genetics &  
Metabolism**

## WHAT IS LYNCH SYNDROME?

**Lynch Syndrome**, also known as **Hereditary Non-Polyposis Colorectal Cancer**, or **HNPCC**, is a genetic condition that causes an increased risk of certain kinds of cancers: specifically, colorectal (large bowel), endometrial (uterine), ovarian, and stomach, among others. It is hereditary, meaning it can be passed on in families from one generation to the next. The name Lynch syndrome comes from Dr. Henry Lynch, who defined the condition.

## WHAT ARE THE FEATURES OF LYNCH SYNDROME?

Most cases of colorectal cancer (CRC) are NOT caused by Lynch syndrome. Only about 2-3% of all CRC cases are due to this condition. However, Lynch Syndrome is suspected in a person or family with some or all of these features:

- CRC diagnosed at an early age (before age 50),
- Cancer more commonly in the right-hand side of the colon,
- Cancers in the endometrium, ovaries, stomach, urinary tract, small bowel, liver/bile ducts (hepatobiliary cancer), sebaceous skin cancers, and/or certain kinds of kidney or brain cancer in the individual or in the family,
- “Positive” colon tumor tissue studies such as immunohistochemistry or microsatellite instability.

## SOME HELPFUL RESOURCES:

**Canadian Cancer Society**  
www.cancer.ca or 1-888-939-3333

**Hereditary Colon Cancer Association**  
www.hereditarycc.org

**Familial GI Cancer Registry**  
www.mountsinai.on.ca/care/fgicr

## WHAT ARE THE CANCER RISKS IF SOMEONE HAS LYNCH SYNDROME?

**Not everyone with Lynch Syndrome will develop cancer.** However, people with this condition are at a higher chance of developing cancer than people without. The lifetime chance (by age 70) of developing cancers are:

Cancer Type	Lifetime Risk for person with Lynch	Lifetime Risk for person without Lynch
Colorectal	up to 80%	5.5%
Endometrial	15-60%	2.7%
Ovarian	1-24%	1.6%
Stomach	1-3%	Less than 1%
Liver/bile tract	1-4%	Less than 1%
Urinary tract	1-4%	Less than 1%
Small bowel	3-6%	Less than 1%
Brain/central nervous system	1-3%	Less than 1%
Pancreatic	1-6%	Less than 1%

Source: NCCN Clinical Practice Guidelines in Oncology: Lynch Syndrome v2.2014

## WHAT CAUSES LYNCH SYNDROME?

Lynch Syndrome is caused by harmful changes, called mutations, in mismatch repair (MMR) genes. Just as you might use a spell-checking program to make sure a sentence is free of spelling mistakes, MMR genes look for mistakes in our genetic information, or DNA, and fix them. If an MMR gene has a mutation, however, it does not “spell-check” our DNA properly. This leads to a buildup of mistakes in the DNA, which can lead to cancer in the colon, rectum, endometrium, ovaries, stomach, and other parts of the body (see above table). **At this time, we know of four MMR genes that are associated with Lynch Syndrome. They are called MLH1, MSH2, MSH6, and PMS2.**

## HOW IS LYNCH SYNDROME PASSED ON IN FAMILIES?

Lynch Syndrome is passed on from parent to child, one generation to another. It does not skip generations. Gender doesn’t matter; both men and women can pass on or inherit this condition.

If a person has an MMR mutation causing Lynch syndrome, their first-degree relatives (parents, siblings, and children) are at up to a 50% risk of having that same mutation. Anyone with the mutation would be at higher risk of colon, ovarian, endometrial, stomach, and other cancers than the general population.

## HOW DO WE KNOW IF LYNCH SYNDROME IS AFFECTING OUR FAMILY?

Lynch syndrome is highly suspected in people who meet the following **high-risk characteristics**:

- A family history of at least 3 relatives with Lynch-related cancers (CRC, endometrial, ovarian, gastric, pancreas, small bowel, ureter, renal pelvis, biliary tract, brain, and/or sebaceous adenomas) Also:
  - 2 of 3 affected family members must be in a 1<sup>st</sup> degree relationship
  - At least two successive generations must be affected
  - 1 diagnosis must be at <50 years of age
  - Other genetic conditions that can cause CRC have been excluded**OR**
- A personal history of CRC and a 2<sup>nd</sup> primary Lynch-associated cancer, at any age  
**OR**
- A personal history of CRC diagnosed at younger than 50 years of age  
**OR**
- People with special testing on tumor tissue, called a microsatellite instability (MSI) or immunohistochemistry (IHC) test, that shows the cancer suspicious for Lynch syndrome.

People who fit the above characteristics should talk to their doctors about high-risk cancer screening guidelines. In some cases, it may be possible to offer genetic testing to determine who in the family is at risk.