

Interpreting for Cancer Genetics

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Licensed Certified Genetic Counselor

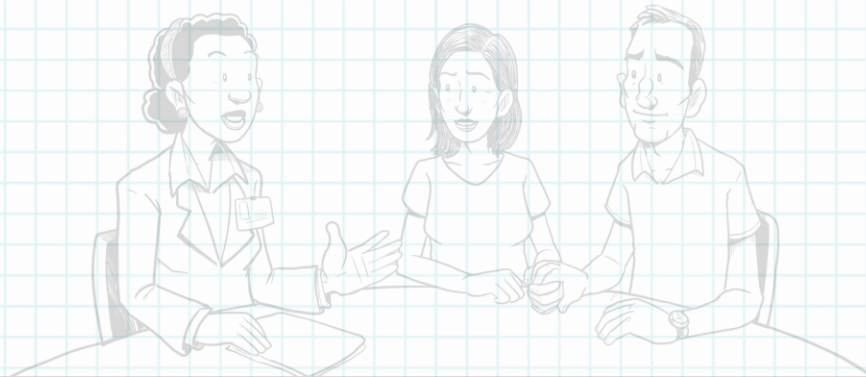
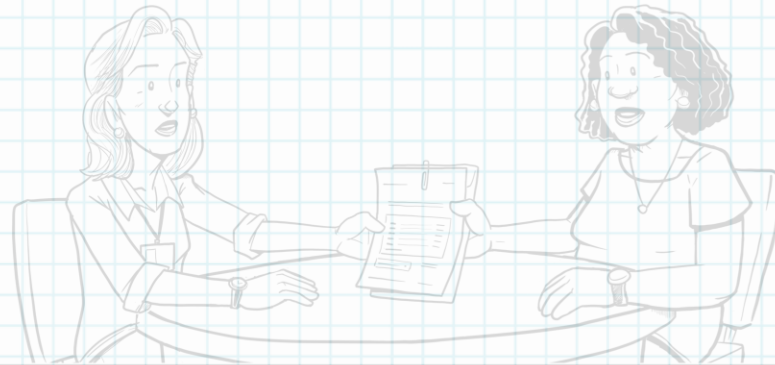
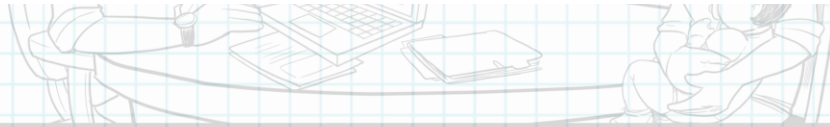
What is genetic counseling?

“Genetic counseling is the process of helping people understand and adapt to the medical, psychological and familial implications of genetic contributions to disease.”

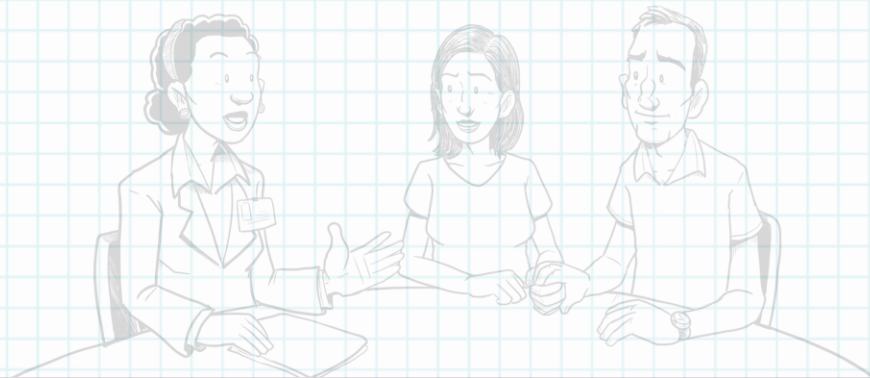
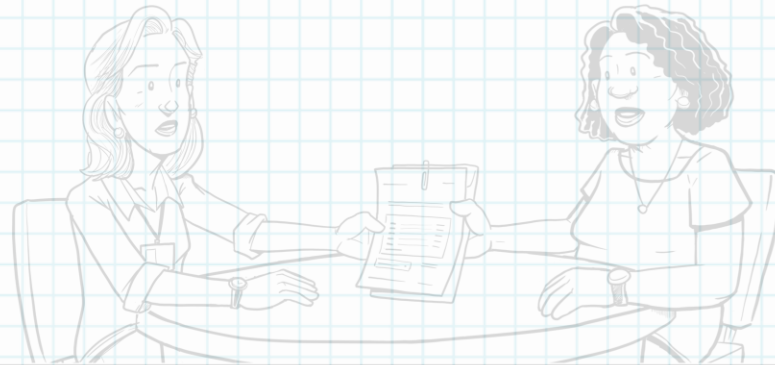
The National Society of Genetic Counselors
www.nsgc.org



What do genetic counselors do?



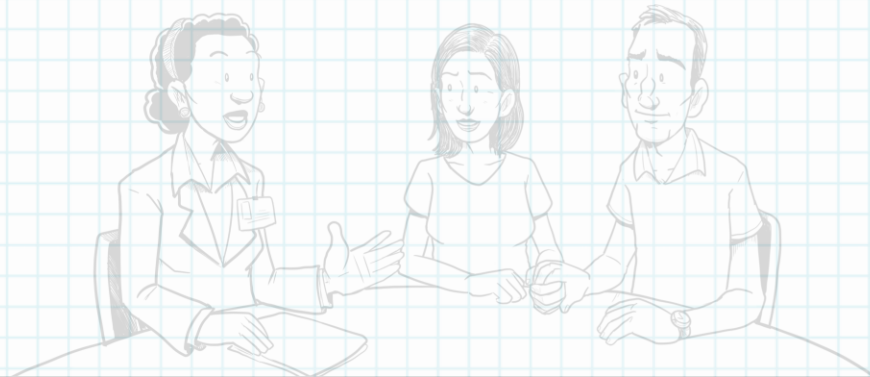
Assess Risk



Assess Risk



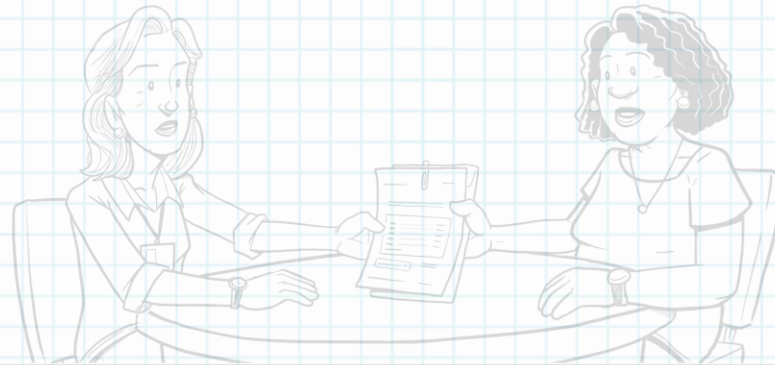
Educate



Assess Risk



Educate



Support

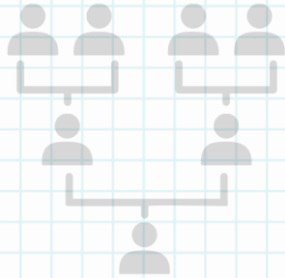


What to expect at a cancer genetics appointment

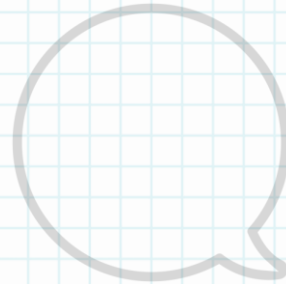
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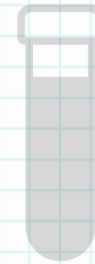
**Set
Expectations**



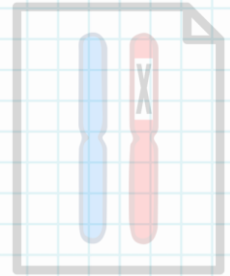
Gather
Information



Education



Testing

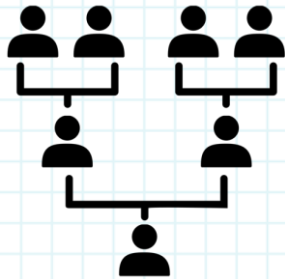


Discuss
Results

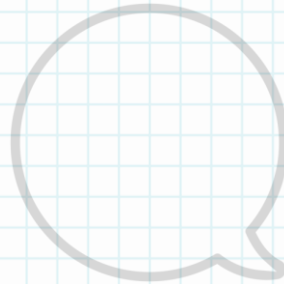
What to expect at a cancer genetics appointment



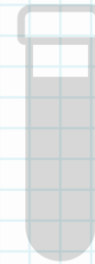
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Expectations



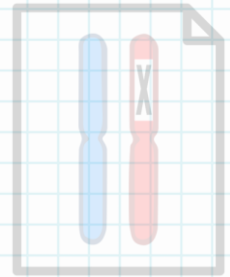
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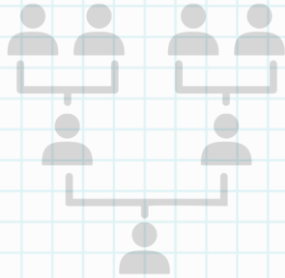


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Results

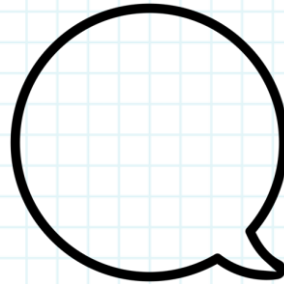
What to expect at a cancer genetics appointment



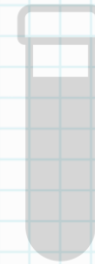
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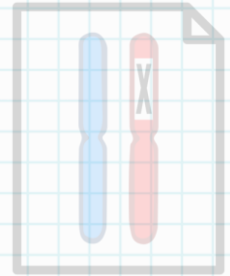
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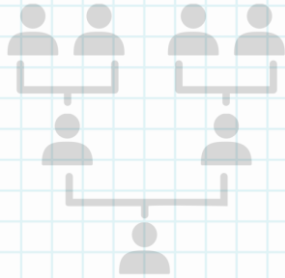


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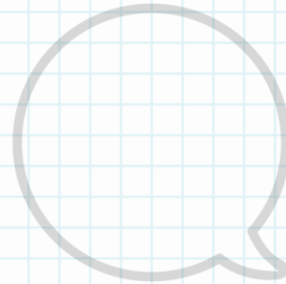
What to expect at a cancer genetics appointment



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Expectations



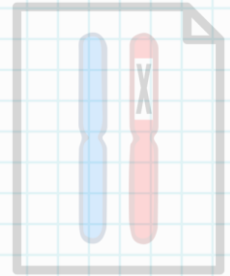
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Information



Education



Testing

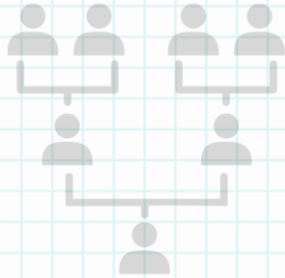


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Results

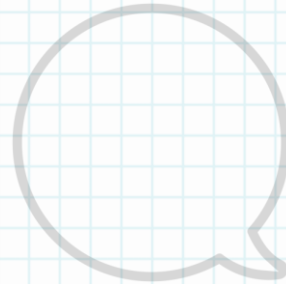
What to expect at a cancer genetics appointment



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Expectations



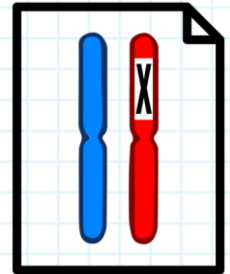
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Education



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Results

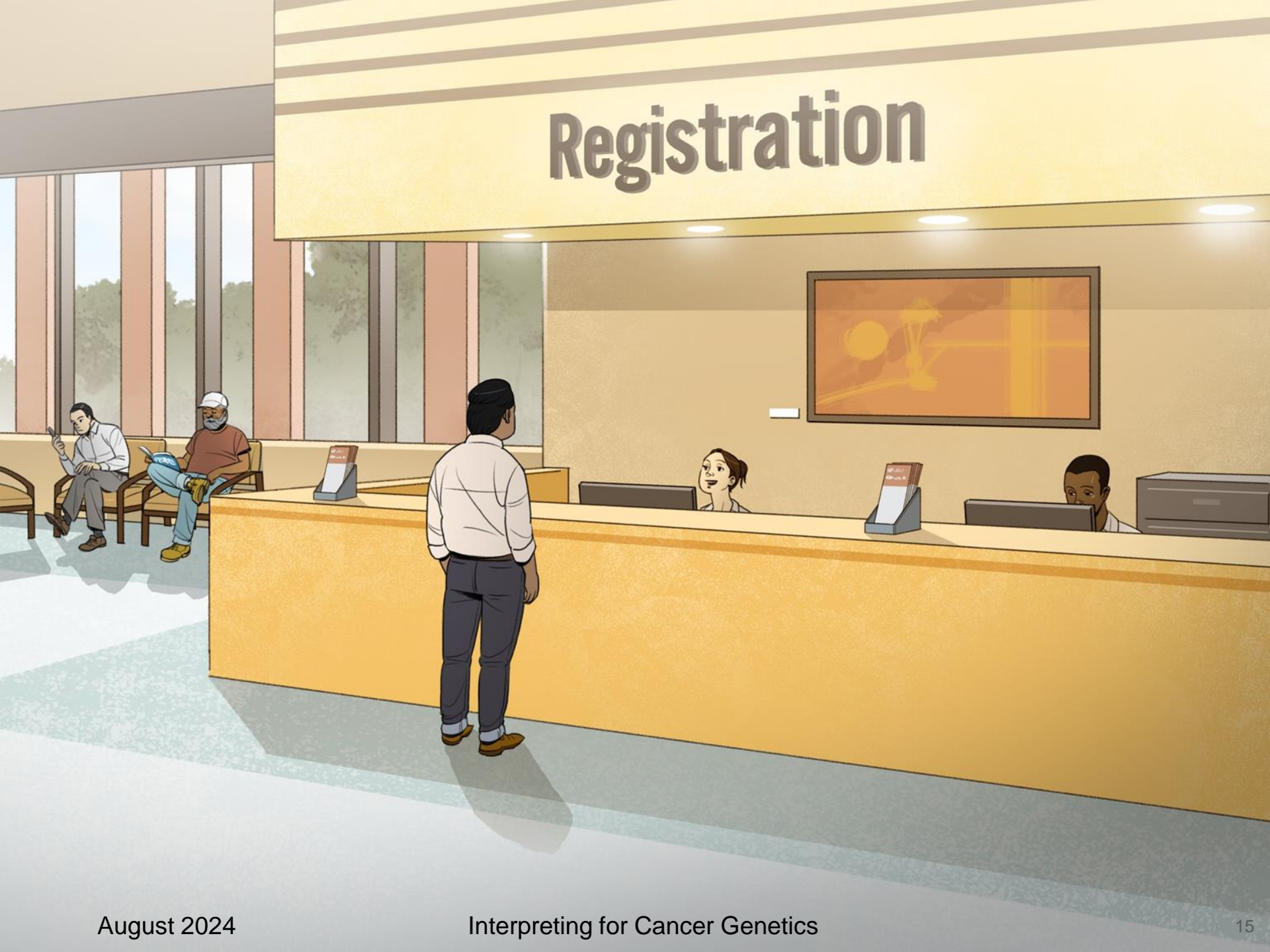
Poll!



August 2024

Interpreting for Cancer Genetics

Registration







My job as a genetic counselor is to help people understand their risk for conditions that may run in families, like cancer sometimes does.



My job as a genetic counselor is to help people understand their risk for conditions that may run in families, like cancer sometimes does.

I'll take a health history for you, and for your family. Then I'll tell you about genetic testing, if it seems like that might be helpful.

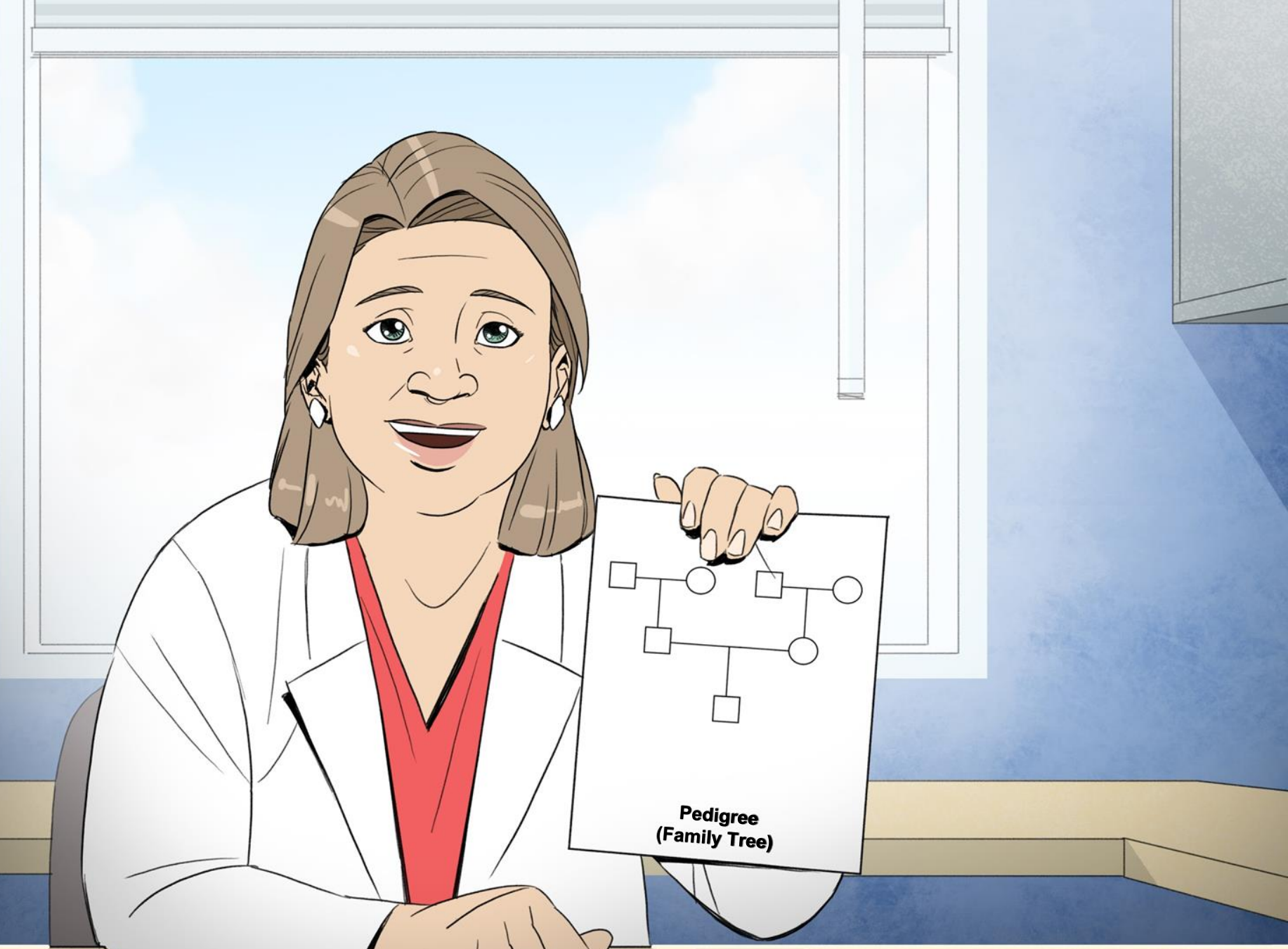


My job as a genetic counselor is to help people understand their risk for conditions that may run in families, like cancer sometimes does.

I'll take a health history for you, and for your family. Then I'll tell you about genetic testing, if it seems like that might be helpful.

And if you DO decide to get tested, I'll be here afterward to explain the results and to help you decide what to do next.





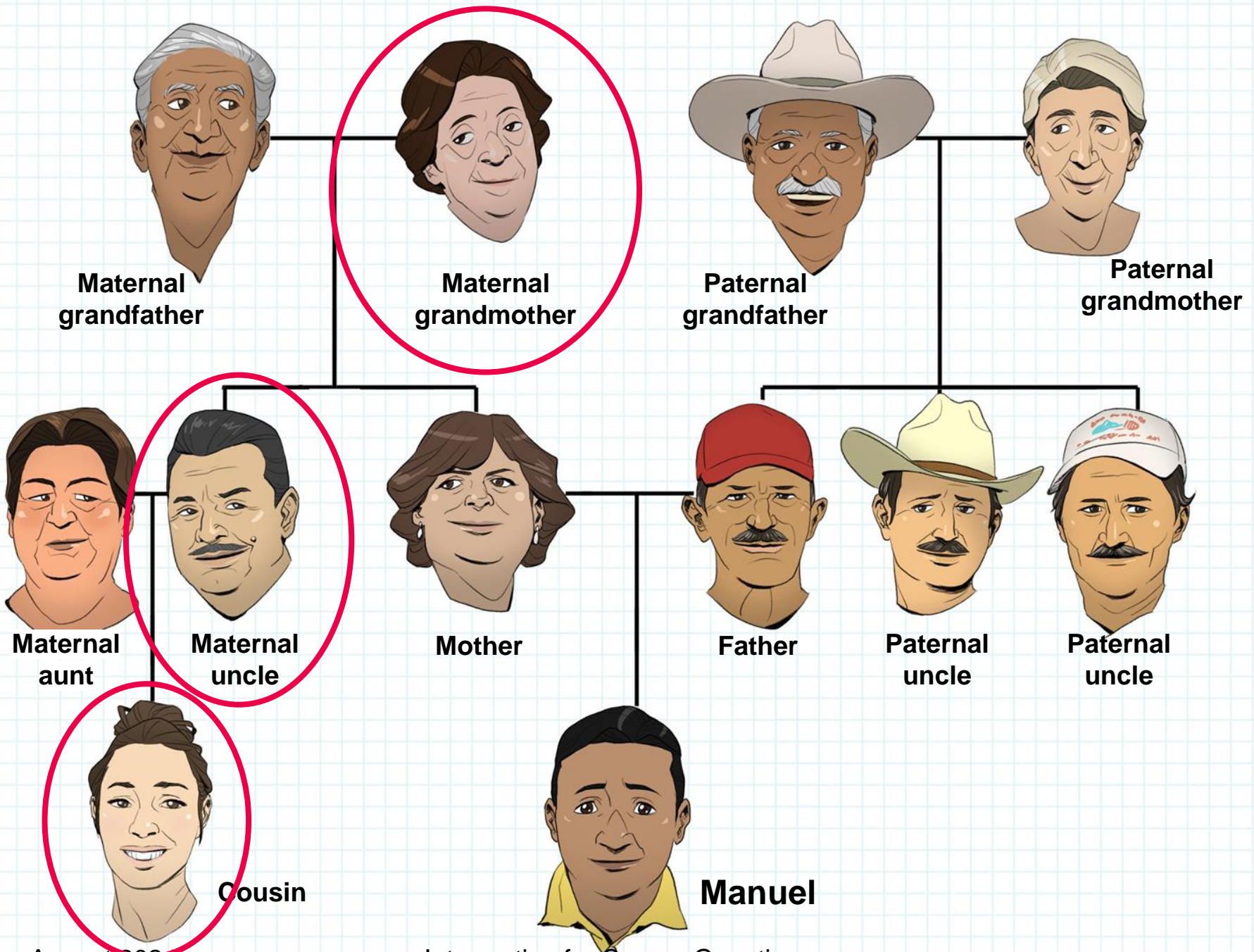
I don't know what my dad's parents died of. I know my grandmother on my mom's side had some kind of cancer, but I don't know what kind.

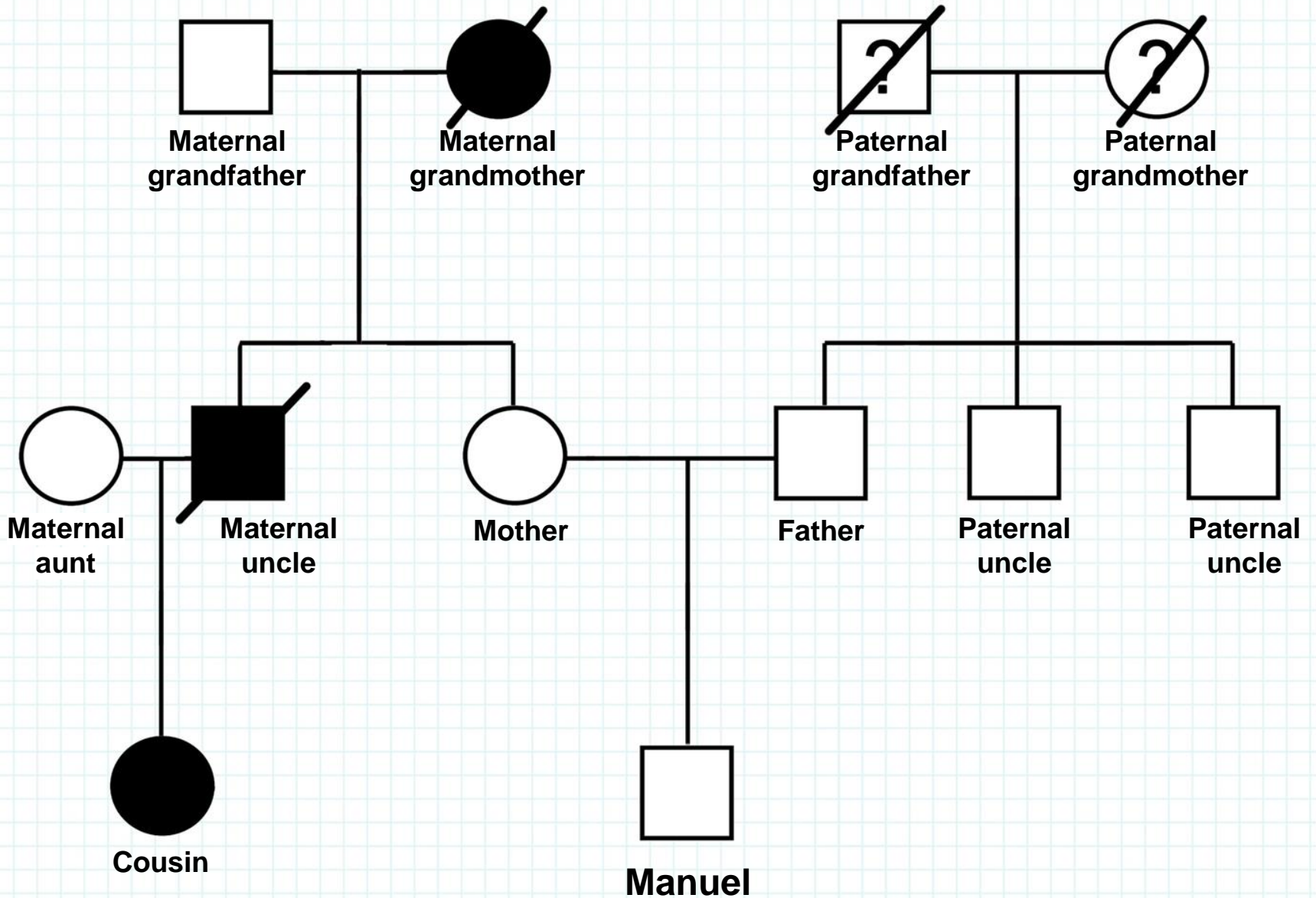



I don't know what my dad's parents died of. I know my grandmother on my mom's side had some kind of cancer, but I don't know what kind.

I guess I could ask. But half the family is back in Mexico, and, well, we don't like to talk about things like this.







An illustration of a man with dark hair and a white button-down shirt, looking thoughtful with his hands clasped. He is positioned on the right side of the frame. To his left is a large green plant. Two yellow speech bubbles are positioned above the plant. The background is a light blue wall with a window on the left and a yellow wall on the right.

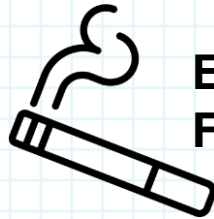
But what does this have to do with genetics?

It's just bad luck, right?

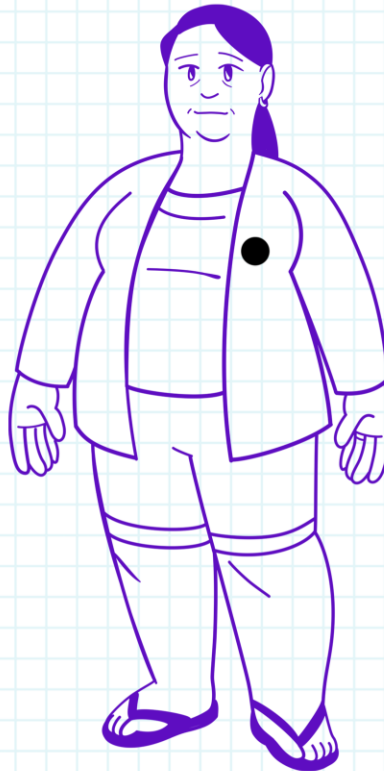
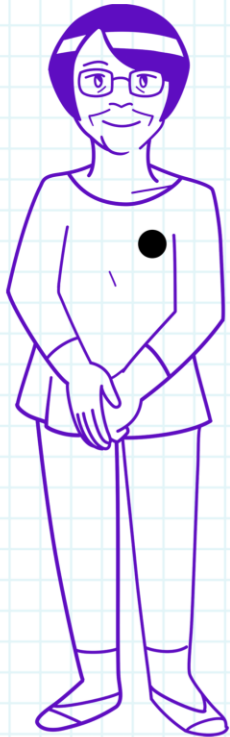
Sporadic Cancer



Random Mutations



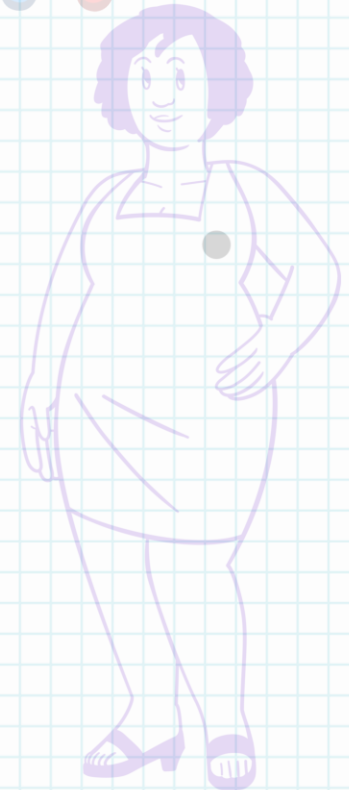
Environmental Factors



Hereditary Cancer



Gene Mutations



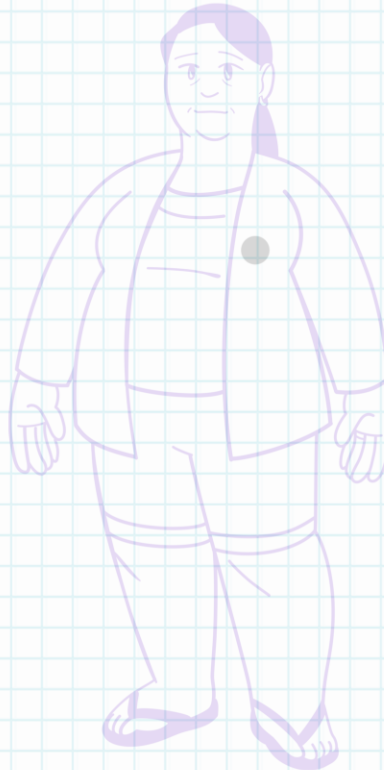
Sporadic Cancer



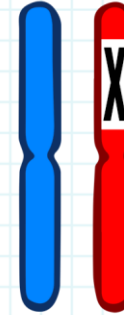
Random Mutations



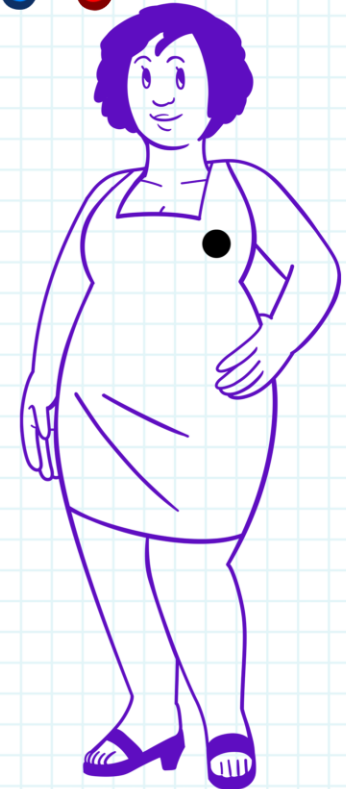
Environmental Factors



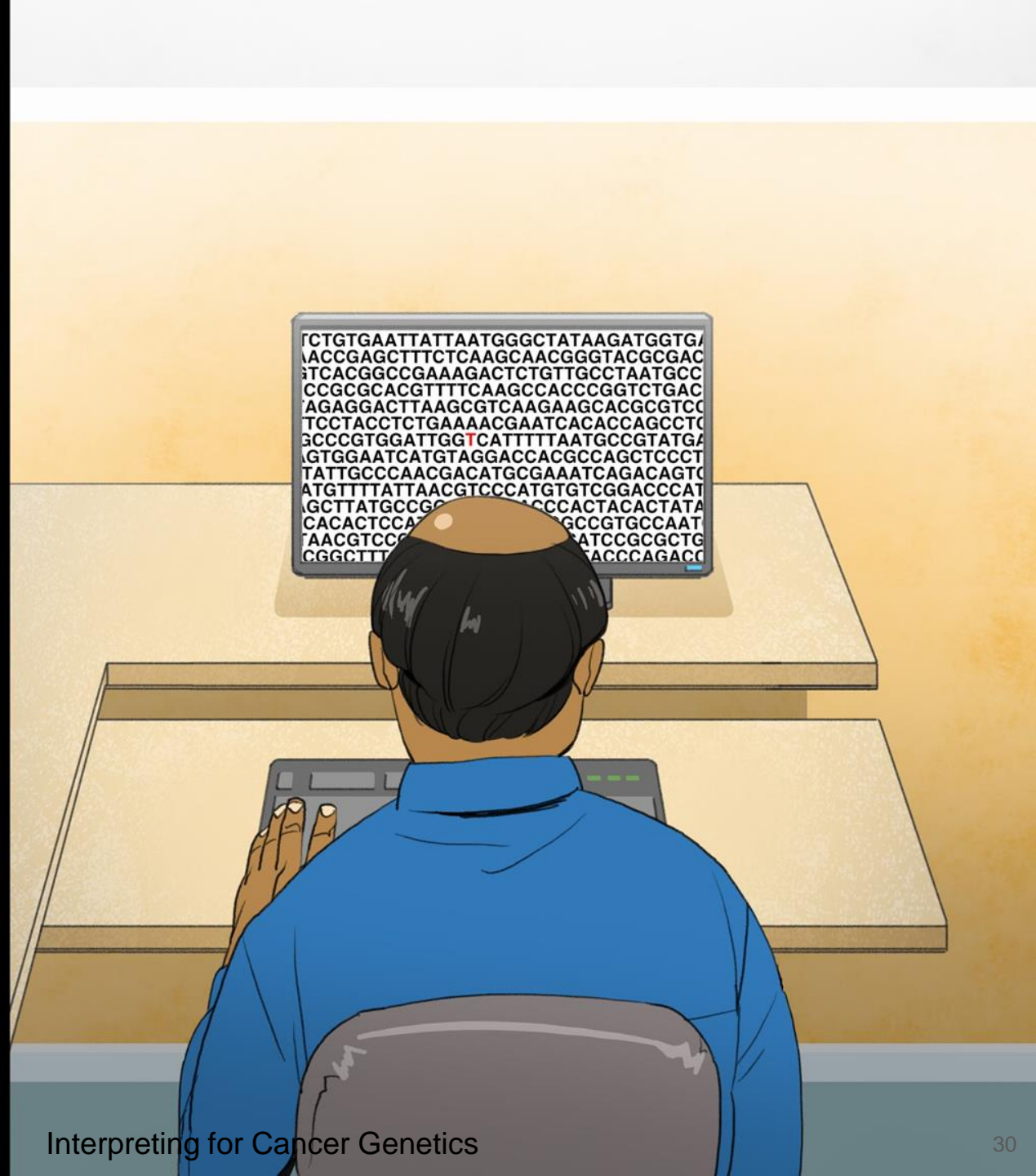
Hereditary Cancer



Pathogenic variant







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Single site analysis

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GCGGATCCACTATTAACGTCCCATGTGTTCGGACCCATCACGCCTT
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Individual gene testing

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Gene panel

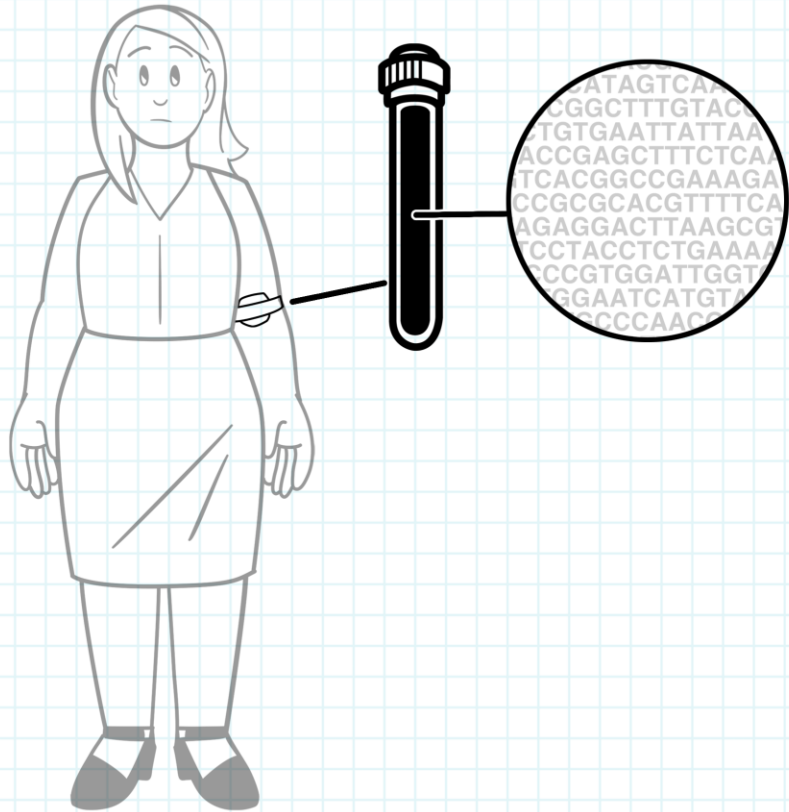
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Other tests

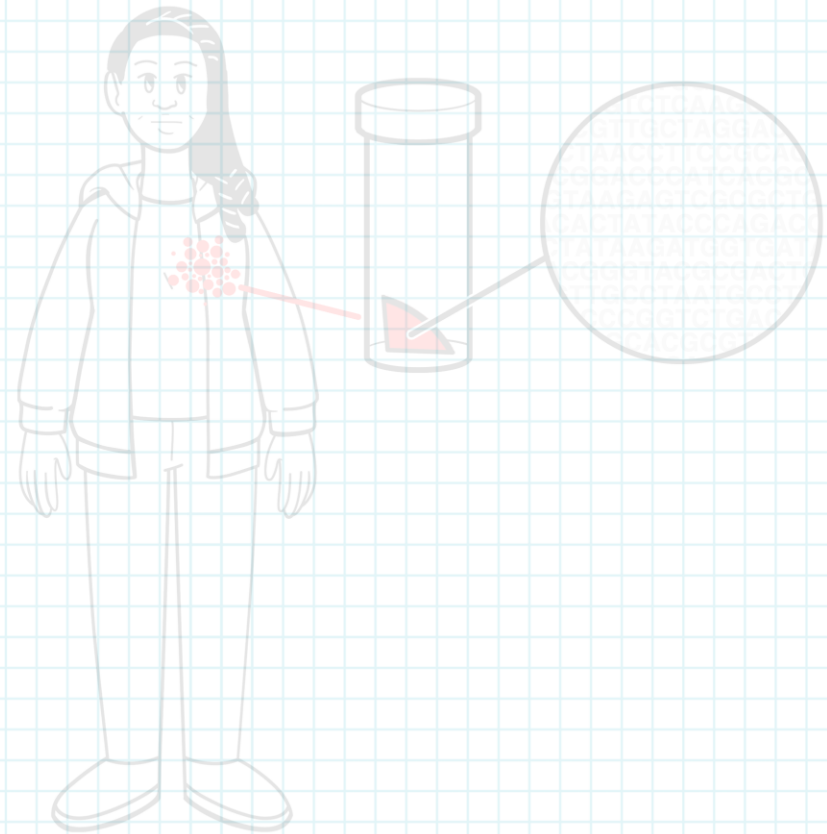


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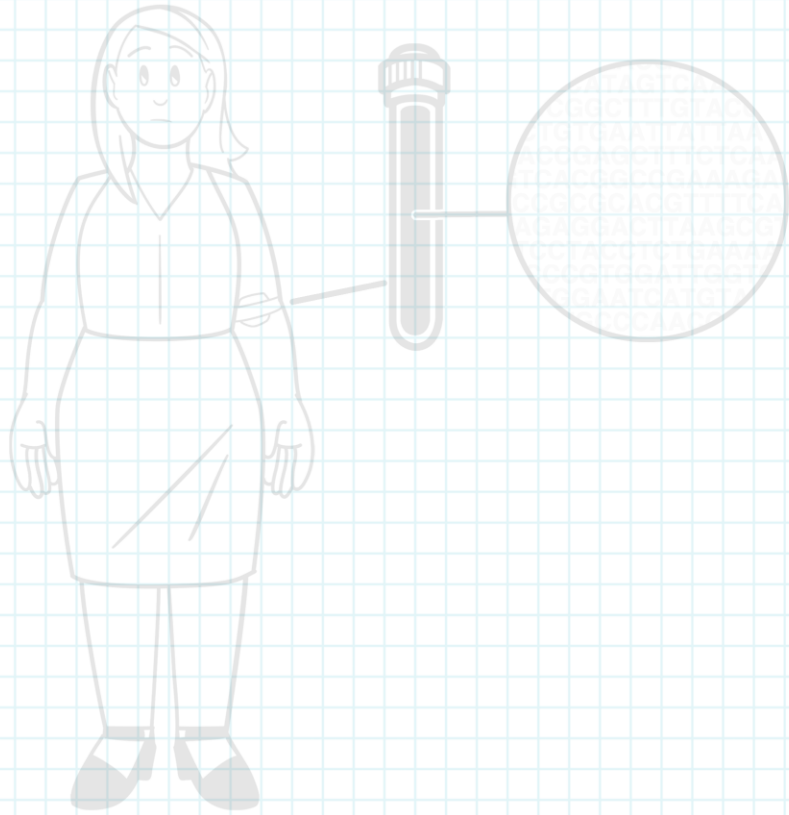
Germline Testing



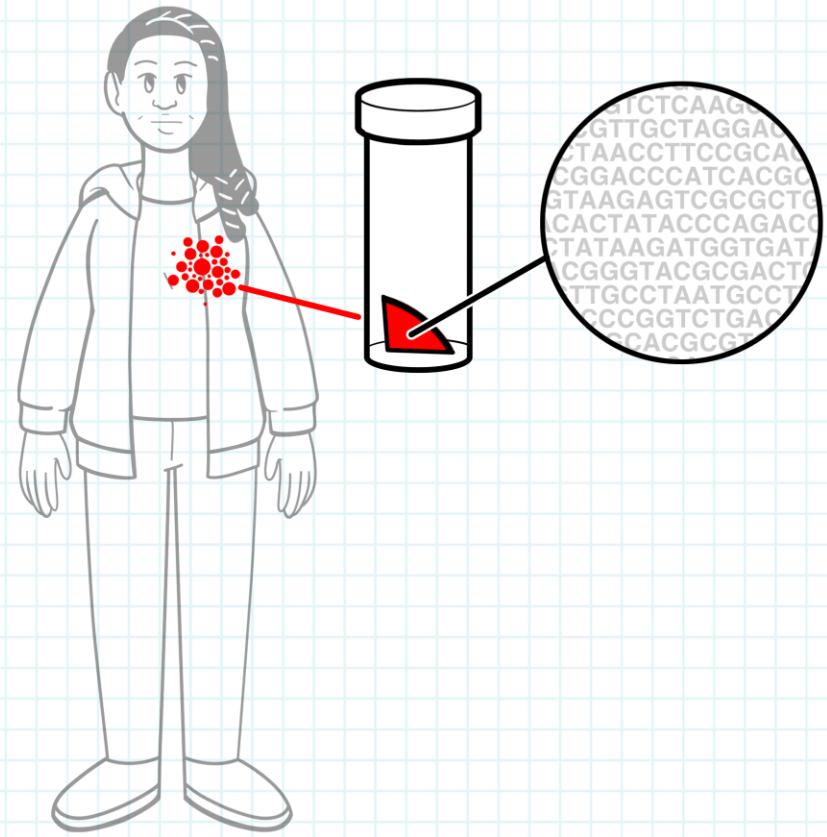
Tumor Testing




Germline Testing




Tumor Testing






So, this test would tell us if I have cancer? Or if I'm going to get cancer?


An illustration of a woman with brown hair, wearing a white lab coat over a red top, sitting at a table with her hands clasped. She is looking towards a man whose back is to the viewer. He has dark hair and is wearing a white shirt. A speech bubble above the woman contains text. The background shows a window with blinds and a blue wall.

Genetic testing can tell us if a person has certain genetic conditions, but it doesn't tell you if you have cancer.



Genetic testing can tell us if a person has certain genetic conditions, but it doesn't tell you if you have cancer.

It tells you if you have a gene that makes it more likely for you to get certain cancers in the future.

An illustration of a woman with brown hair, wearing a white lab coat over a red top, sitting at a table with her hands clasped. She is looking towards a man whose back is to the camera. He has dark hair and is wearing a white shirt. The background shows a window with a white frame. Three green speech bubbles are positioned around the woman, containing text.

Genetic testing can tell us if a person has certain genetic conditions, but it doesn't tell you if you have cancer.

It tells you if you have a gene that makes it more likely for you to get certain cancers in the future.

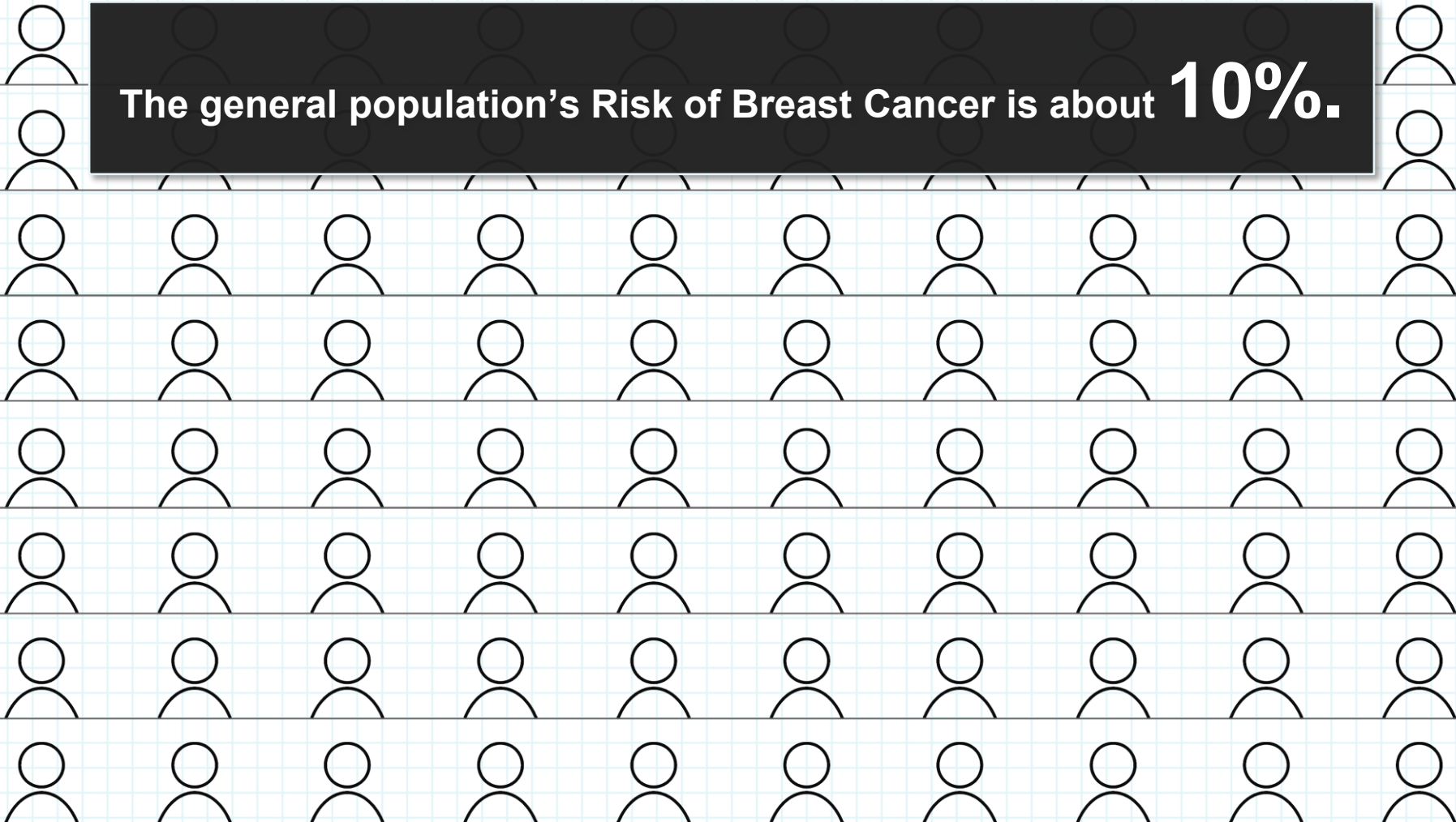
But even then, we can't know if you would develop the disease or condition for sure.

A grid of 100 person icons arranged in 10 rows and 10 columns. A black rectangular box with the text "General Population" is centered over the top two rows of the grid.

General Population

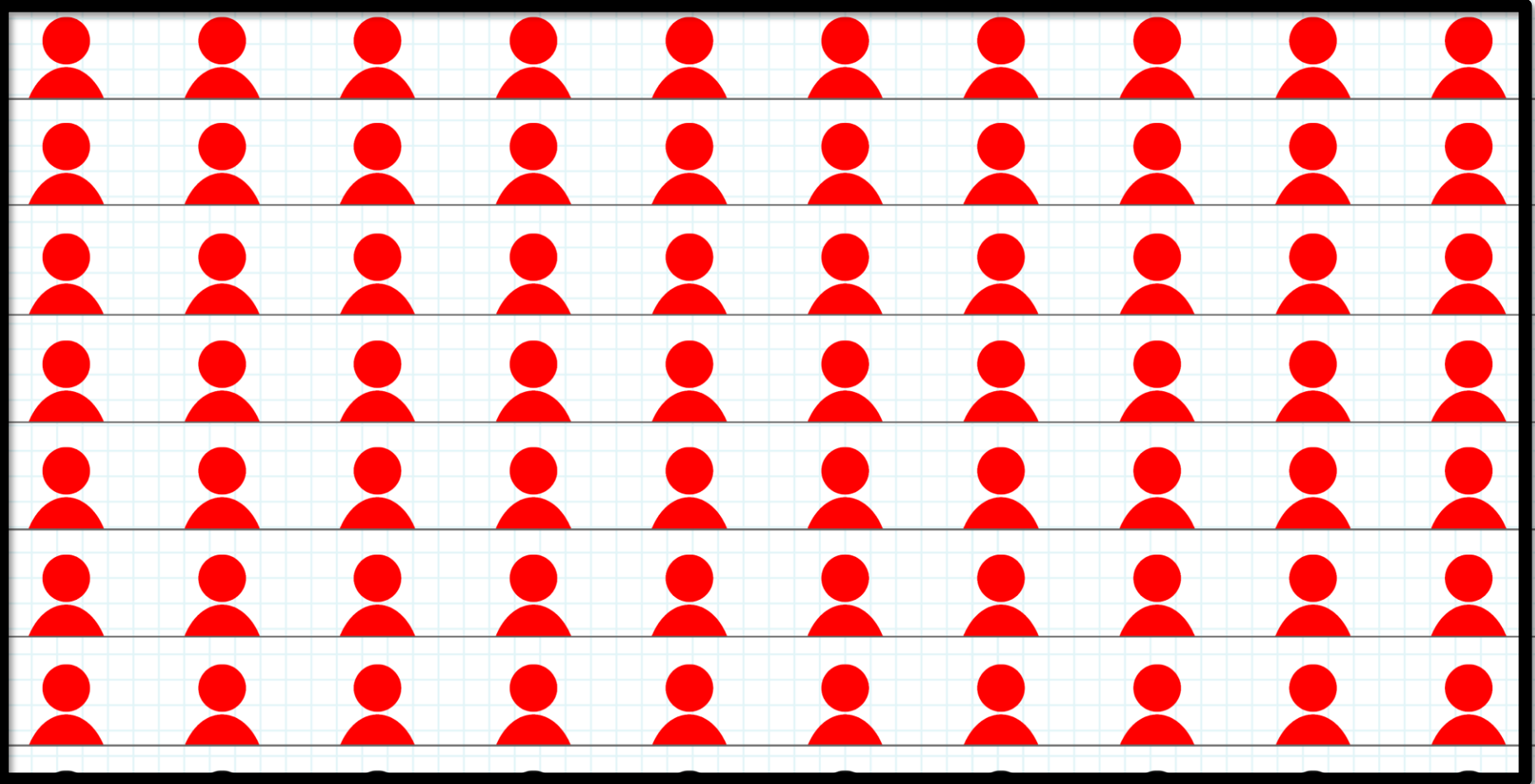


The general population's Risk of Breast Cancer is about **10%.**



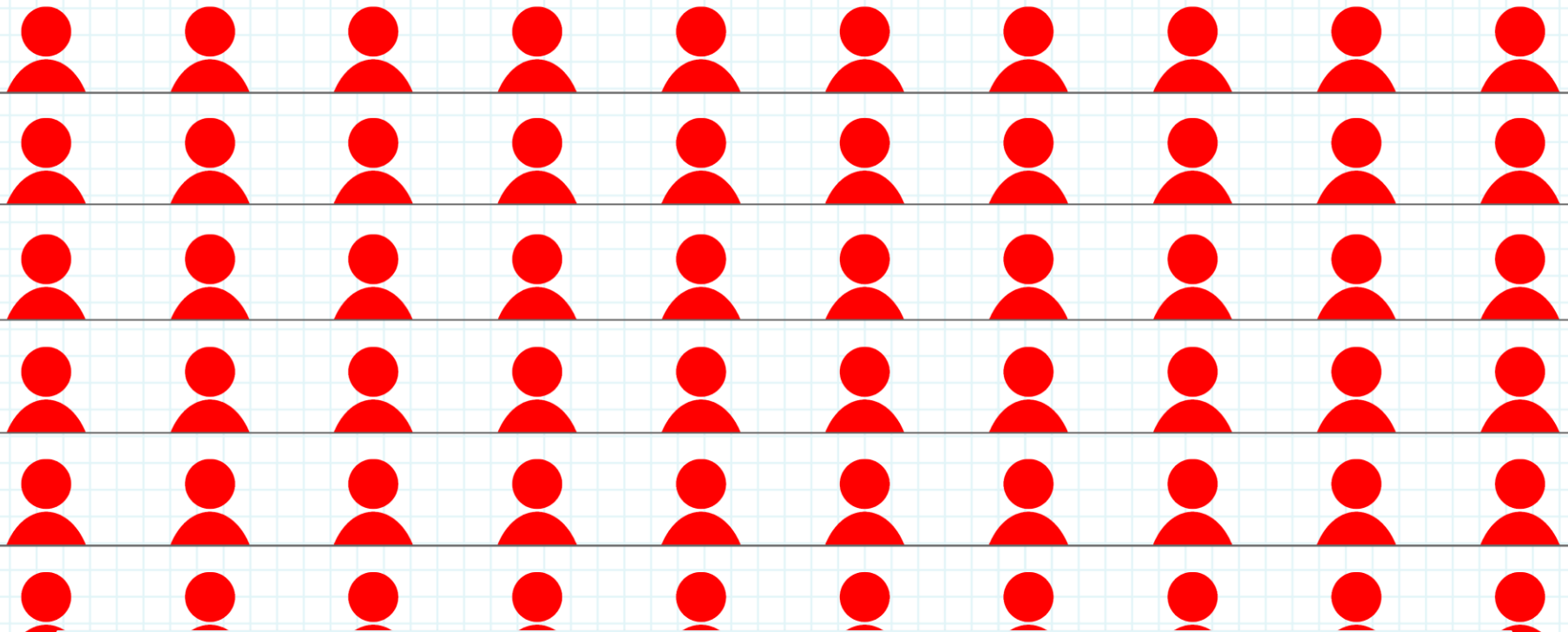
A grid of 100 person icons arranged in 10 rows and 10 columns. A black rectangular box is centered over the grid, containing the text "People with BRCA1". The box covers the icons in the second and third rows, columns 4 through 7.

People with BRCA1

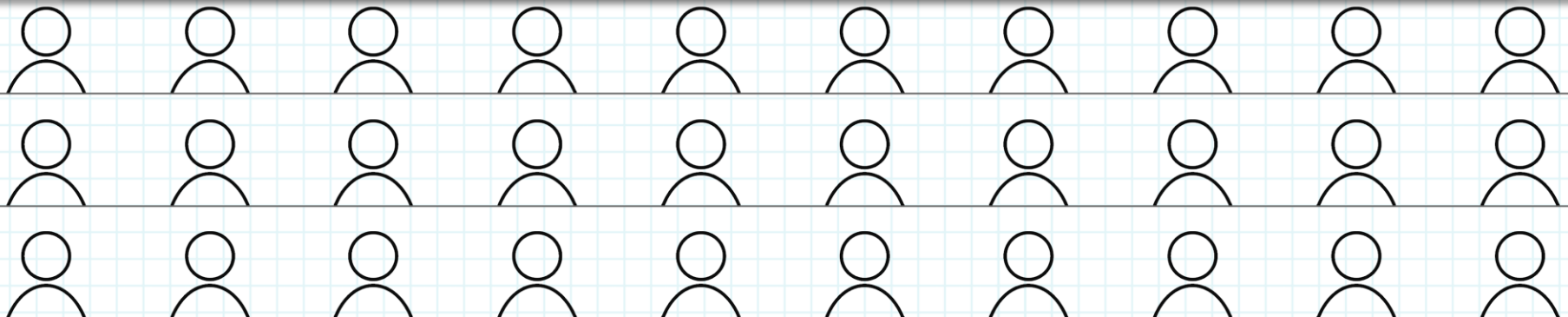


70% of people with BRCA1 will get Breast Cancer.





30% of people with BRCA1 will not get Breast Cancer.



Poll!



This test just tells me if I have a higher risk than everyone else of getting cancer, right?



This test just tells me if I have a higher risk than everyone else of getting cancer, right?

But so what? If I'm going to get cancer, there's nothing I can do about it, right?



This test just tells me if I have a higher risk than everyone else of getting cancer, right?

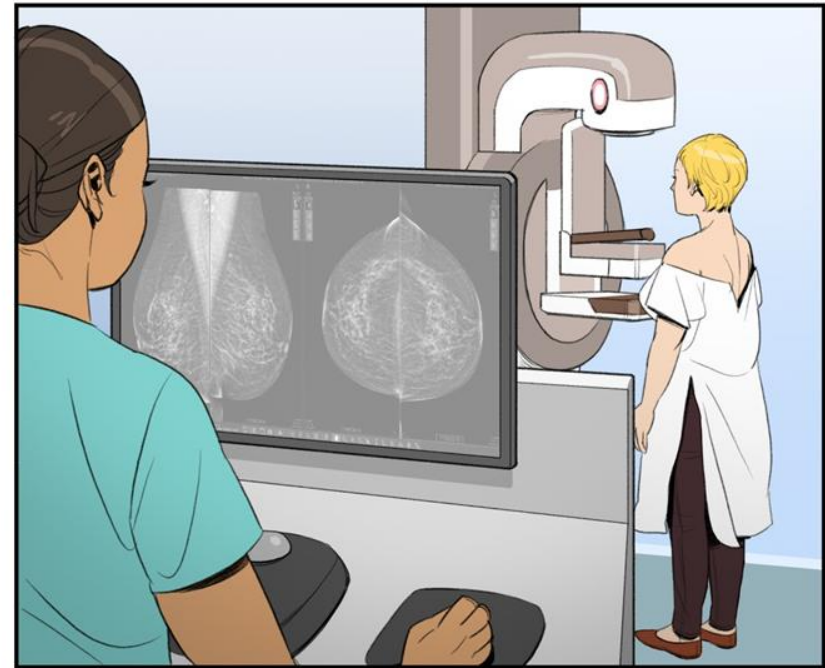
But so what? If I'm going to get cancer, there's nothing I can do about it, right?

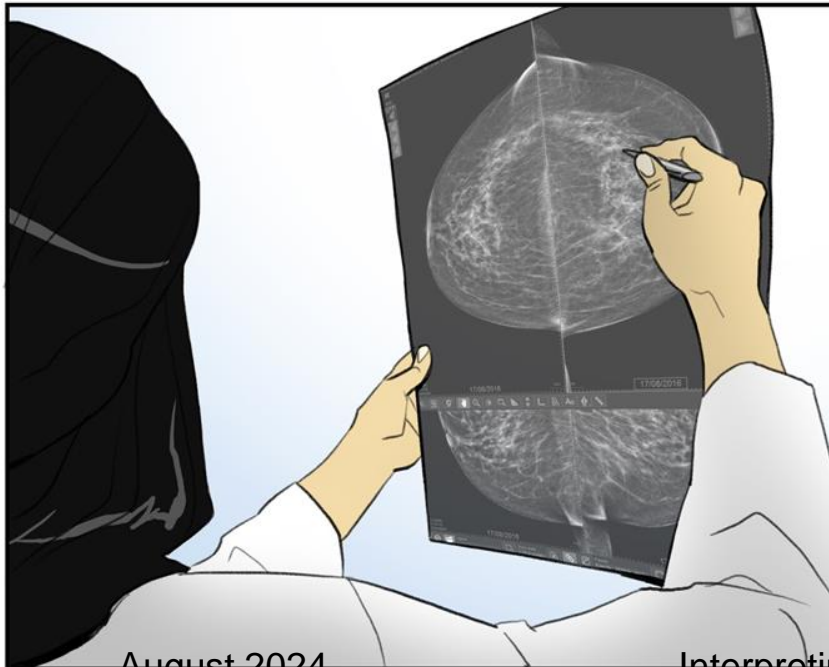
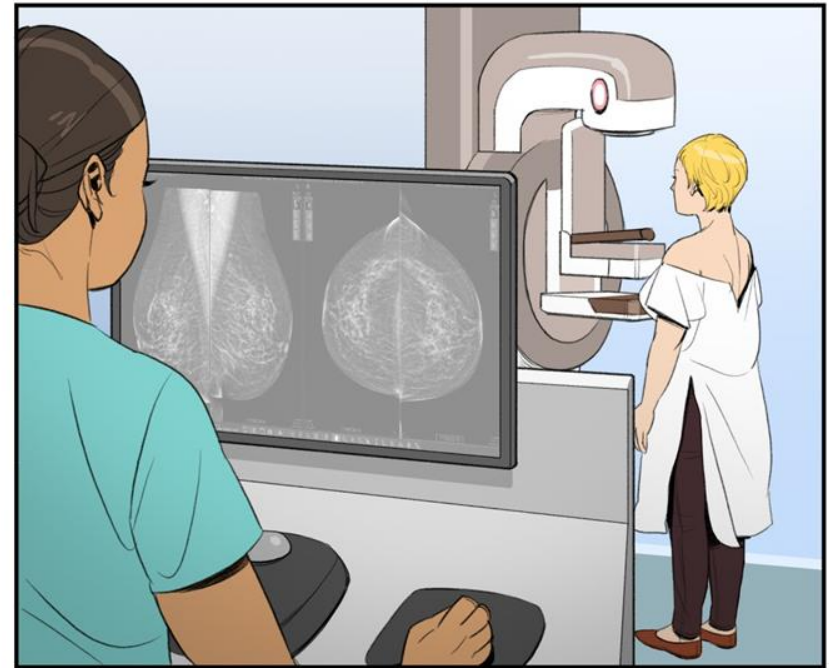
So why bother getting tested? What does it matter?

“It actually does matter...”

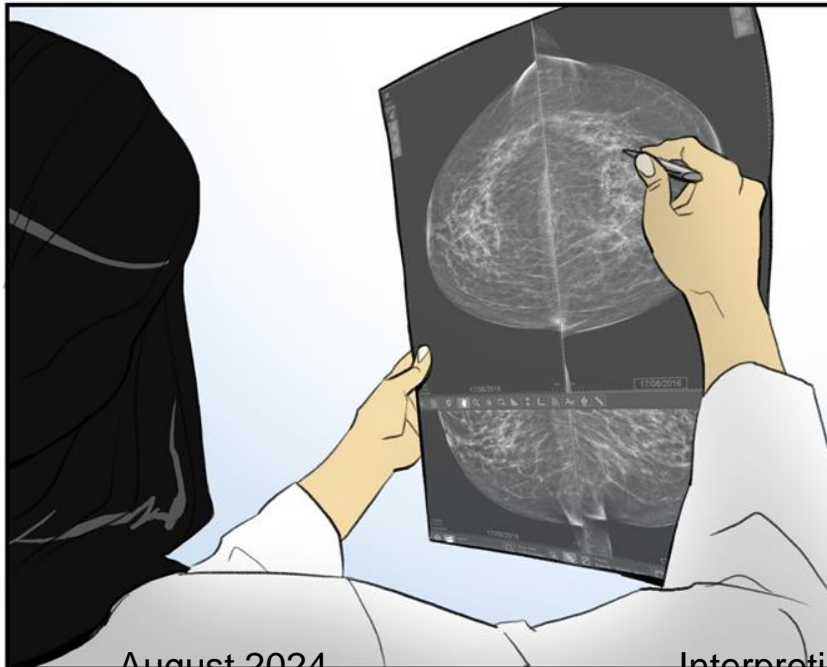
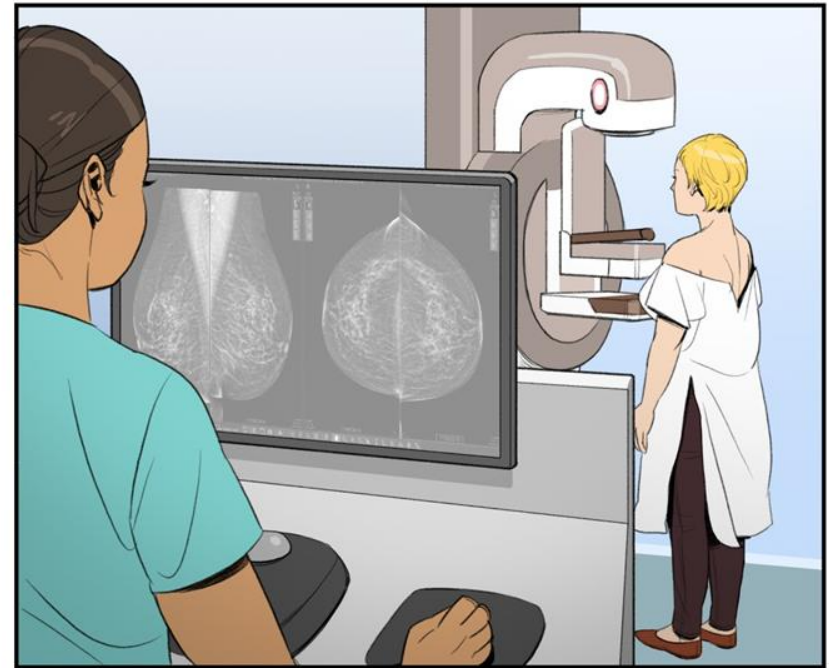
"It actually does matter..."







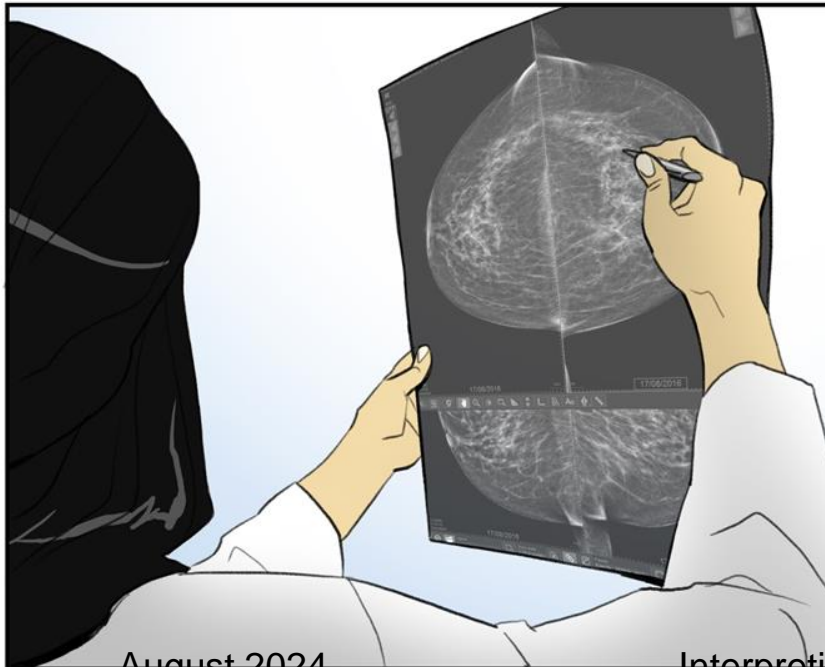
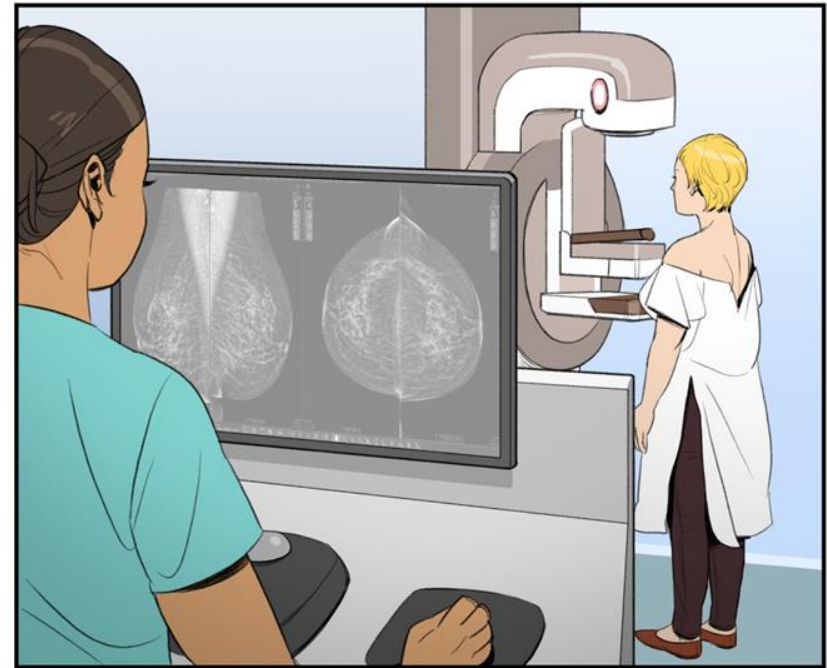
"It actually does matter..."



August 2024

Interpreting for Cancer Genetics

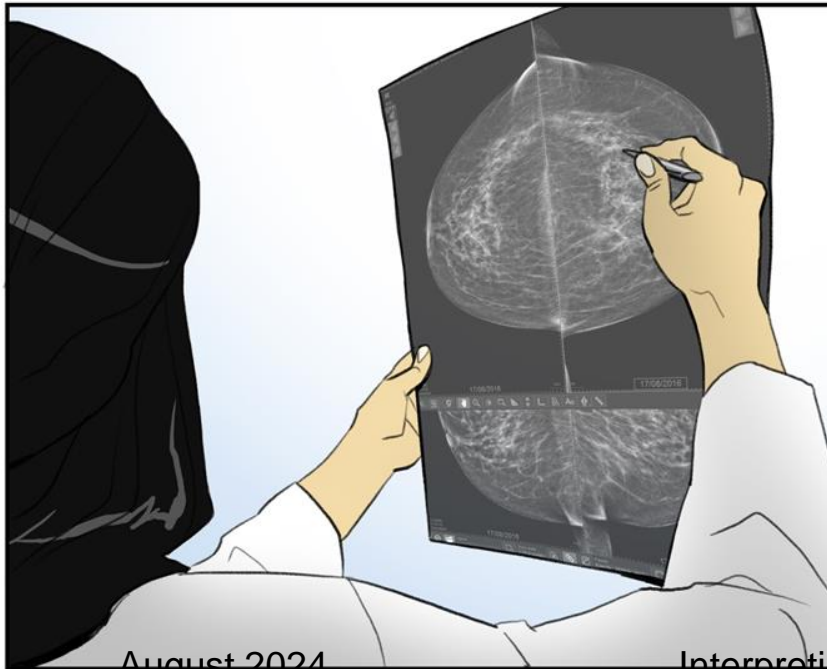
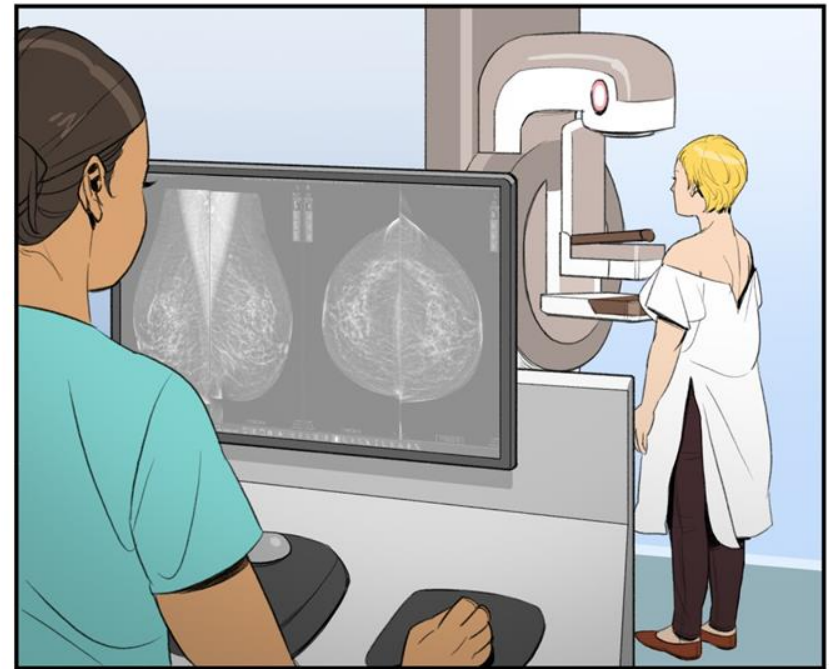
"It actually does matter..."




August 2024

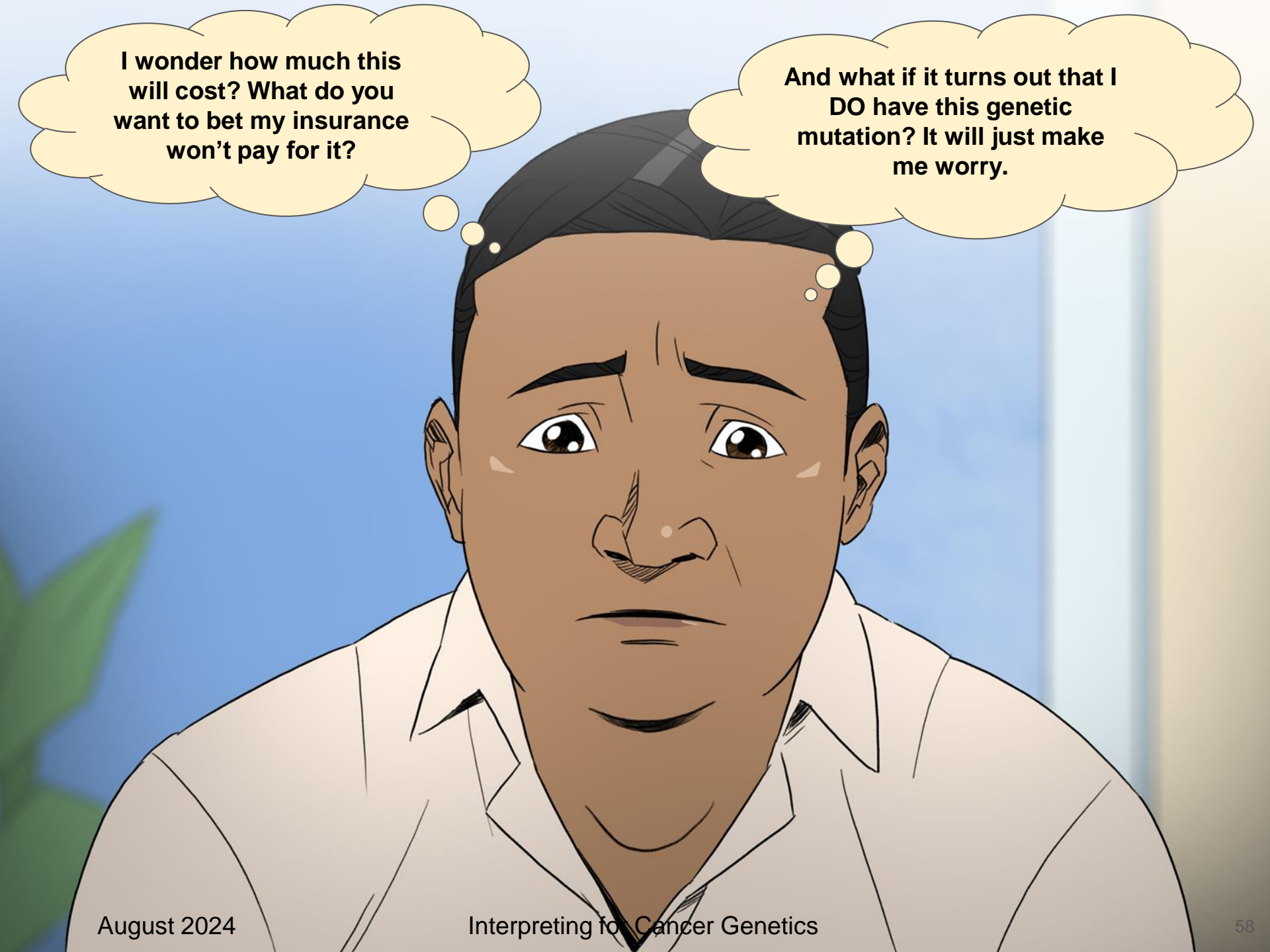
Interpreting for Cancer Genetics

"It actually does matter..."



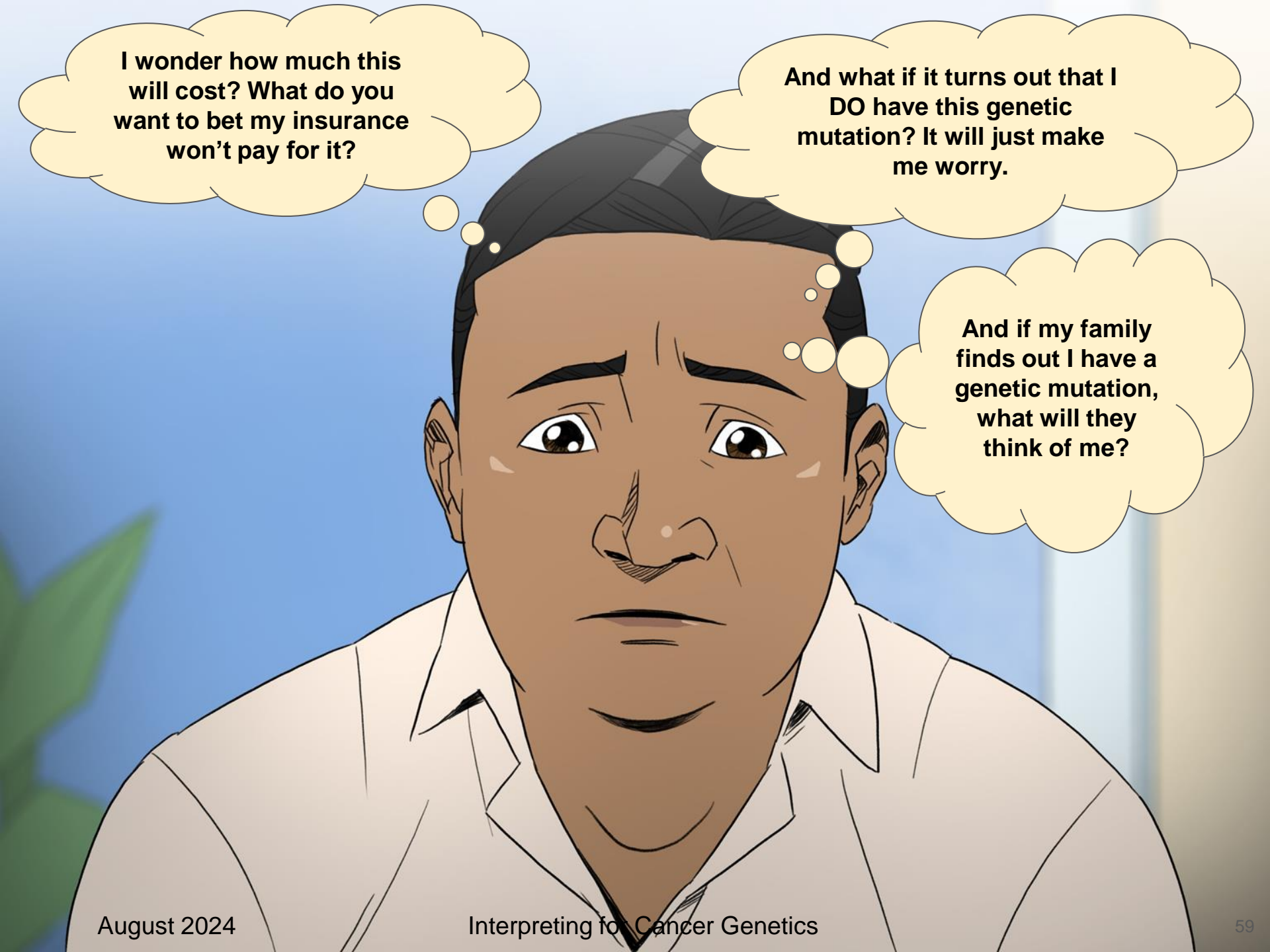
A cartoon illustration of a man with dark hair, wearing a light-colored collared shirt. He has a worried expression with furrowed brows and wide eyes. A yellow thought bubble is positioned above his head, containing text. The background is a soft-focus blue and yellow gradient.

I wonder how much this will cost? What do you want to bet my insurance won't pay for it?



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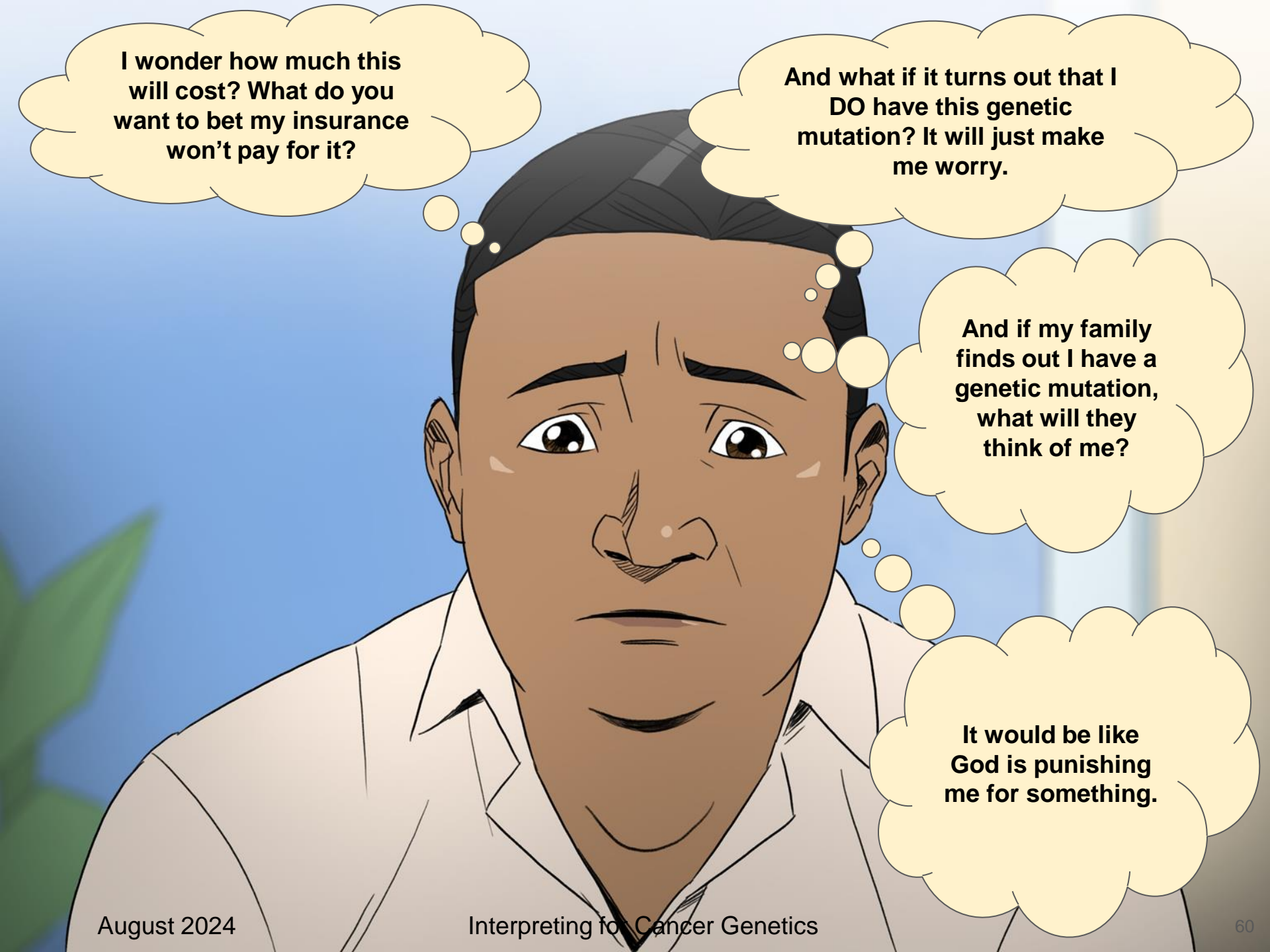
And what if it turns out that I DO have this genetic mutation? It will just make me worry.

A man with a worried expression, surrounded by thought bubbles. The man has dark hair, a high forehead, and is wearing a light-colored collared shirt. He has a furrowed brow and wide, anxious eyes. Three thought bubbles are connected to his head by small circles. The background is a soft-focus indoor setting with a blue wall and a green plant on the left.

I wonder how much this will cost? What do you want to bet my insurance won't pay for it?

And what if it turns out that I DO have this genetic mutation? It will just make me worry.

And if my family finds out I have a genetic mutation, what will they think of me?

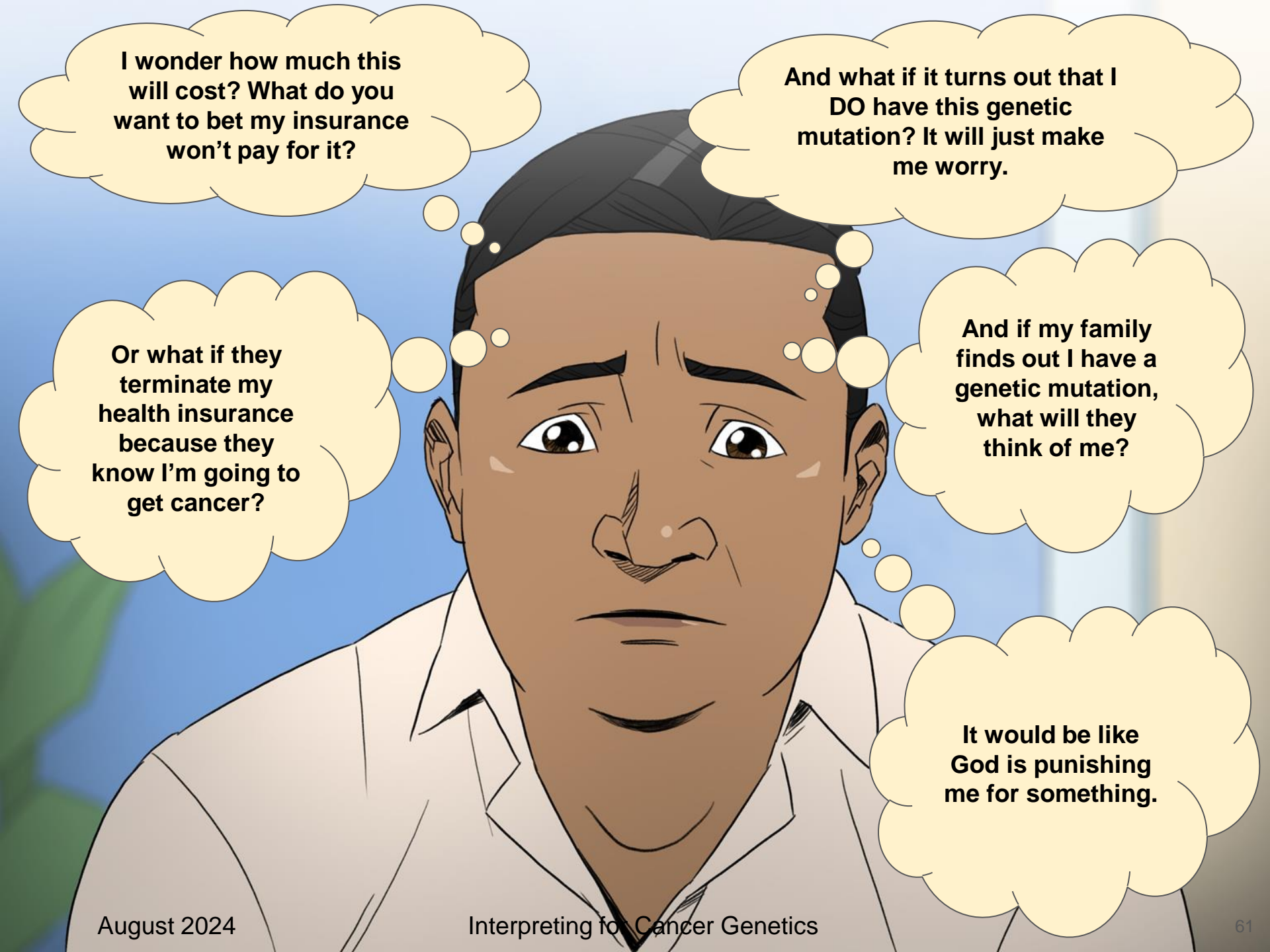
A man with a worried expression, surrounded by thought bubbles. The man has dark hair, a high forehead, and is wearing a light-colored collared shirt. He has a furrowed brow and wide, anxious eyes. Five yellow thought bubbles of varying sizes are connected to his head by thin lines. The background is a soft-focus indoor setting with a blue wall and a green plant on the left.

I wonder how much this will cost? What do you want to bet my insurance won't pay for it?

And what if it turns out that I DO have this genetic mutation? It will just make me worry.

And if my family finds out I have a genetic mutation, what will they think of me?

It would be like God is punishing me for something.



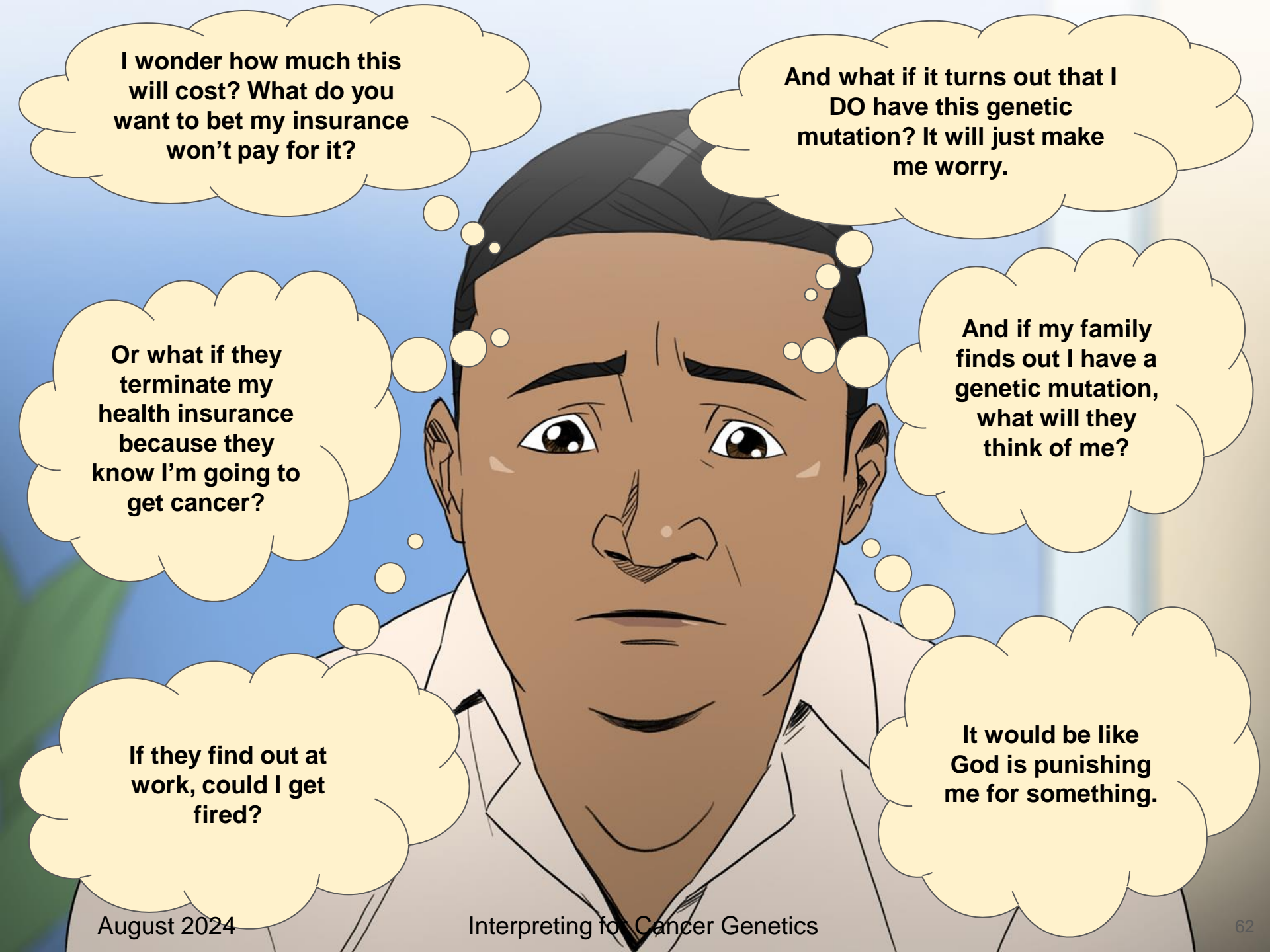
I wonder how much this will cost? What do you want to bet my insurance won't pay for it?

And what if it turns out that I DO have this genetic mutation? It will just make me worry.

Or what if they terminate my health insurance because they know I'm going to get cancer?

And if my family finds out I have a genetic mutation, what will they think of me?

It would be like God is punishing me for something.

A man with a worried expression is shown from the chest up. He has dark skin, short dark hair, and is wearing a light-colored collared shirt. He is surrounded by several yellow thought bubbles of various sizes, some connected to his head by thin lines. The background is a soft-focus outdoor scene with blue sky and green foliage.

I wonder how much this will cost? What do you want to bet my insurance won't pay for it?


And what if it turns out that I DO have this genetic mutation? It will just make me worry.

Or what if they terminate my health insurance because they know I'm going to get cancer?

And if my family finds out I have a genetic mutation, what will they think of me?

If they find out at work, could I get fired?

It would be like God is punishing me for something.



Manuel, you look worried. What's going through your mind?



GINA: the Genetic Information Nondiscrimination Act of 2008

PUBLIC LAW 110-233—MAY 21, 2008

122 STAT. 881

Public Law 110-233
110th Congress

An Act

May 21, 2008
[H.R. 493]

To prohibit discrimination on the basis of genetic information with respect to health insurance and employment.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the “Genetic Information Nondiscrimination Act of 2008”.

(b) TABLE OF CONTENTS.—The table of contents of this Act is as follows:

Sec. 1. Short title; table of contents.
Sec. 2. Findings.

TITLE I—GENETIC NONDISCRIMINATION IN HEALTH INSURANCE

Sec. 101. Amendments to Employee Retirement Income Security Act of 1974.
Sec. 102. Amendments to the Public Health Service Act.
Sec. 103. Amendments to the Internal Revenue Code of 1986.
Sec. 104. Amendments to title XVIII of the Social Security Act relating to medigap.
Sec. 105. Privacy and confidentiality.
Sec. 106. Assuring coordination.

TITLE II—PROHIBITING EMPLOYMENT DISCRIMINATION ON THE BASIS OF GENETIC INFORMATION

Sec. 201. Definitions.
Sec. 202. Employer practices.
Sec. 203. Employment agency practices.
Sec. 204. Labor organization practices.
Sec. 205. Training programs.
Sec. 206. Confidentiality of genetic information.
Sec. 207. Remedies and enforcement.
Sec. 208. Disparate impact.
Sec. 209. Construction.
Sec. 210. Medical information that is not genetic information.
Sec. 211. Regulations.
Sec. 212. Authorization of appropriations.
Sec. 213. Effective date.

TITLE III—MISCELLANEOUS PROVISIONS

Sec. 301. Severability.
Sec. 302. Child labor protections.

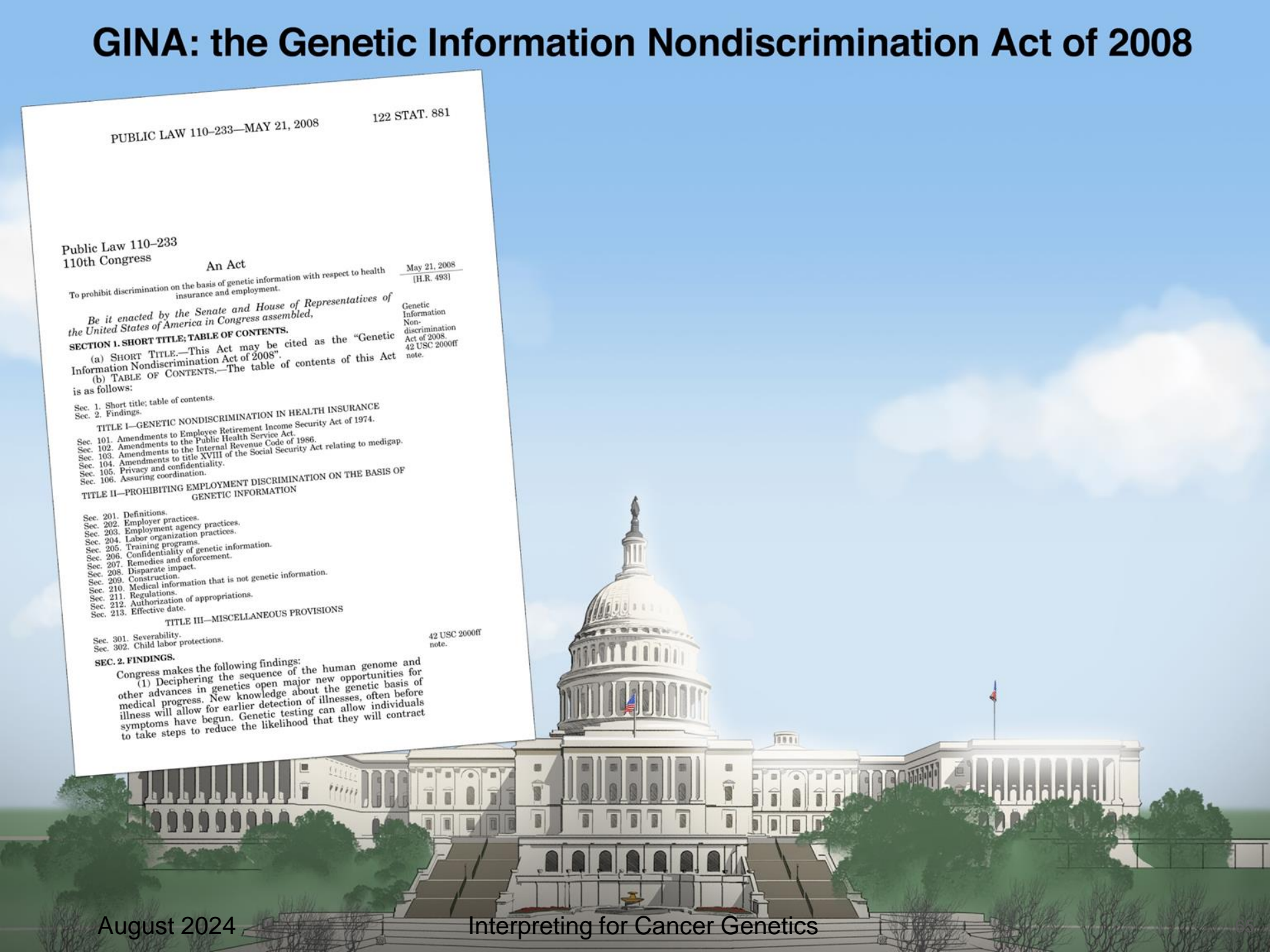
SEC. 2. FINDINGS.

Congress makes the following findings:

(1) Deciphering the sequence of the human genome and other advances in genetics open major new opportunities for medical progress. New knowledge about the genetic basis of illness will allow for earlier detection of illnesses, often before symptoms have begun. Genetic testing can allow individuals to take steps to reduce the likelihood that they will contract

Genetic Information Nondiscrimination Act of 2008
42 USC 2000ff note.

42 USC 2000ff note.



GINA: the Genetic Information Nondiscrimination Act of 2008

PUBLIC LAW 110-233—MAY 21, 2008

122 STAT. 881

TITLE I—GENETIC NONDISCRIMINATION IN HEALTH INSURANCE

“(3) NO GROUP-BASED DISCRIMINATION ON BASIS OF GENETIC INFORMATION.—

“(A) IN GENERAL.—For purposes of this section, a group health plan, and a health insurance issuer offering group health insurance coverage in connection with a group health plan, may not adjust premium or contribution amounts for the group covered under such plan on the basis of genetic information.”

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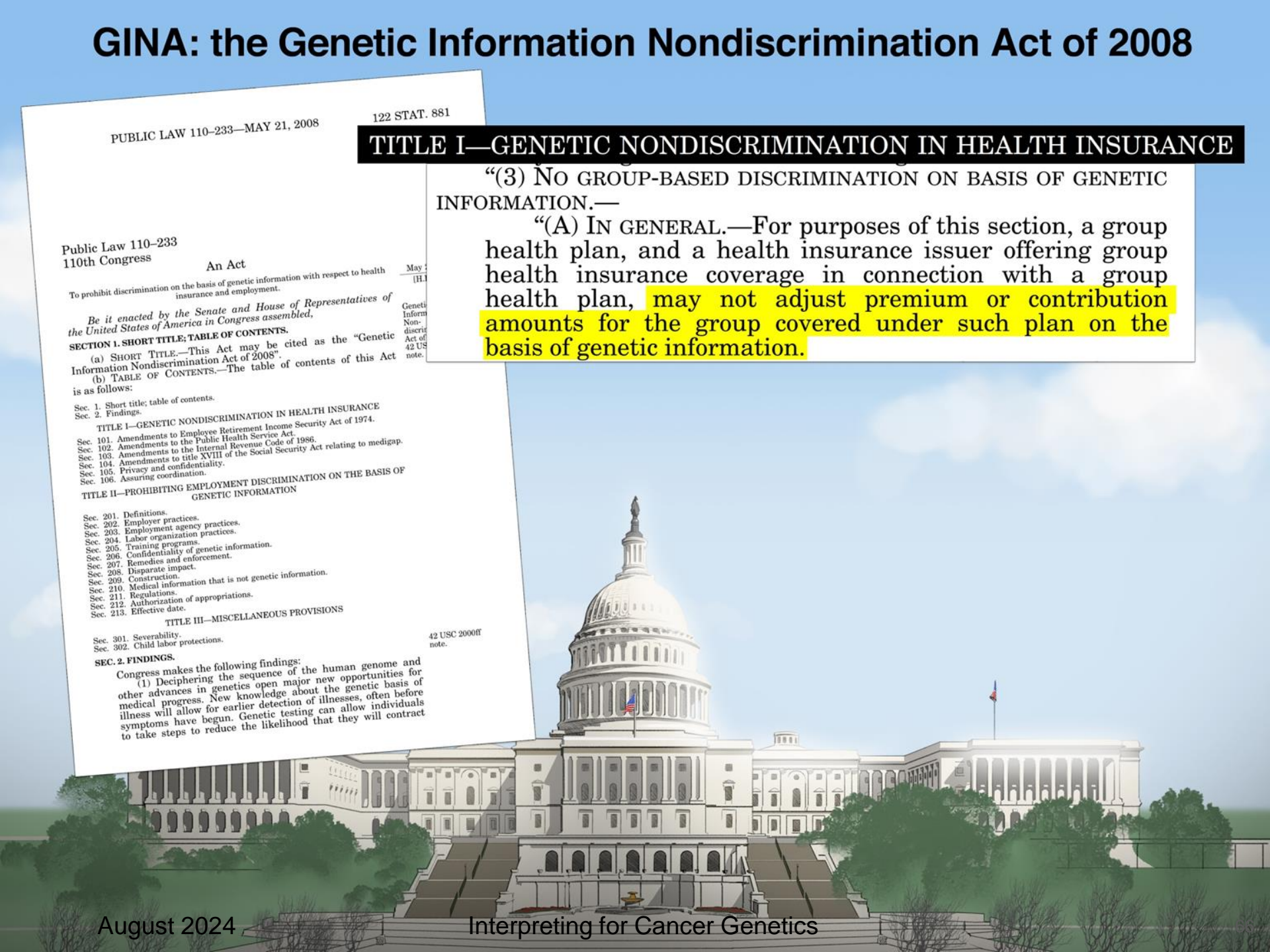
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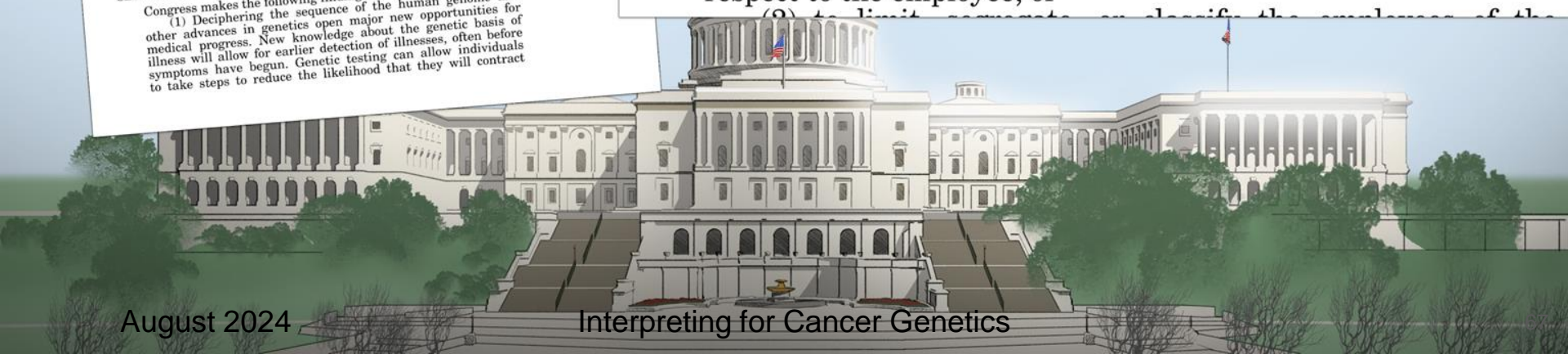
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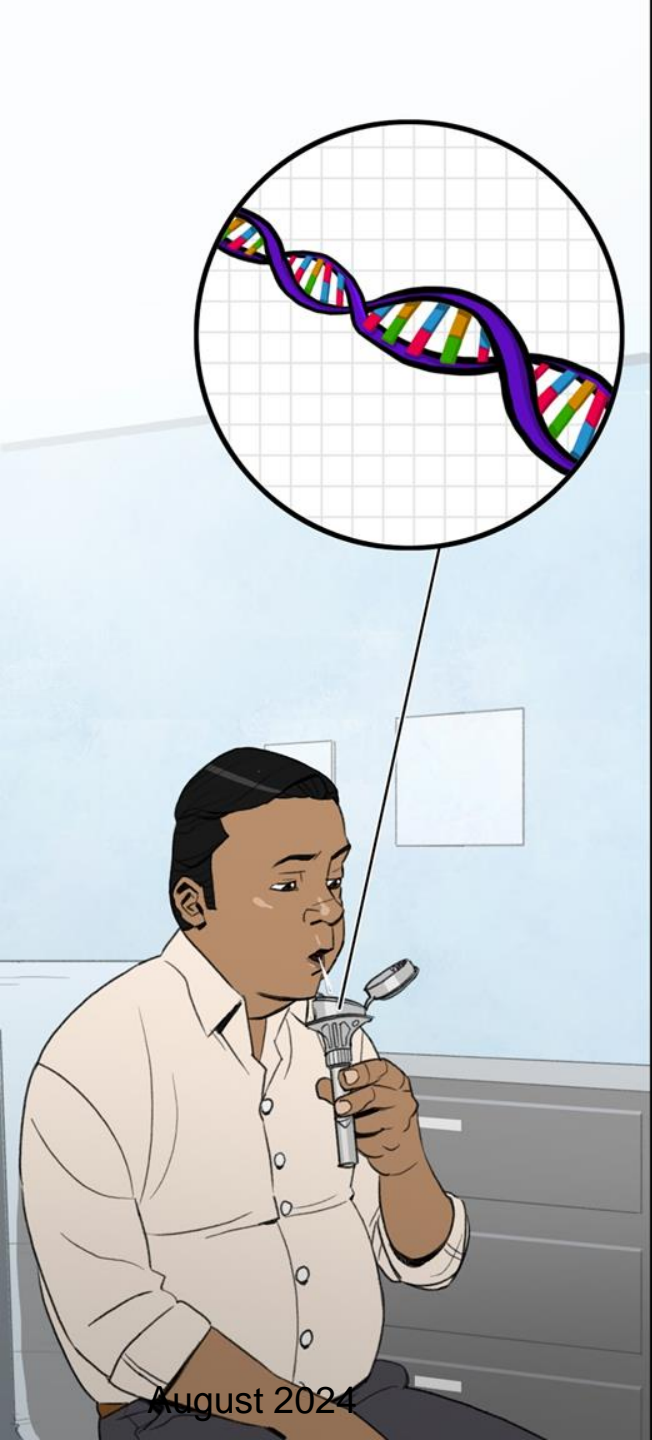
(a) DISCRIMINATION BASED ON GENETIC INFORMATION.—It shall be an unlawful employment practice for an employer—

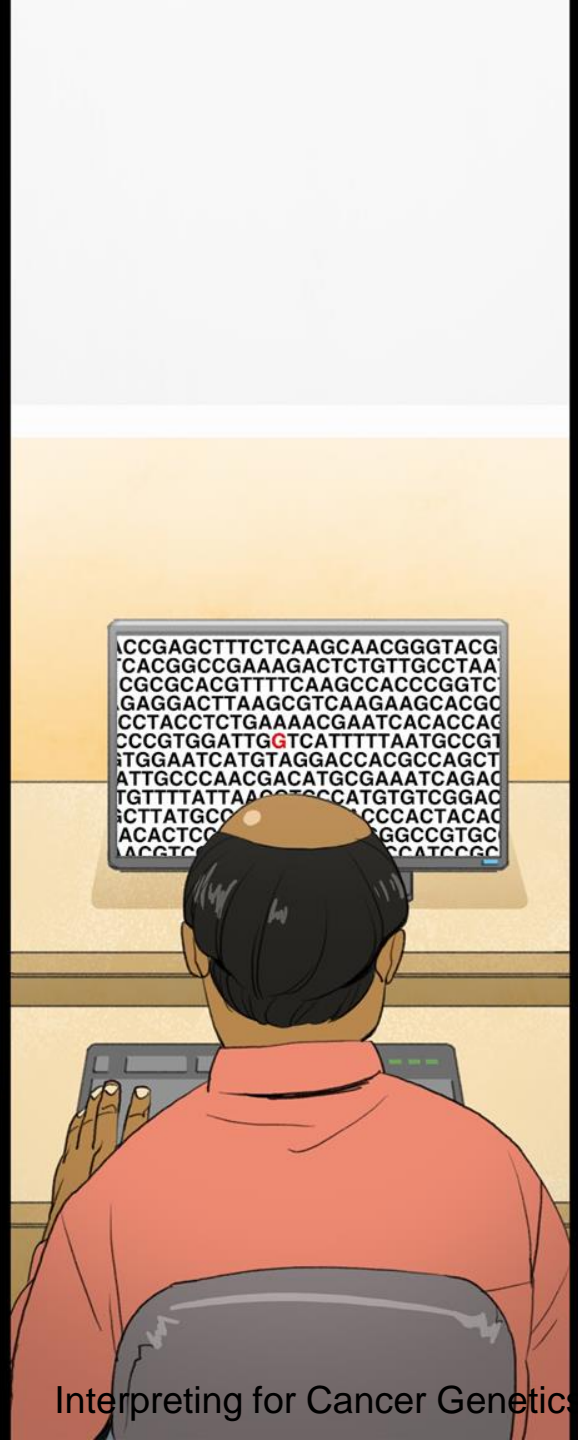
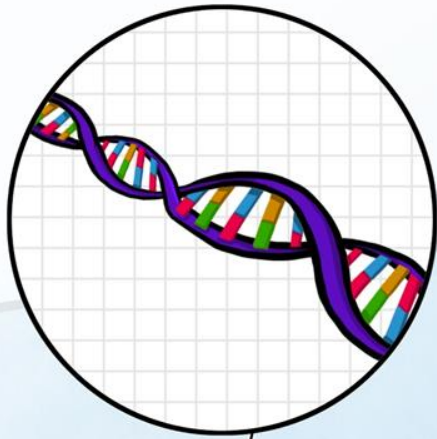
(1) to fail or refuse to hire, or to discharge, any employee, or otherwise to discriminate against any employee with respect to the compensation, terms, conditions, or privileges of employment of the employee, because of genetic information with respect to the employee; or

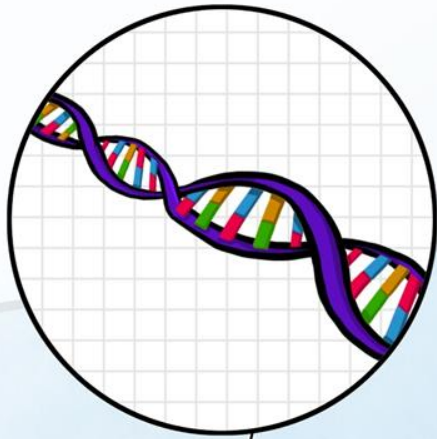
42 USC 2000ff note.











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```



Quiz!

- What could be some of the benefits to genetic testing?
- Why might some people be wary of testing?
- What is GINA?



August 2024

Interpreting for Cancer Genetics



**"Negative"
(Normal)**



**"Negative"
(Normal)**



**"Positive"
(Pathogenic variant)**



"Negative"
(Normal)



August 2024

"VUS"
(Variant of uncertain
significance)



Interpreting for Cancer Genetics

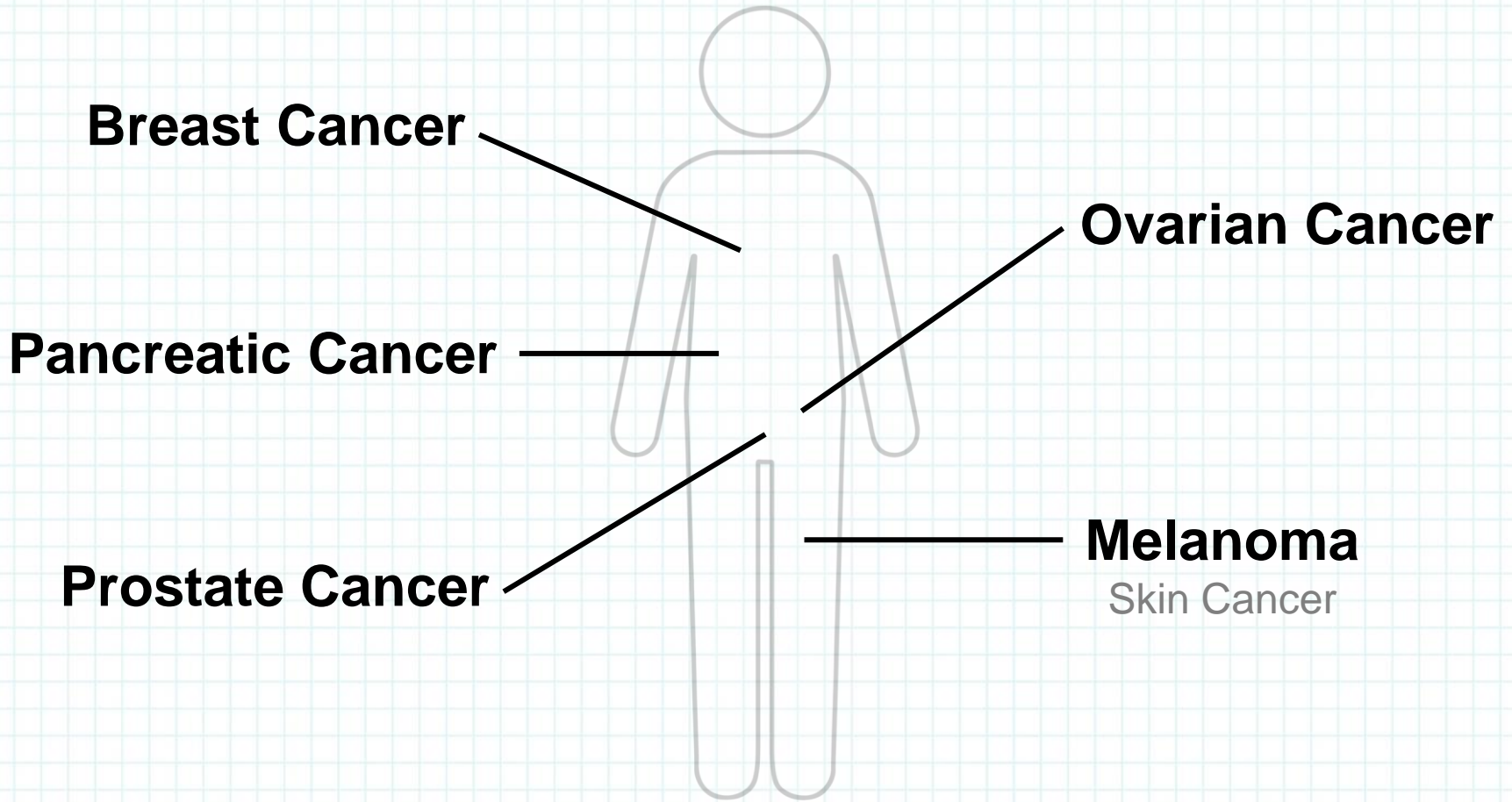
"Positive"
(Deleterious variant)



Test Results: Common Hereditary Cancer Conditions

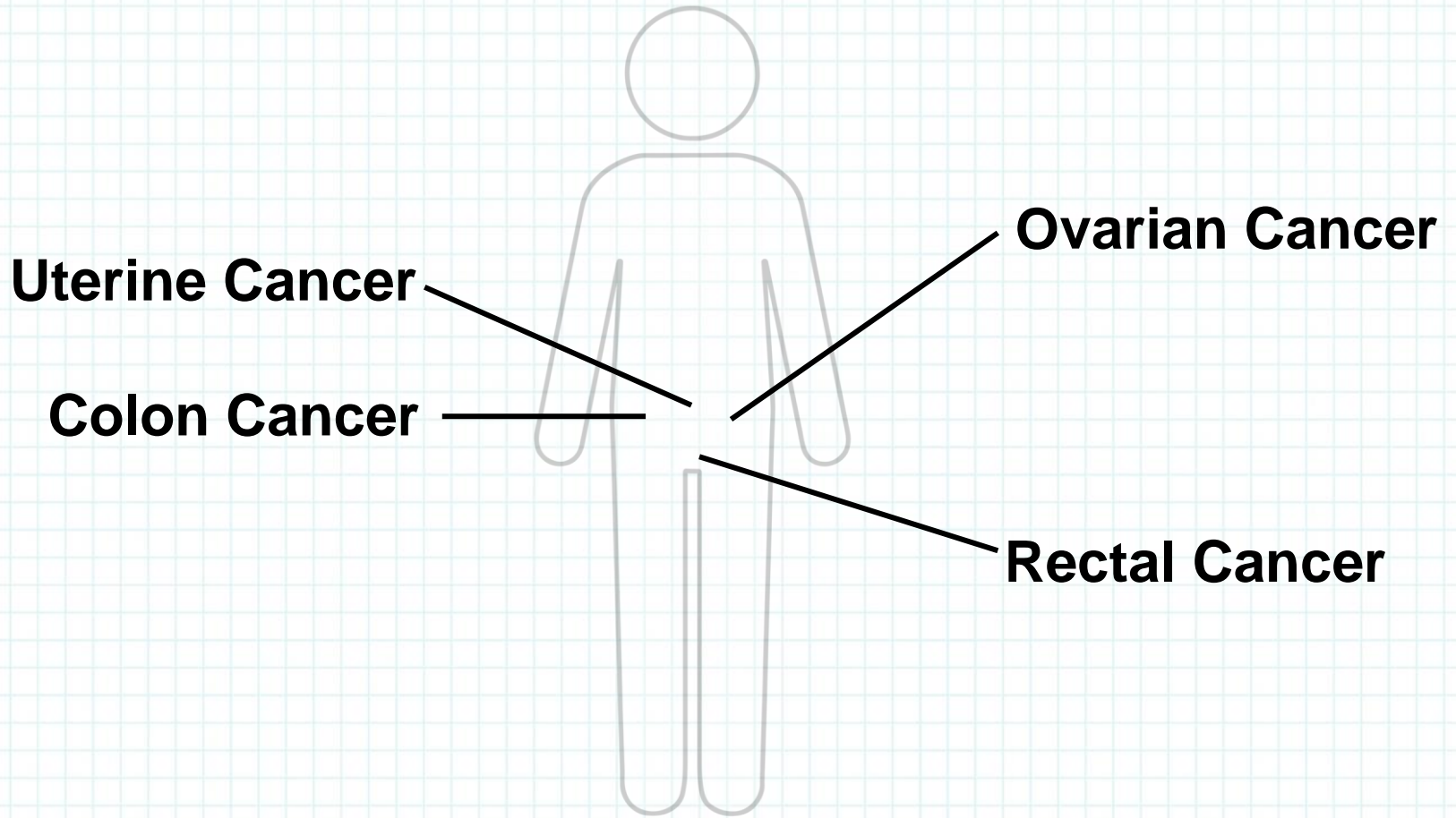
Hereditary Breast and Ovarian Cancer Syndrome

HBOC Syndrome



Test Results: Common Hereditary Cancer Conditions

Lynch Syndrome

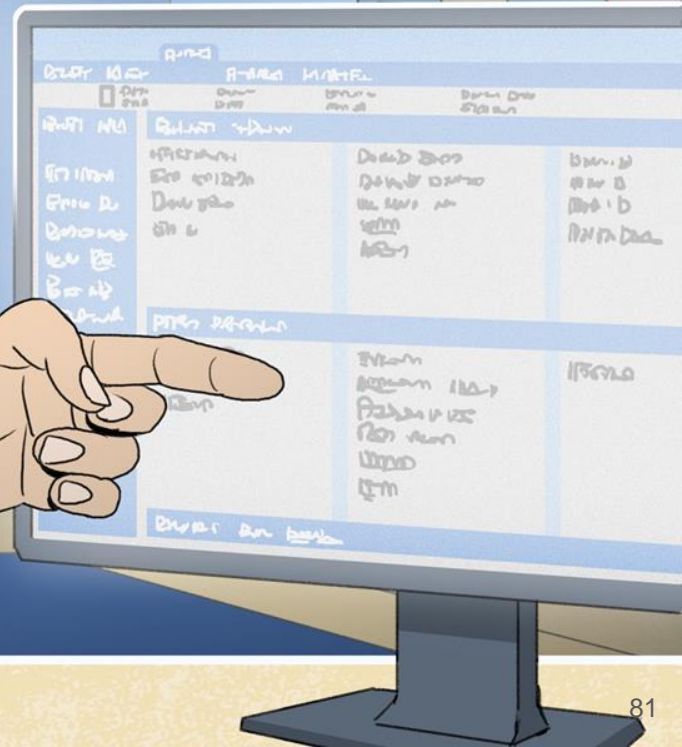


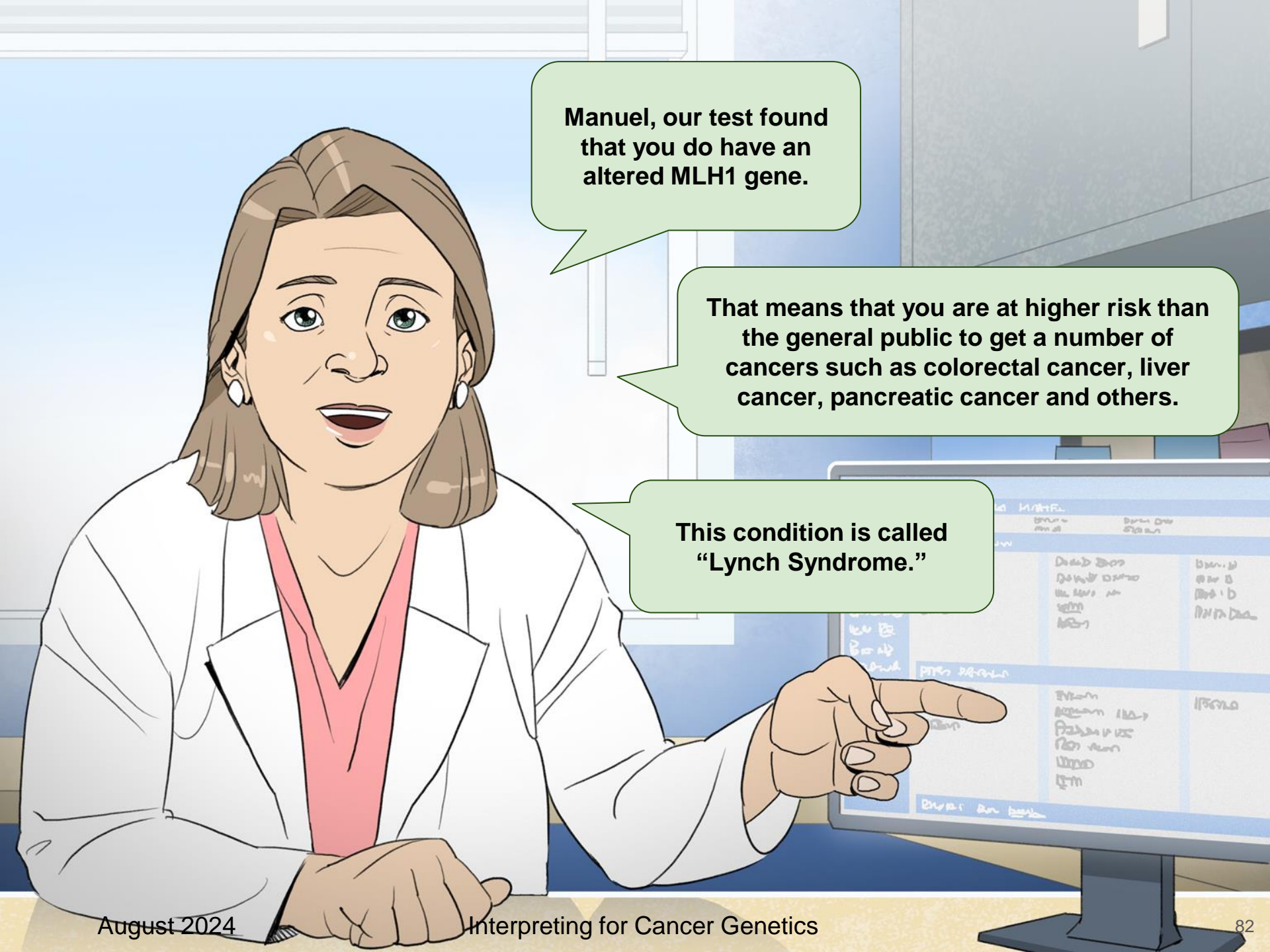
Manuel, our test found that you do have an altered MLH1 gene.



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That means that you are at higher risk than the general population to get a number of cancers such as colorectal cancer, liver cancer, pancreatic cancer and others.





Manuel, our test found that you do have an altered MLH1 gene.

That means that you are at higher risk than the general public to get a number of cancers such as colorectal cancer, liver cancer, pancreatic cancer and others.

This condition is called “Lynch Syndrome.”

So, let's set up an appointment for a colonoscopy for you. It would probably be a good idea to do them more frequently than usual, now that we know you have a high risk of colon cancer.



So, let's set up an appointment for a colonoscopy, which is a procedure that screens for colon cancer. It would probably be a good idea to do them more frequently than usual, now that we know you have a high risk of colon cancer.

We know that removing polyps can help prevent cancer, AND catch it early if it starts.



That makes sense. Let's make that appointment.





Nurses Station

Questions?