CancerGene Connect™ user guide

TABLE OF CONTENTS

GETTING STARTED

This guide explains the steps to collecting, assessing, and managing genetic family histories with CanceGene Connect's end-to-end software platform. You can navigate to and from information contained in this user guide by finding the topic in the table of contents, then clicking it to link directly to that page.

KEY FEATURES

ACCESSIBILITY

This tool is hosted in the Azure cloud—a computing service similar to the Amazon cloud. It is browser-based. The tool can be accessed from a HIPAA-compliant browser (i.e., a recently updated browser) and is mobile-friendly (i.e., it is designed for use on a smartphone or tablet).

EASY-TO-ACCESS SIDEBAR MENU

At any time, you can click the sidebar menu to immediately navigate to any page in the questionnaire.

USER-FRIENDLY RESPONSE FORMATS

Patient responses are collected in easy-to-use response formats. Inputting a response is as simple as clicking "yes" or "no" radio buttons, selecting answers from a drop-down menu, or entering text in a freeform box.

USES BRANCHING LOGIC

A custom path through the questionnaire is created based on your patient's responses. Only those questions that are applicable to your patient will be presented to them.

BUILT-IN DEFINITIONS AND PROMPTS

Throughout the questionnaire, blue information circles contain definitions and prompts for helping your patient to understand the health and medical terminology used in the questionnaire.

BUILT-IN RISK MODELS

The platform has built in a series of risk models that conveniently run with the click of a button. Details are provided on the Risk assessment page.

AUTOSAVE FUNCTIONALITY

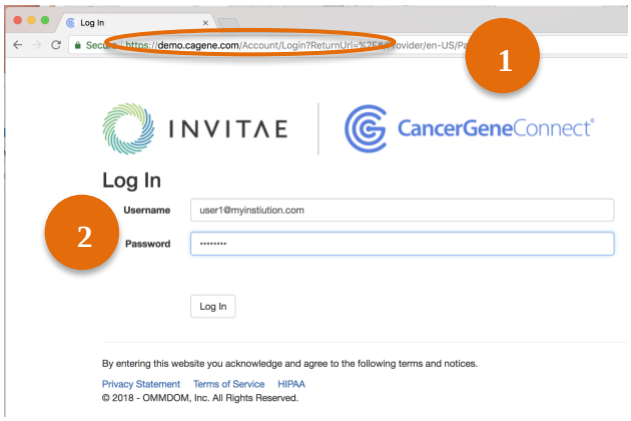
Your patient can log in to and out of the questionnaire as needed until they click **Submit** at the end of the questionnaire. Your patient's progress will be saved every time they click a "next" or "save" button.

PRINTABLE QUESTIONNAIRES

Questionnaires are easy to print.

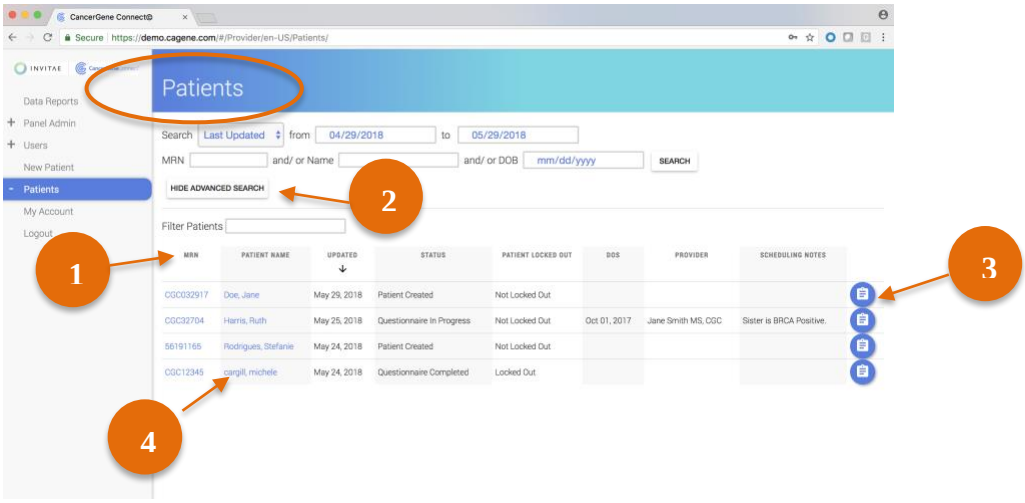
How to log into CancerGene Connect

1. Type your institution's custom CancerGene Connect web address into a HIPAA-compliant browser.
2. Enter in your login credentials (username and password).



How to navigate the patient dashboard

1. When you log in as a provider, you are taken to the landing page of the Patients tab. This landing page provides you with a list of your patients, their MRNs, the dates their profiles were last updated, the status of their questionnaires, their current access to the questionnaire (i.e., whether or not they've been locked out), and the following optional fields: DOS (date of service), provider, and scheduling notes.
2. All patient information is searchable using the advanced search**.** Enter a date range, a partial MRN, a partial name, or a date of birth (DOB), then click **Search**.
3. Click the blue clipboard icon to access the patient view of the questionnaire.
4. Click a patient's name to access the provider view of the questionnaire.



How to use the sidebar menu

Upon logging in, you can access the sidebar menu on the left side of the screen. Provider view sidebars come with seven standard tabs. Show links to all the tab's pages by clicking the plus (+) symbol next to the tab's name. **NOTE:** Full directories of the provider-view and patient-view sidebar menus, as they relate to a selected questionnaire, are given in the appendix. This user guide specifically highlights the CancerGene Connect questionnaire.

Data Reports

This tab provides a comprehensive database of all your CancerGene Connect information. All reports can be downloaded into Excel. In addition to the five standard reports listed below, custom reports are available, by request, through our customer support team.

AllPositivesReport

This is a complete list of all patients who have a positive test result.

GenePositiveReport

Select a gene to return all patients with a positive test result for that selected gene.

SpecificVariantReport

Select a gene to return all variants for that selected gene.

PsychConclusions

The report provides an overview of patient responses to four separate psycho-social assessments. The report produces patient scores and conclusions in addition to basic demographic data.

MegaReport

Set a date range and receive output for all data points within CancerGene Connect.

Panel Admin

In this tab, you can build the custom genetic testing panels that are used by the "genetic testing tracking" feature on the Family page.

Users

Add, edit, and assign permission privileges using this tab. You can also view and track a history of CancerGene Connect site users. This tab is only available to providers for whom the “administrator” role has been enabled.

New Patient

Use this tab to create a new patient in the system.

Patients

This tab includes the patient dashboard landing page: Providers are automatically taken to this page upon logging in to the system. The Patient tab contains a number of pages that are specific

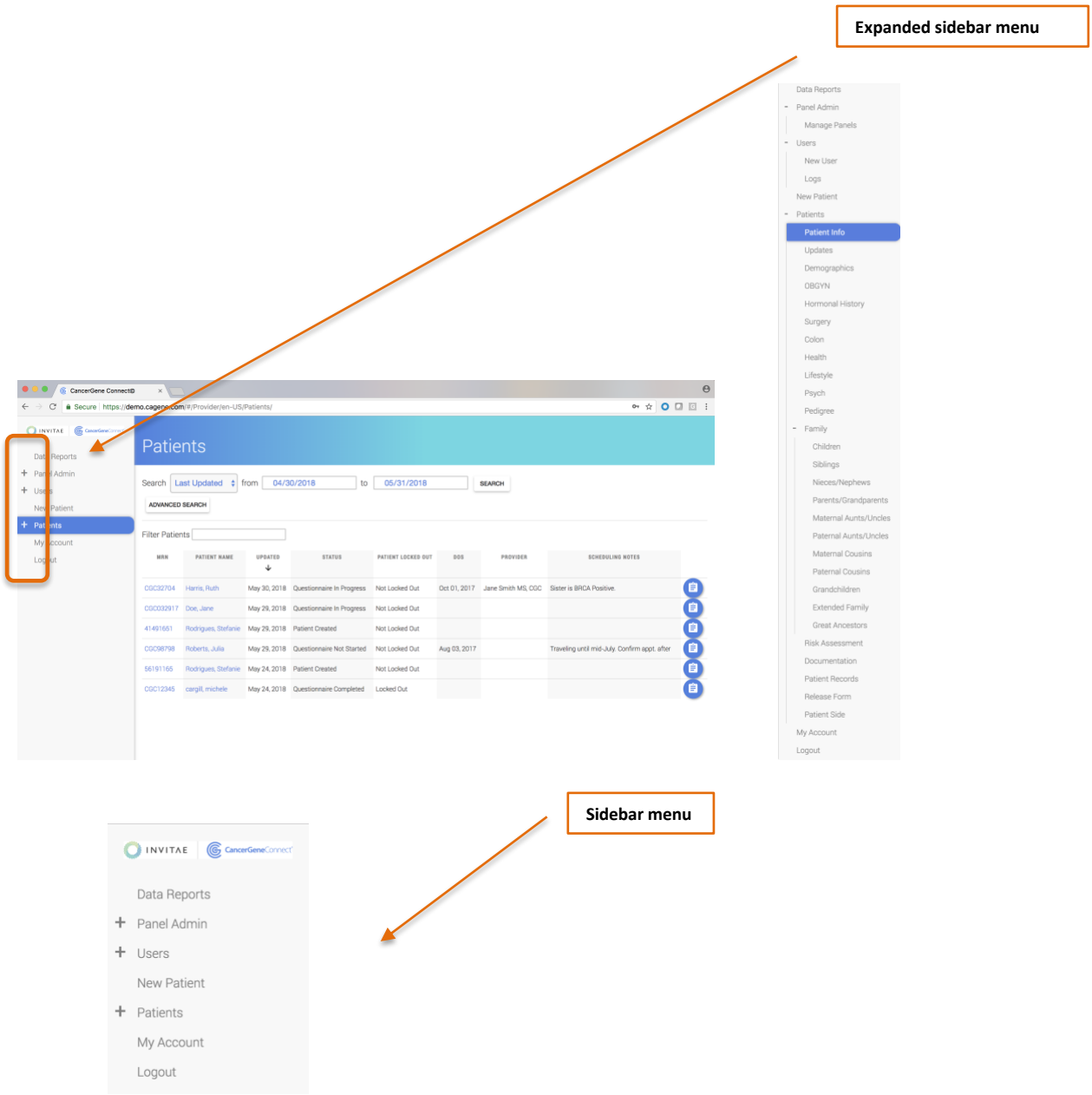
to the questionnaire selection which includes the ability for a provider to toggle between patient and provider views via the **Patient Side** subtab.

My Account

In this tab, you can change your password or view this user guide.

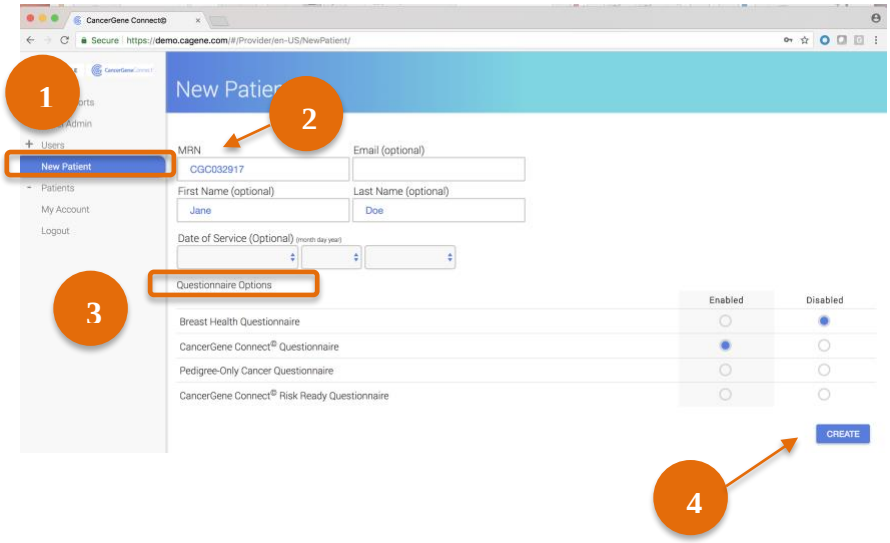
Logout

Use this tab to log out of the CancerGene Connect platform.



HOW TO CREATE A NEW PATIENT IN THE SYSTEM

1. Click the **New Patient** tab in the sidebar menu.
2. Enter a medical record number (MRN) or a patient identifier.
    - An MRN is required to move forward. It can be temporary.
    - The email, name, and date of service fields are optional.
3. Under **Questionnaire Options**, use the radio buttons to select the questionnaire(s) you wish to enable.
4. Click **Create**. The system will generate a username and password.



HOW TO PROVIDE THE PATIENT WITH LOGIN CREDENTIALS

In the previous step, the system generated a unique username and password for the patient. These are the patient's login credentials. The patient will be able to access the questionnaire by visiting the institution's CancerGene Connect web address and signing in with the login credentials. You can get the login credentials to the patient using any of the three methods below.

1. **If you entered a valid email address:** If, in the previous step, you entered a valid patient email address, and *if the email feature has been activated in CancerGene Connect through customer support*, you can email the credentials directly to the patient by clicking **Generate and email**. The patient will receive a personalized email from the CancerGene Connect platform with unique login credentials and a link to the questionnaire. **NOTE:** The provider who is logged in to the system when the email is sent will show up as the email's sender.

   Once the email is sent, the patient's status will change to "Login provided" on the **Patients** tab. Once the patient changes the temporary password, the status will update to "Questionnaire in progress."

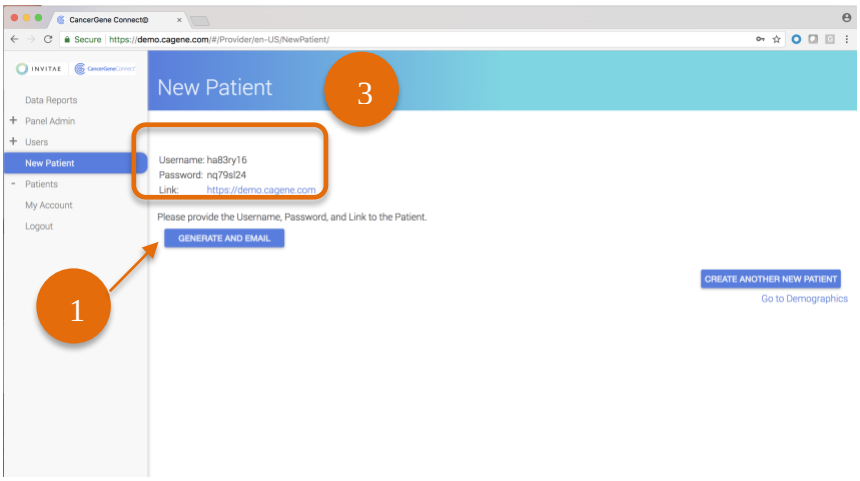
2. If an invalid email or no email is entered after clicking the **Create** button you will be taken to the screen with the Username, Password, and Link as usual. You will then see a greyed out "Generate and Email" button with a warning message regarding the invalid email.
   - You can alternatively copy and paste this information into an email you generate via your institutions webmail service.
   - You can distribute via a phone call.
   - You can navigate to the Patient Info tab and update the email field with a valid email address. Then send the credentials by clicking **Generate and email**.

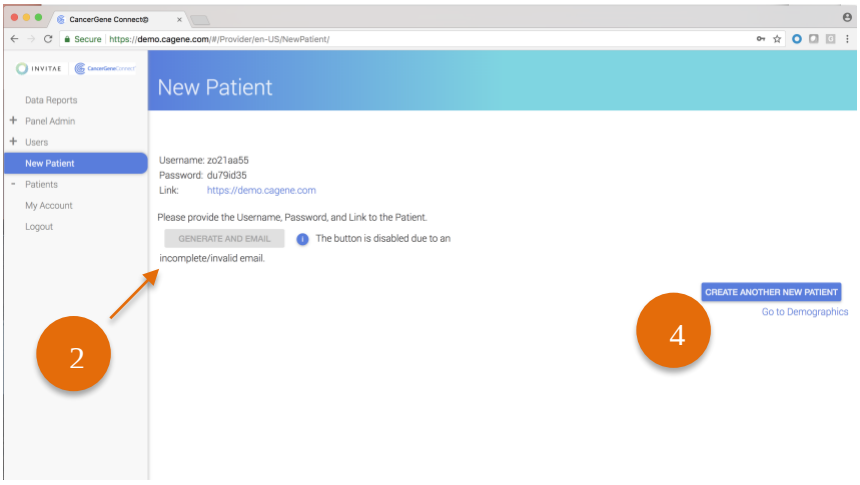
   Once the email is sent, the patient's status will change to "Login provided" on the **Patients** tab. Once the patient changes the temporary password, the status will update to "Questionnaire in progress."

3. **If there is no email address:** Make note of the username, password, and link URL, and distribute it in a phone call to the patient.

As a HIPAA compliance measure, upon receipt of their login credentials, patients must reset their password to complete their questionnaires.

Once you have disseminated a new patient's login credentials, you can create another patient by selecting **Create another new patient**, or you can begin entering your patient's demographic information in the Demographics page by clicking **Go to Demographics**.





QUESTIONNAIRE SELECTION

CancerGene Connect includes four standard questionnaires, described below. See the appendix for a complete list of the pages and sections included in each questionnaire, for each view (patient [table 1] and provider [table 2]). NOTE: Because it contains nearly all available pages and sections (including those found in the other three questionnaires), the CancerGene Connect questionnaire is highlighted in this user guide and is depicted in the instructional images.

BREAST HEALTH QUESTIONNAIRE

This questionnaire is very specific to breast health management and is used primarily by breast surgeons and professionals working within the breast specialty. The Breast Health questionnaire includes specific questions about breast disease and breast management.

CANCERGENE CONNECT QUESTIONNAIRE

This is an exhaustive genetic counseling questionnaire that includes detailed questions about personal, health, and family history. It includes questions on colon disease and management. The

family history is used to generate a pedigree, and related information from the questionnaire feeds into the built-in risk models.

Pedigree-Only Cancer Questionnaire

This questionnaire generates a pedigree using in-depth family history questions in addition to a few demographic questions.

CancerGene Connect Risk Ready Questionnaire

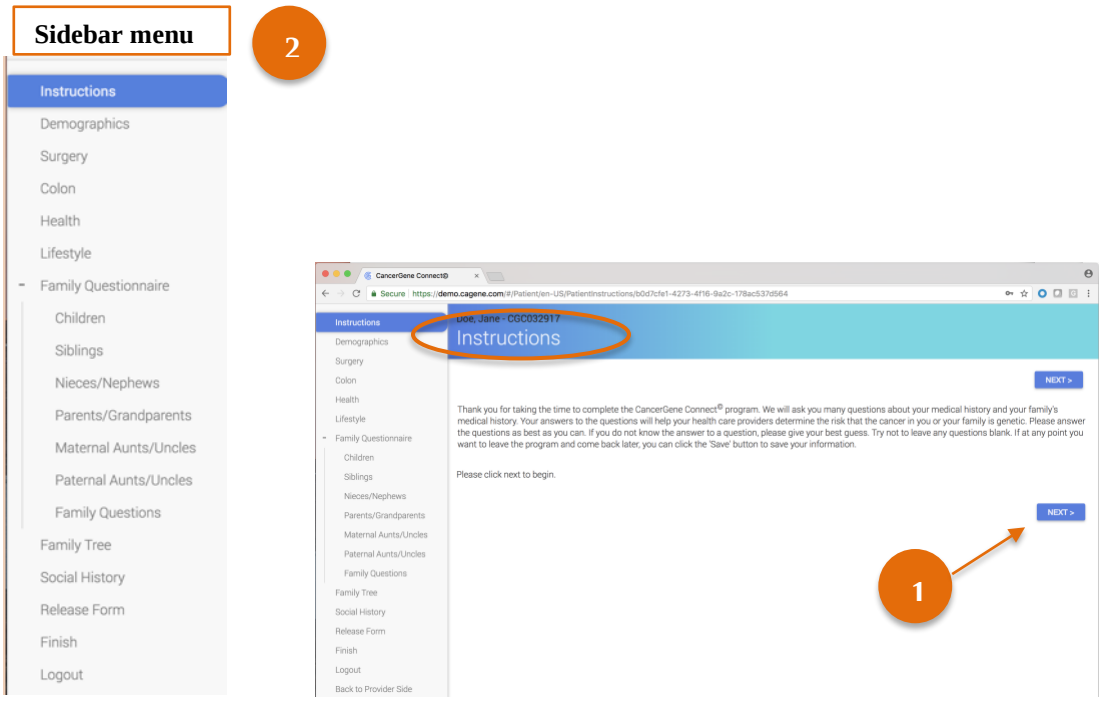
This questionnaire includes specific questions whose answers are necessary for the risk models that run in the background.

Patient view of the (CancerGene Connect) questionnaire

Instructions page

Upon logging in with their self-created password, patients are taken to the Instructions page. This landing page provides information on the types of questions that will be asked and how to complete the questionnaire. It also explains that patients can log in and out as needed and that their progress is saved every time they click a "next" or "save" button.

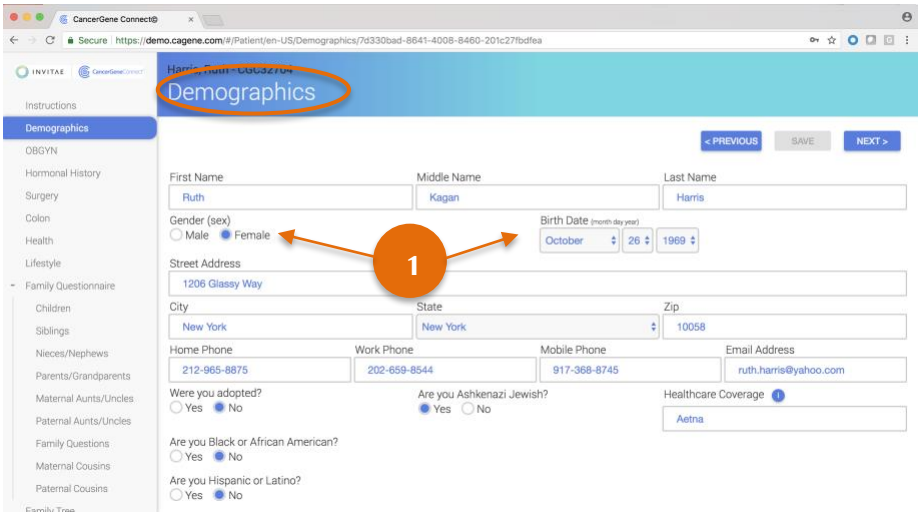
1. Click **Next** to begin filling out the questionnaire.
2. Directly access any page in the questionnaire by using the **sidebar menu**. Click the name of the desired page to navigate to it.



Demographics page

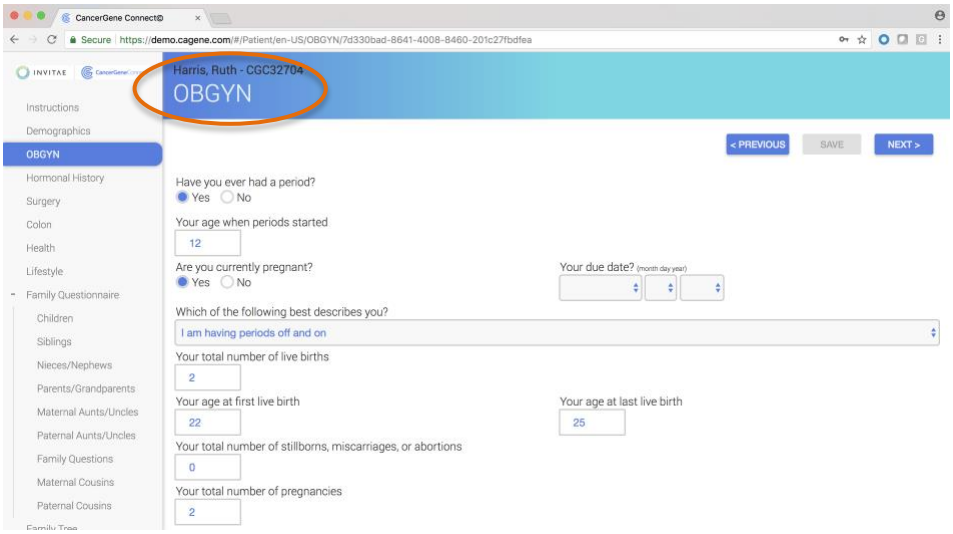
The Demographics page includes questions related to a variety of demographic characteristics.

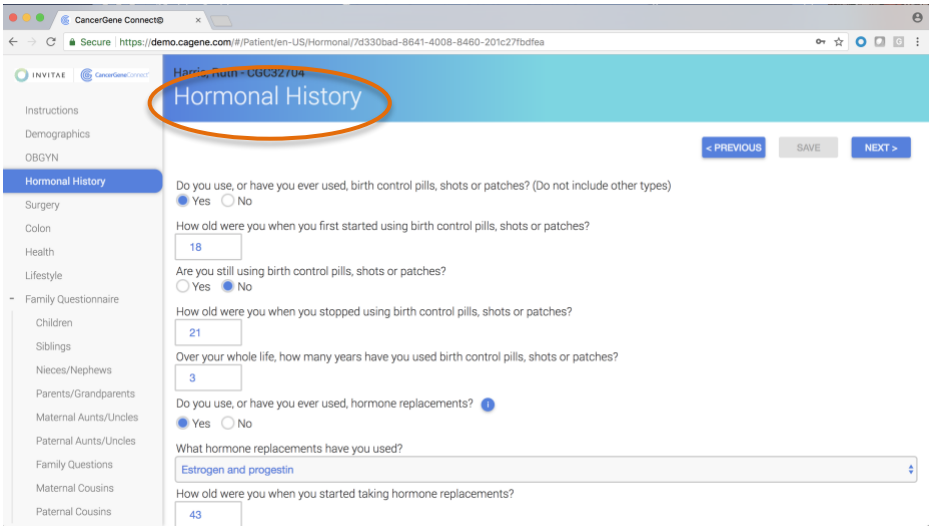
NOTE: To accurately run the risk models, some questions are required; patients will not be able to proceed until these questions are answered. On the Demographics page, questions that require answers include the Gender and Birth Date fields.



OBGYN and Hormonal History pages

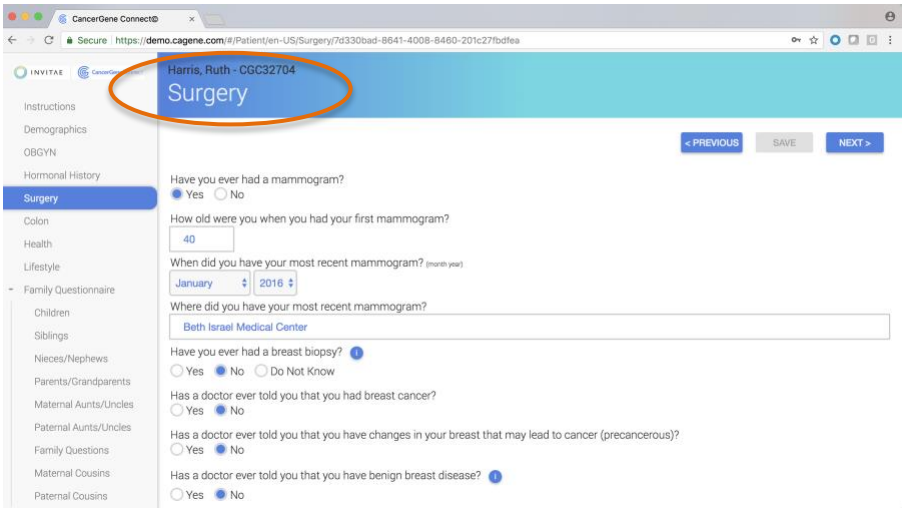
The OBGYN and Hormonal History pages include questions on female reproductive health.
NOTE: These pages only populate for female patients, and only those questions that are material to the patient are included.





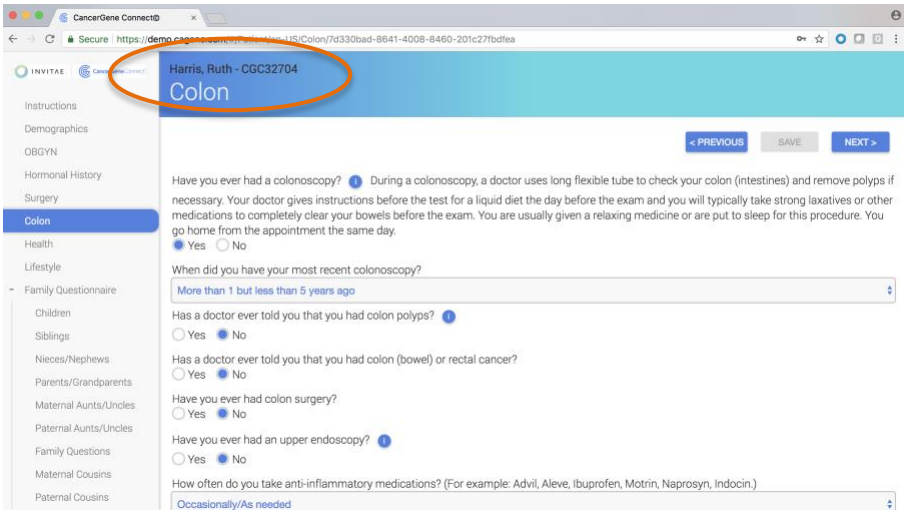
SURGERY PAGE

The Surgery page includes questions on breast- and reproductive organ-related surgeries and screenings.



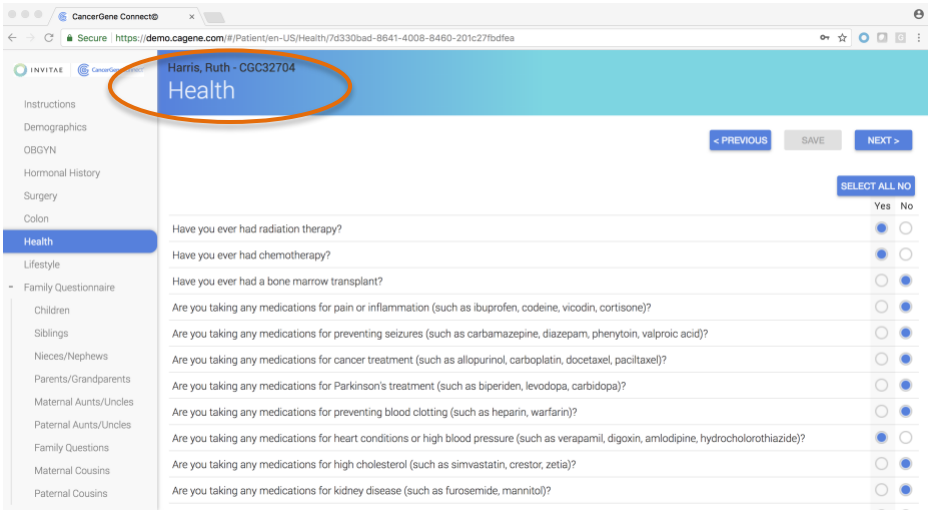
COLON PAGE

The Colon page includes questions on colon-related procedures and disease management.



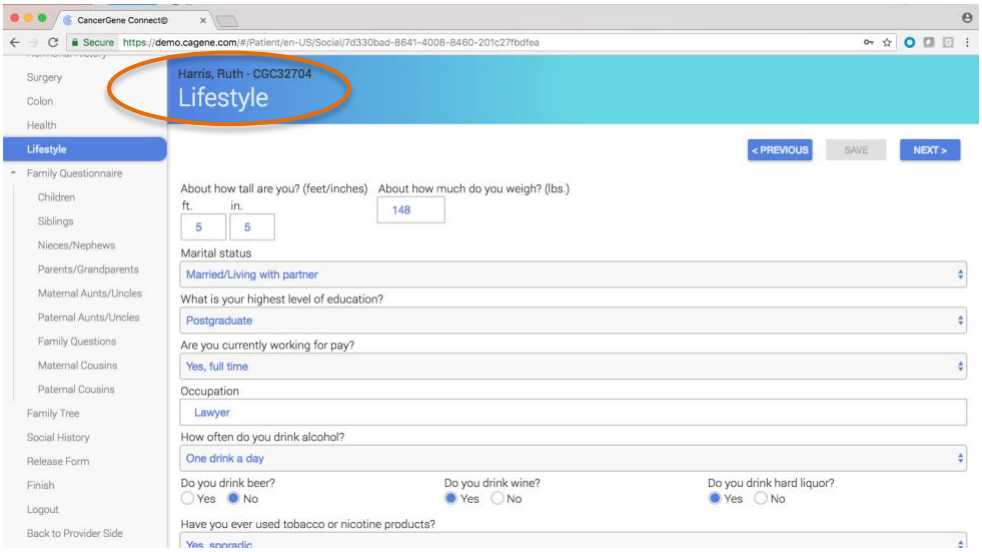
HEALTH PAGE

The Health page includes questions on disease-management therapies, medication management, and supplement management. Because the information collected on this page is not material to the risk models, inclusion of the Health page is optional.



Lifestyle page

The Lifestyle page gathers information on risk factors such as alcohol and tobacco use, caffeine consumption, and exercise. The height and weight entries generate the body mass index (BMI), which is available for viewing in the provider view. For risk modeling purposes, answers to the height and weight questions are required.



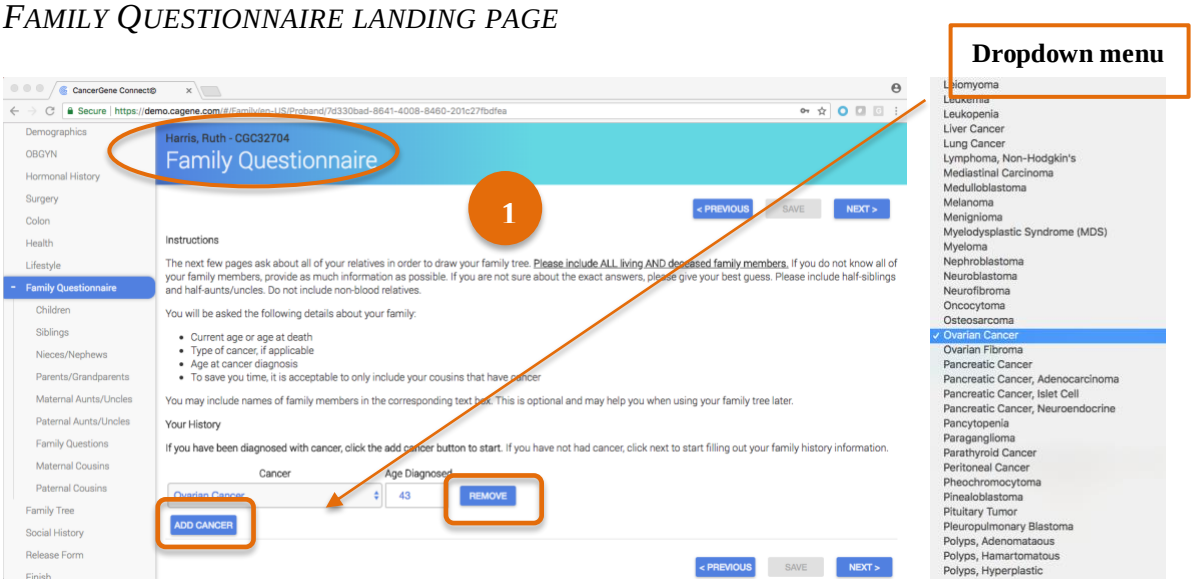
Family Questionnaire

This section includes questions about the cancer histories of your patient and your patient's family. Answers to the questions in this section generate the pedigree. ***These pages cannot be altered.***

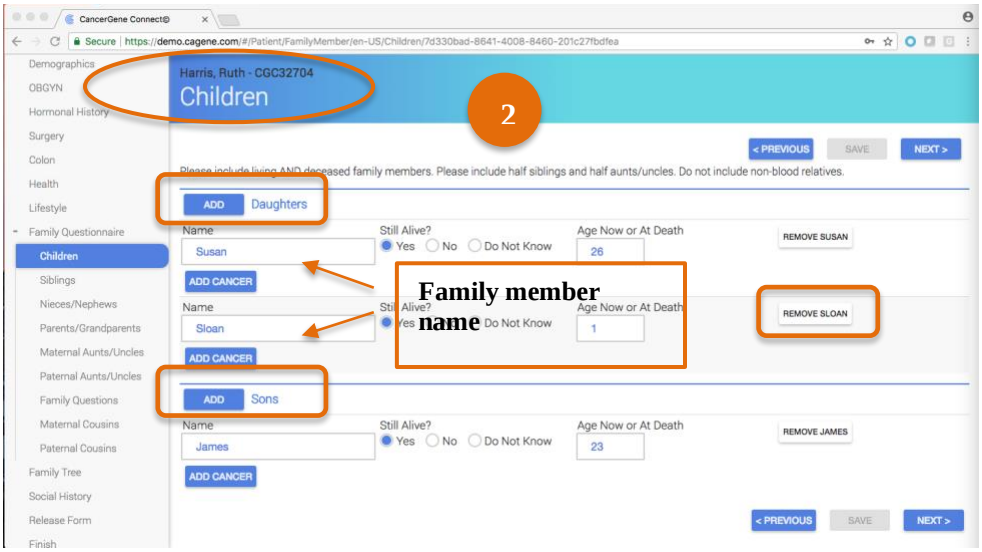
1. Your patient enters their own cancer history and age at diagnosis.
    - Click the **Add cancer** button to list a cancer. Select the type of cancer from the dropdown menu; if the applicable cancer is not listed, choose "Other" and type in the information. Patients who have never been diagnosed with cancer do not need to click the **Add cancer** button; alternatively, they may choose "No Cancer" from the dropdown menu.
    - To delete a line entry, click the **Remove** button.

2. Your patient enters the cancer histories and ages at diagnoses of all living and deceased family members, including half-siblings, half-aunts, and half-uncles, but excluding non-blood relatives.
    - Click the **Add** button to add a family member.
    - Enter the family member's name. This will be helpful to the patient for keeping track of family members while filling out the family questionnaire. From a provider viewpoint, being able to refer to the patient's family members by their names helps you to create a personal connection with your patient. ***If names are not entered, the platform defaults to a naming convention that indicates the type(s) and number of relatives entered (e.g., Daughter 1, Son 2, Brother 3).***
    - To delete a line entry, click the **Remove [name]** button.

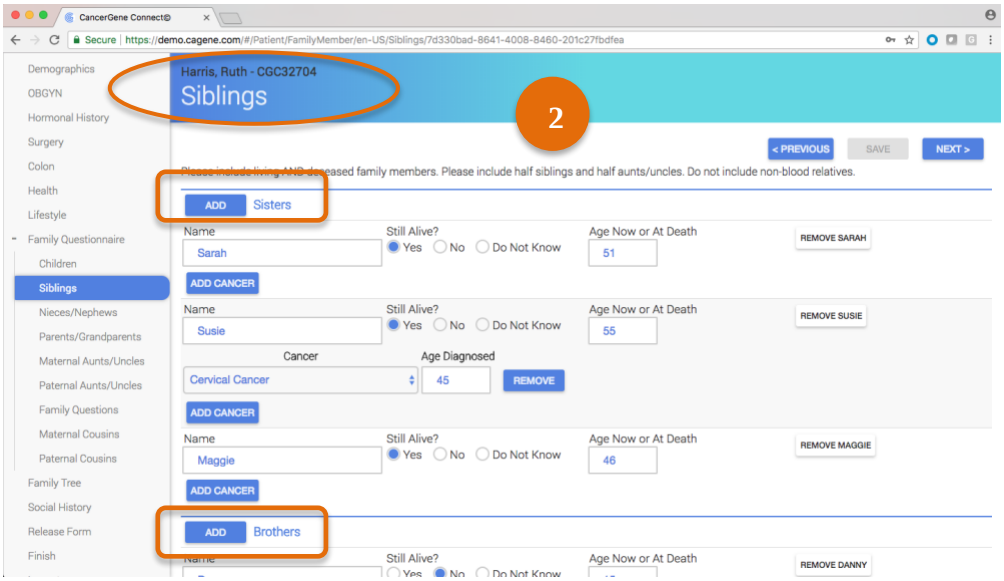
Family Questionnaire landing page



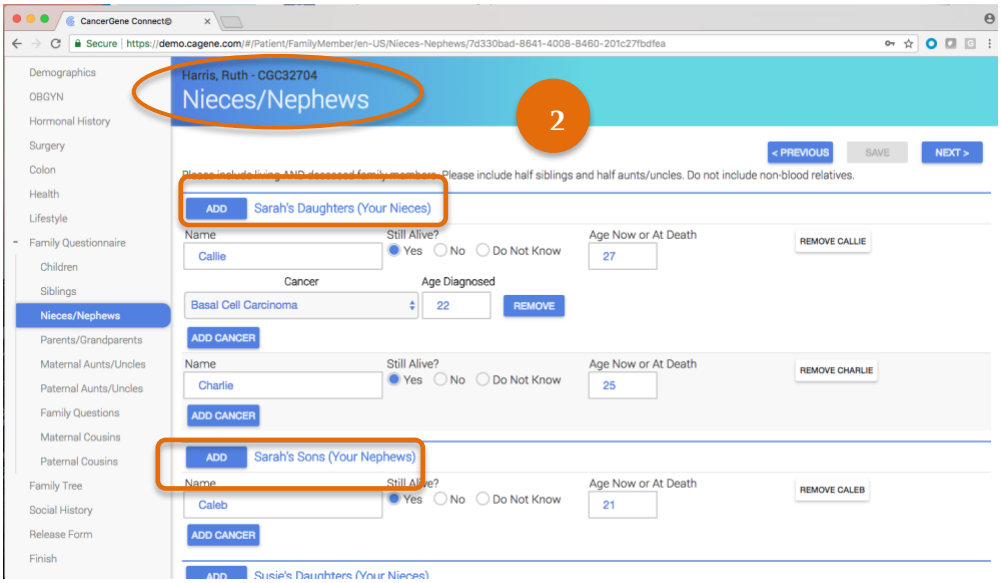
Children page



SIBLINGS PAGE



NIECES/NEPHEWS PAGE



PARENTS/GRANDPARENTS PAGE

CancerGene Connect©

Secure | https://demo.cagene.com/#/Patient/FamilyMember/en-US/Parents-Grandparents/7d330bad-8641-4008-8460-201c27fbdfea

INVITAE CancerGeneConnect

Instructions
Demographics
OBGYN
Hormonal History
Surgery
Colon
Health
Lifestyle
Family Questionnaire
Children
Siblings
Nieces/Nephews
Parents/Grandparents
Maternal Aunts/Uncles
Paternal Aunts/Uncles
Family Questions
Maternal Cousins
Paternal Cousins
Family Tree
Social History
Release Form
Finish
Logout
Back to Provider Side

Harris, Ruth - CGC32704

Parents/Grandparents

2

< PREVIOUS | SAVE | NEXT >

Please include living AND deceased family members. Please include half siblings and half aunts/uncles. Do not include non-blood relatives.

Your Mother

Name: Mom
Still Alive? Yes / No / Do Not Know
Age Now or At Death: 72
Both ovaries removed? Yes / No / Do Not Know

Cancer	Age Diagnosed	
Breast Cancer	58	REMOVE
Pancreatic Cancer	72	REMOVE

ADD CANCER

Your Father

Name: Dad
Still Alive? Yes / No / Do Not Know
Age Now or At Death: 78

ADD CANCER

Your Mother's Mother (Maternal Grandmother)

Name: MGMother
Still Alive? Yes / No / Do Not Know
Age Now or At Death: 79

Cancer	Age Diagnosed	
Polyps, Unknown	60	REMOVE

ADD CANCER

Your Mother's Father (Maternal Grandfather)

Name: MGFather
Still Alive? Yes / No / Do Not Know
Age Now or At Death: 80

ADD CANCER

Your Father's Mother (Paternal Grandmother)

Name: PGMother
Still Alive? Yes / No / Do Not Know
Age Now or At Death: 62

Cancer	Age Diagnosed	
Breast Cancer	61	REMOVE

ADD CANCER

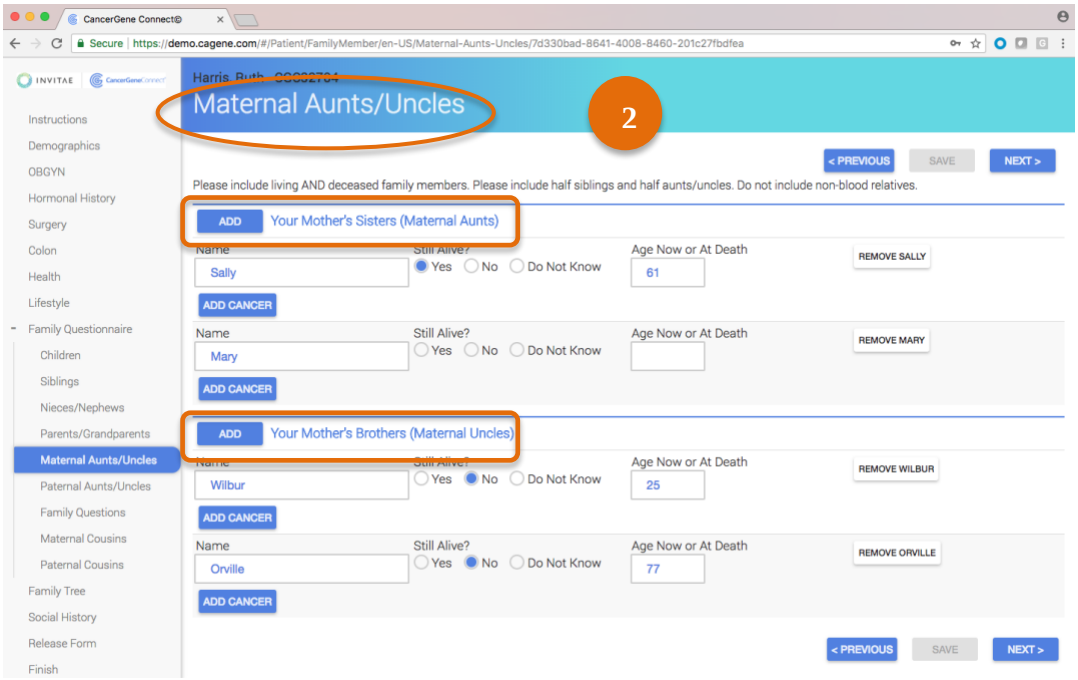
Your Father's Father (Paternal Grandfather)

Name: PGFather
Still Alive? Yes / No / Do Not Know
Age Now or At Death: 65

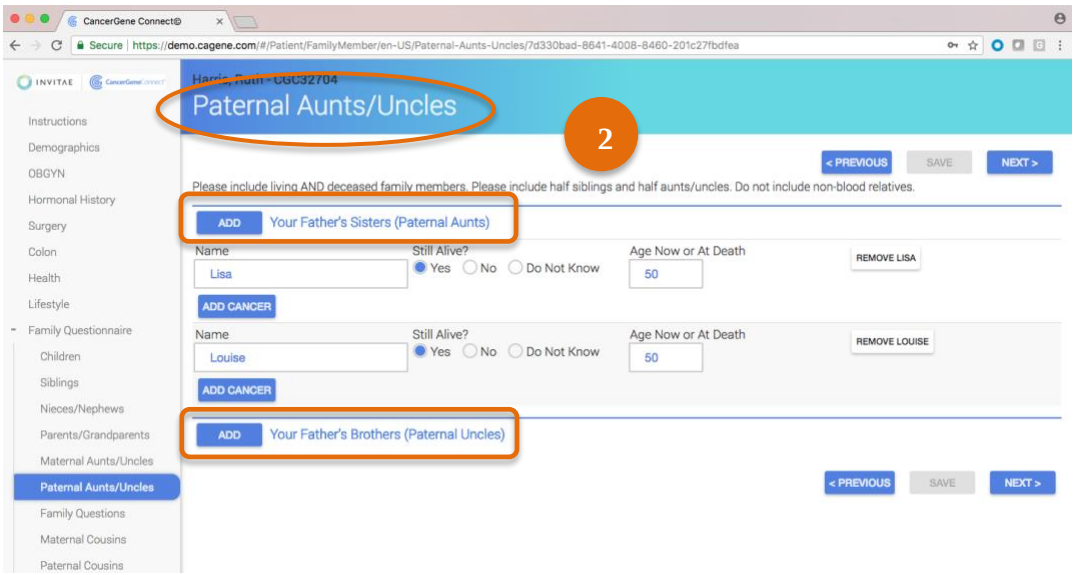
Cancer	Age Diagnosed	
Lung Cancer	65	REMOVE

ADD CANCER

Maternal Aunts/Uncles page



Paternal Aunts/Uncles Page



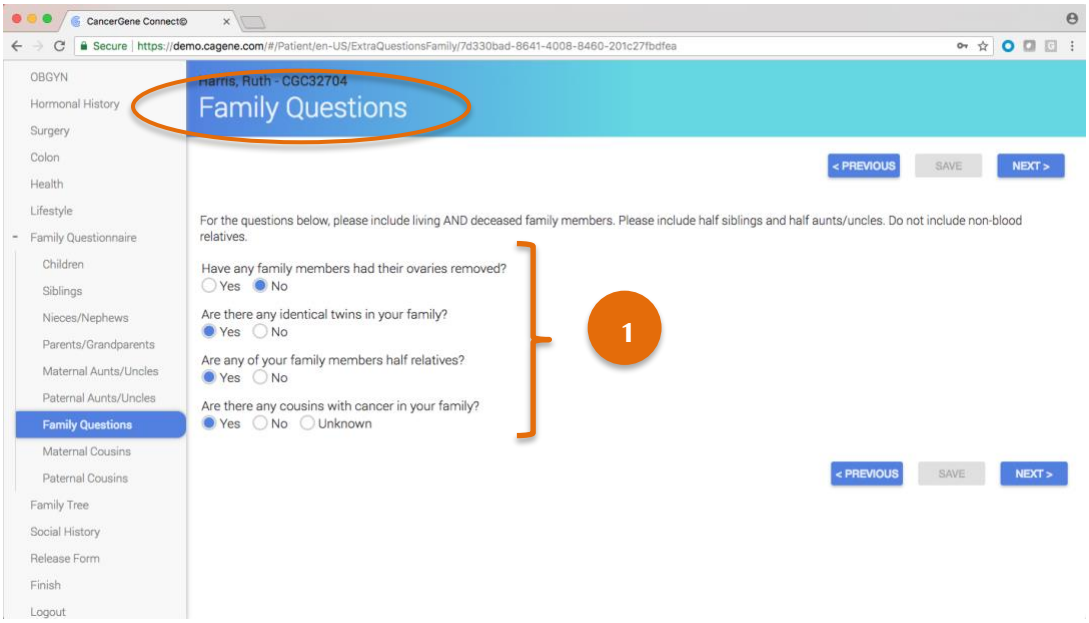
NOTE: In the provider view, on the pedigree page, you will have the option to add in great grand relatives (e.g., great grandparents, great aunts, great uncles, grandchildren, grand nieces, grand nephews). You can also add and note extended family members (i.e., those family members with an unknown relationship to the patient). They will appear at the bottom of the pedigree.

Family Questions Page

After the patient completes their family histories, they will proceed to the Family Questions page. This page includes several yes/no questions on topics on which patients have historically provided inaccurate information. The answers to these questions will help provide accurate family and risk-assessment information.

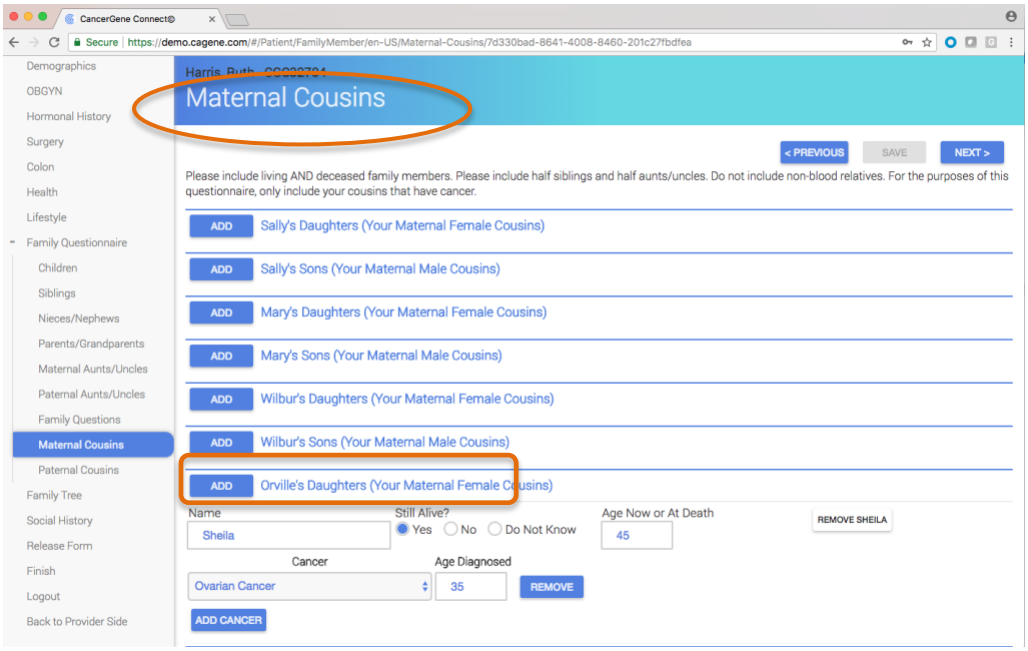
1. This page includes questions on whether or not any family members have had their ovaries removed, there are any identical twins or half relatives in the family, or there are any affected cousins. If there are affected cousins, the maternal cousins and paternal cousins pages will populate and the patient can add information on any cousins with cancer.

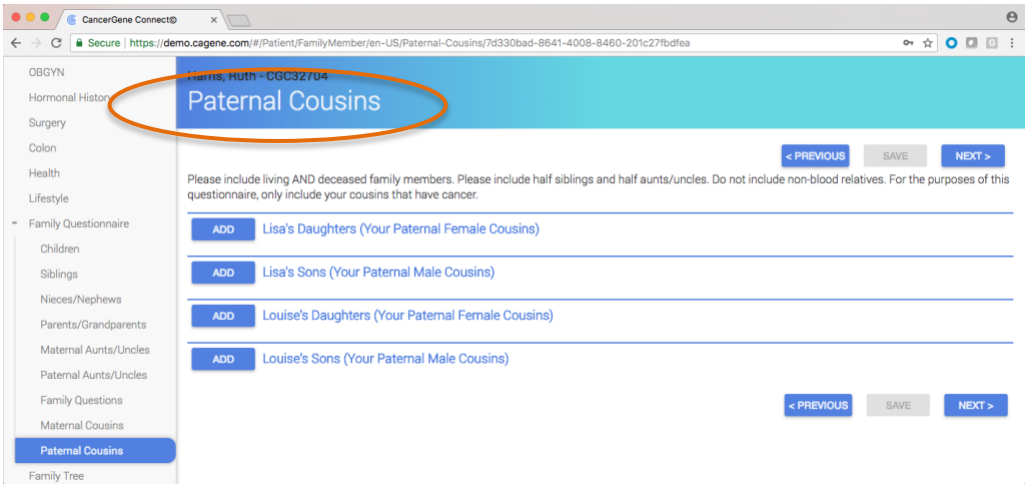
2. If a patient answers "yes" to any of the questions on the Family Questions page, there will be a visual cue in the Family page on the provider side that reminds you to follow up with the patient and to enter in the details.



Maternal Cousins and Paternal Cousins pages

If, on the Family Questions page, a patient indicates that there are any affected cousins, the Maternal Cousins and Paternal Cousins pages will populate so that the patient can add in any cousins with cancer. NOTE: If it's desired to flesh out the family pedigree, patients and providers can add in any non-affected cousins.

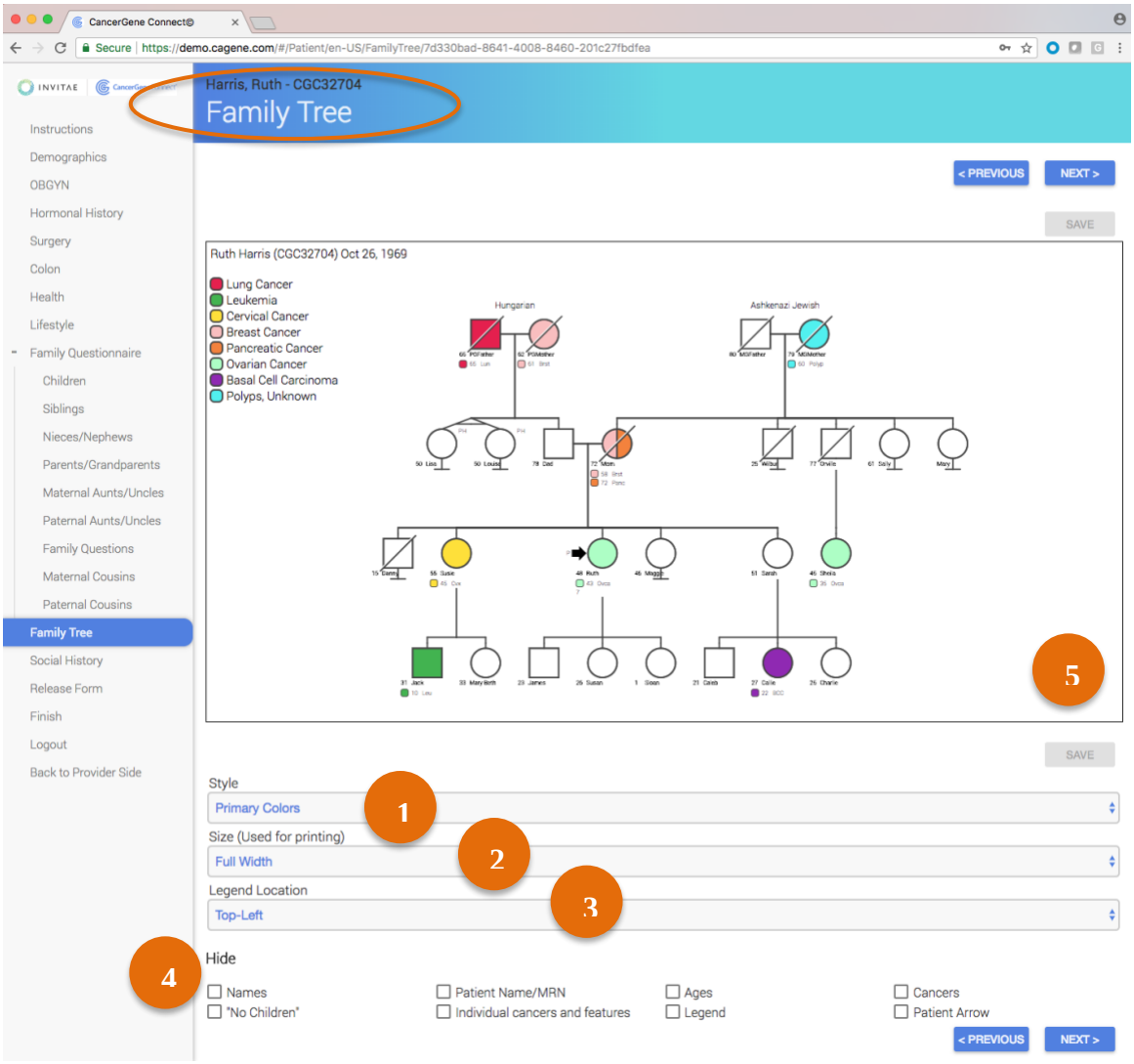




Family Tree page

The Family Tree page ("Pedigree" in the provider view) is generated from the patient's answers to the family questionnaire. Patients can see their pedigrees and may access some of the Pedigree page's tools and features.

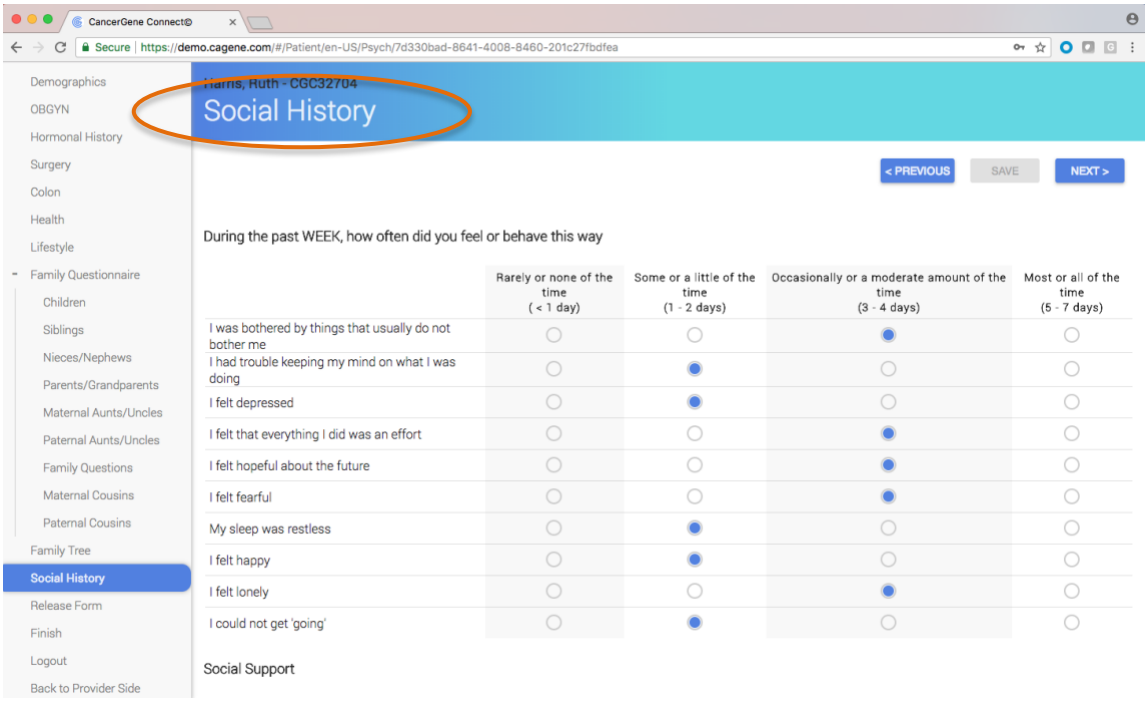
1. **Style** – Use the dropdown to toggle between *Primary Colors***,** *Black***,** and *White***.**
2. **Size** – Set the margins for printing the family tree. Choose *Full Width* or *Landscape*. You can also select *Internet Explorer (IE) Copy/Paste* to ensure that the pedigree prints properly when using IE**.**
3. **Legend Location** – Use the dropdown menu to select the position of the legend.
4. **Hide** – Tick the boxes to exclude information from the family tree display.
5. The pedigree has both slide and zoom settings that are compatible with macOS and Windows applications.



Social History page

The Social History page includes four informal psycho-social assessments. Questions gauge the patient's depression (CES-D), social support (ISEL), personal and family cancer history impact (IES-R), and cancer worries. See the appendix for details on how these assessments are scored and conclusions are drawn.

Because the information collected here is not material to the risk models, inclusion of the Social History page is optional. When this page is included in the patient's questionnaire, patient scores and conclusions are highlighted on the Psych page of the provider view.

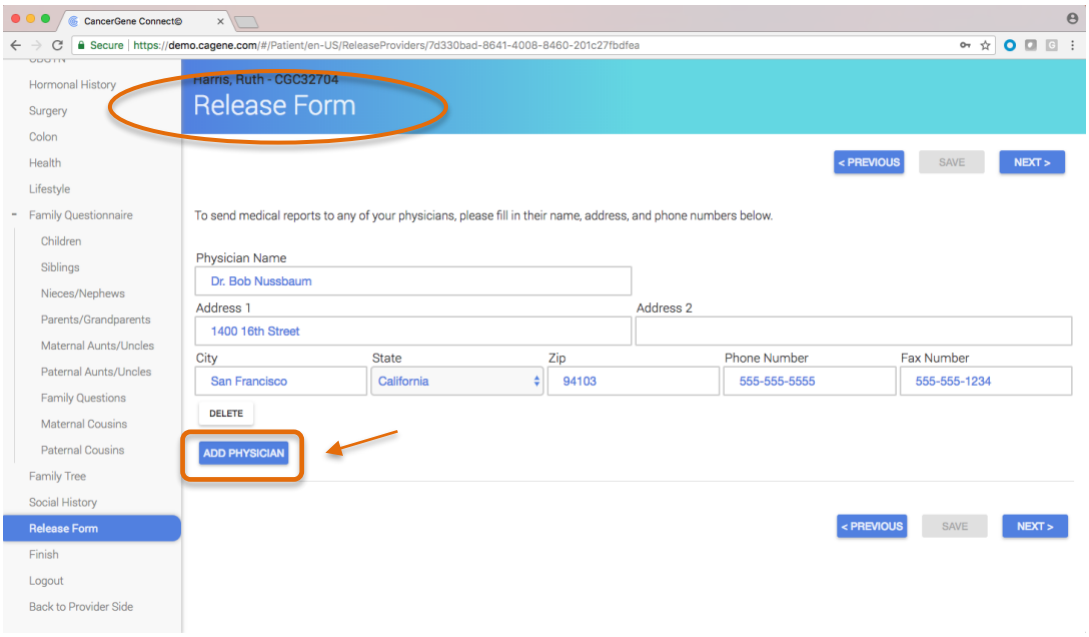


Release Form page

The Release Form page enables the patient to provide questionnaire-based medical reports and consultation letters to a member of their medical care team (e.g., their physician). The patient clicks **Add physician** and is prompted to include the care team member's name, address, and phone number. There is no limit on the number of physicians that can be added. If physicians are included, their names will carbon copy on any documentation generated on the provider side; they will also be visible on the Release Form page of the provider view.

Because the information collected here is not material to the risk models, inclusion of the Release Form page is optional.

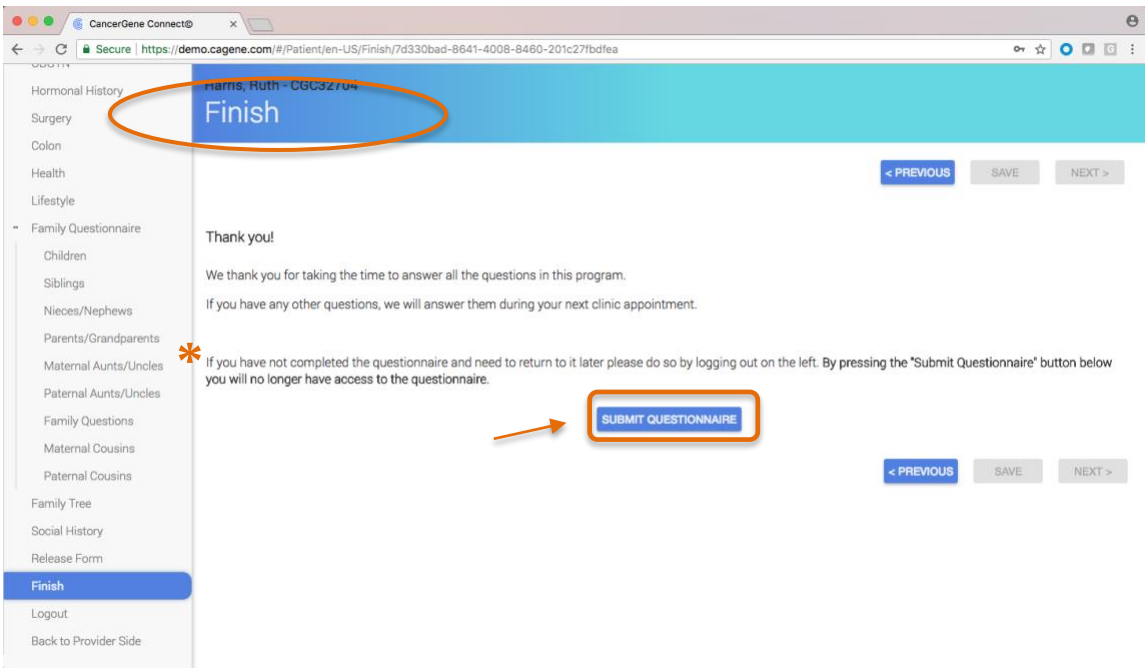
NOTE: This page does not auto-release any information.



FINISH PAGE

The Finish page is the last page of the patient questionnaire. On this page, the patient submits the questionnaire using the **Submit questionnaire** button. Once the questionnaire is submitted, the patient is locked out and will be unable to make any edits. Upon submission, the provider can review the patient's questionnaire.

There may be some instances in which the patient accidentally locks themselves out of the questionnaire or the provider wishes to turn their access on and off. Refer to the provider view section of this user guide for instructions on granting and revoking patient access to the questionnaire.



PROVIDER VIEW OF THE QUESTIONNAIRE

This section describes the platform's **provider view**. Please refer to the beginning of this user guide for information about logging in, creating a new patient, questionnaire selection, patient dashboard, and sidebar menu navigation.

NOTE: Full directories of the sidebar menu as it relates to a selected questionnaire are given in the appendix. This user guide specifically highlights the CancerGene Connect questionnaire.

IMPORTANT PROVIDER NOTES

- In the provider view, all the information seen on the **Demographics page** through the **Health page** is a mirror image of the patient view and reflects the answers that the patient has provided. For more information on these pages, refer to the patient view section of this user guide.
- Use the sidebar menu to switch between patient view and provider views.
- If a mistake has been made or a patient has updated information to add after submitting their questionnaire, a provider can update, edit, and re-save a patient's questionnaire in either the patient view or the provider view.

PATIENT INFO PAGE

Patient Info is an administrative page on which the provider can view, add, and edit information about their patient or their patient's appointment. Information available on this page includes date of service, patient email address, the status of the questionnaire, a list of additional providers who may be working on the case, and scheduling notes. The provider can also use this page to enable and disable questionnaire options, add the patient type (new or follow-up), note whether or not the provider has entered data or if the patient was seen under a research setting, and update or change the patient's MRN. This page also covers three additional important provider functions:

1. **Patient access** — View and grant patient access to the questionnaire from the **Patient Locked Out** dropdown menu.

2. **Generate a new patient password** — If you have a valid email address for the patient, you can click **Generate and email** to generate the new password and send it to the patient. If you do not have a valid email address, click **Generate and display**. A new password will be generated, which you can copy and paste into a secure institutional email or give to your patient in person or over the phone. Upon logging in with the new credentials, patients are prompted to change their passwords.

3. **Delete a patient** — Click the red **Delete patient** button. You will be prompted to enter the patient's MRN; afterward, click **Confirm patient deletion**.

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Secure | https://demo.cagene.com/#/Provider/en-US/PatientInfo/7d330bad-8641-4008-8460-201c27fbdfea

INVITAE | CancerGeneConnect

Harris, Ruth - CGC32704

Patient Info

- Data Reports
- + Panel Admin
- + Users
- New Patient
- - Patients
  - Patient Info
  - Updates
  - Demographics
  - OBGYN
  - Hormonal History
  - Surgery
  - Colon
  - Health
  - Lifestyle
  - Psych
  - Pedigree
- + Family
- Risk Assessment
- Documentation
- Patient Records
- Release Form
- Patient Side
- My Account
- Logout

1

SAVE

Date of Service (month day year): October 1 2017

Email: ruth.harris@yahoo.com

Status: Questionnaire In Progress

Patient Locked Out: ✓ Not Locked Out / Locked Out

Provider 1: Jane Smith MS, CGC

Provider 2: None

Scheduling Notes: Sister is BRCA Positive.

Questionnaire Options

	Enabled	Disabled
Breast Health Questionnaire	○	●
CancerGene Connect© Questionnaire	●	○
Pedigree-Only Cancer Questionnaire	○	●
CancerGene Connect© Risk Ready Questionnaire	○	●

Patient Type: ○ New ○ Follow Up

☐ Provider Entered Data ☐ Research

Change MRN (requires browser refresh): CGC32704

2

Generate new password

GENERATE AND DISPLAY | GENERATE AND EMAIL

New password for qq35pv65 is **hh48kc35**

Username: qq35pv65

DELETE PATIENT

3

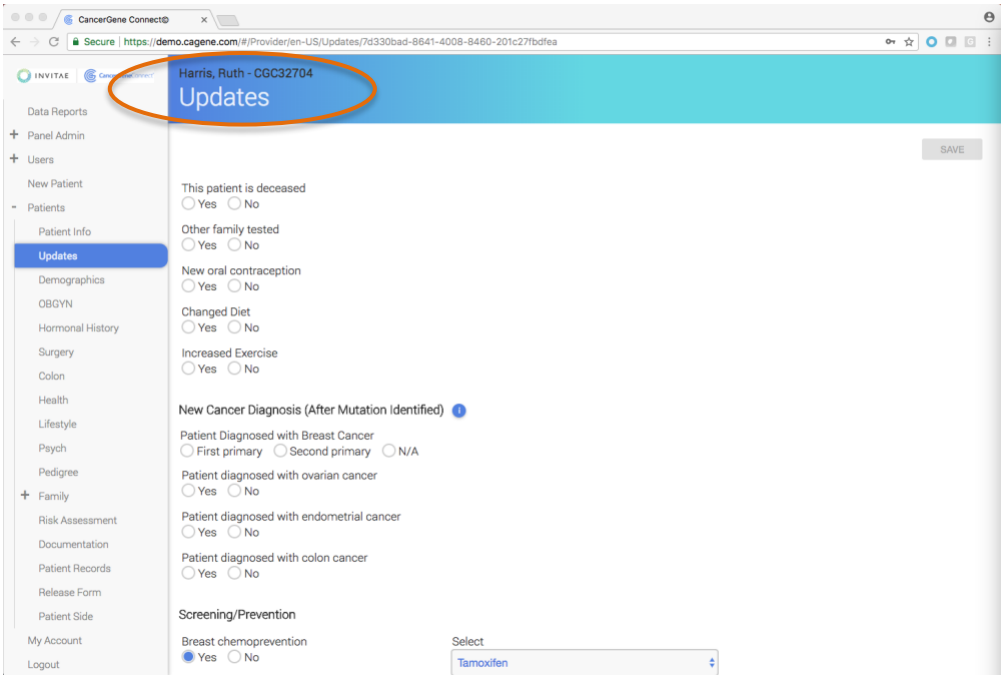
Confirm Patient MRN to delete:

CONFIRM PATIENT DELETION

SAVE

UPDATES PAGE

The Updates page enables a provider to track patients after their appointments. Providers may use this page to determine which patients they might continue to see in a research, screening, or clinical trials setting.



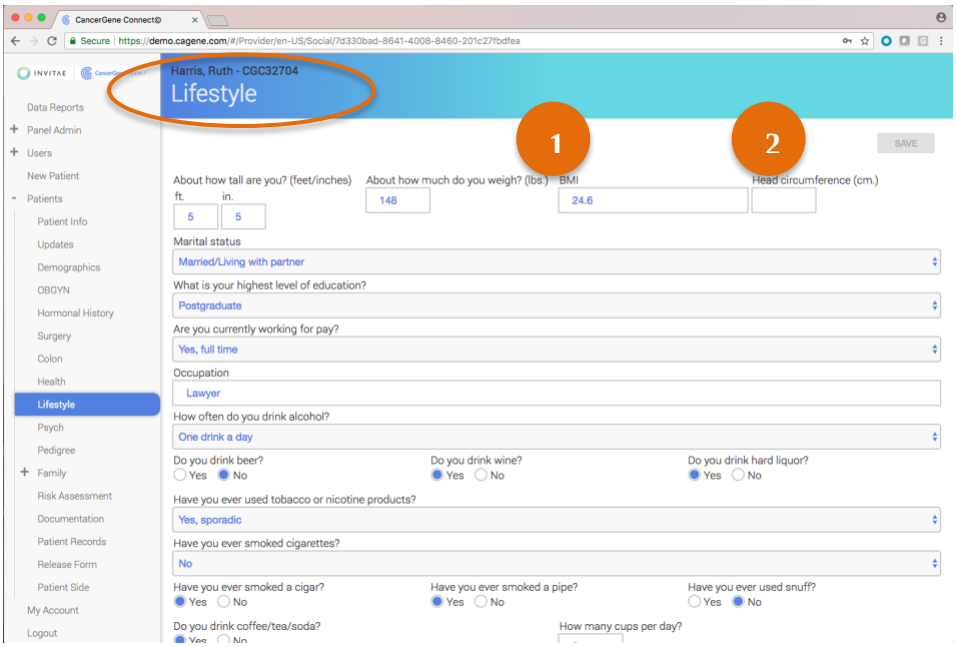
The Updates page, which is optional, is a popular addition.

LIFESTYLE PAGE

For risk modeling purposes, answers to the height and weight questions are required.

The Lifestyle page gathers information on risk factors such as alcohol and tobacco use, caffeine consumption, and exercise. There is also a field for documenting the patient's head circumference.

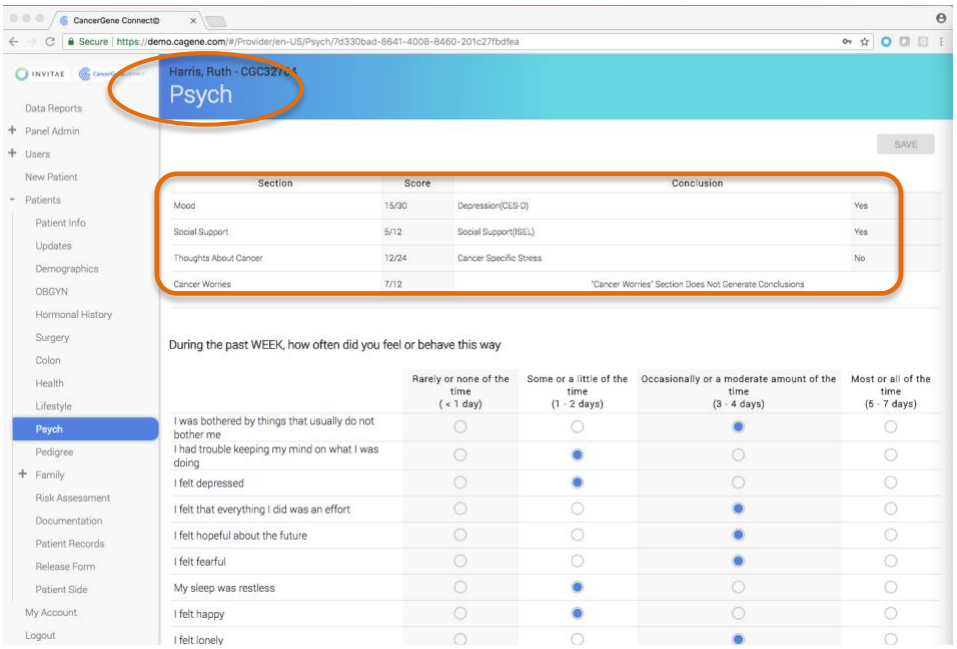
The system uses the patient's height and weight values to generate the body mass index (BMI). Because the BMI (which is only viewable in the provider view) is material to risk modeling, the patient's height and weight values are required.



PSYCH PAGE

The Psych page, which is optional, is comparable to a distress protocol. It includes four informal psycho-social assessments that gauge a patient's depression (CES-D), social support (ISEL), personal and family cancer history impact (IES-R), and cancer worries. See the appendix for details on how these assessments are scored and conclusions are drawn.

This page mirrors the Social History page in the patient view. The difference in naming convention between the patient and provider view supports patient adherence to filling out the information. When the Social History page is included in the patient's questionnaire, the provider will see a list of scores on the Psych page, as well as a yes-or-no conclusion based on the patient's responses.



PEDIGREE PAGE

The Pedigree page generates a pedigree using either the answers your patient provided on their Family Questionnaire or information you've entered into the **Family** section (available on the provider view's sidebar).

1. **Add family members and their histories.**
    - Click the **Add** button to add a family member.
    - Enter the family member's name. This will be helpful for keeping track of family members throughout the questionnaire. From a provider viewpoint, being able to refer to the patient's family members by their names can help you to create a personal connection with your patient. ***If names are not entered, the platform defaults to a naming convention that indicates the type(s) and number of relatives entered (e.g., Daughter 1, Son 2, Brother 3).***
    - Enter the cancer histories and ages at diagnoses of all the patient's living and deceased family members, including half-siblings, half-aunts, and half-uncles, but excluding non-blood relatives.
    - To delete a line entry, click the **Remove [name]** button.

2. **Add or edit additional information about family members.**
    - For each family member, you can provide additional information on ethnicity, ovary removal, twinning, half relatives, bilateral prophylactic mastectomies, bilateral breast cancer, pathology results, side indications of cancer results, any applicable test results, additional cancers, and clinical features. You also have the ability to add in a wide variety of notes, some of which can be displayed on the pedigree, others of which (i.e., "additional notes") that are for provider reference only.
    - Clicking on a family member from inside the pedigree will open their family member page beneath the pedigree.

3. **Set pedigree layout options and print the pedigree.**
    - Lay out the pedigree using these tools:
        - **Style** – Use the dropdown to toggle between *Primary Colors***,** *Black***,** and *White***.**
        - **Size** – Set the margins for printing the family tree. Choose *Full Width* or *Landscape*. You can also select *Internet Explorer (IE) Copy/Paste* to ensure that the pedigree prints properly when using IE**.**
        - **Legend Location** – Use the dropdown menu to select the position of the legend.
        - **Hide** – Tick the boxes to exclude information from the family tree display.
        - The pedigree has both slide and zoom settings that are compatible with macOS and Windows applications.
    - Print the pedigree by clicking **Print this page**.

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Secure | https://demo.cagene.com/#/Provider/en-US/Pedigree/7d330bad-8641-4008-8460-201c27fbdfea

Harris, Ruth - CGC32704

Pedigree

- Data Reports
- Panel Admin
- Users
- New Patient
- Patients
  - Patient Info
  - Updates
  - Demographics
  - OBGYN
  - Hormonal History
  - Surgery
  - Colon
  - Health
  - Lifestyle
  - Psych
  - Pedigree
  - Family
    - Children
    - Siblings
    - Nieces/Nephews
    - Parents/Grandparents
    - Maternal Aunts/Uncles
    - Paternal Aunts/Uncles
    - Maternal Cousins
    - Paternal Cousins
    - Grandchildren

SAVE

Note: Click on a family member name below to make changes to their personal information.

PRINT THIS PAGE

Ruth Harris (CGC32704) Oct 26, 1969

- Lung Cancer
- Leukemia
- Cervical Cancer
- Breast Cancer
- Pancreatic Cancer
- Ovarian Cancer
- Basal Cell Carcinoma
- Polyps, Unknown

Hungarian

Ashkenazi Jewish

ADD SON | ADD DAUGHTER | ADD BROTHER | ADD SISTER

SAVE

1

2

3

Name: Mom

Relation: Mother

Still Alive? ○ Yes ● No ○ Do Not Know

Age Now or At Death (Give your best guess; enter 1 if younger than 1 year-old): 72

Ethnicity: Ashkenazi Jewish

Has she had both ovaries removed? ○ Yes ○ No ○ Do Not Know

Identical Twin ID (identify identical twins, triplets etc.. by setting them to the same number below)

Bilateral Prophylactic Mastectomy

Additional Notes: Notes! Notes! Notes! Lots of notes!

Pedigree Notes: BRCA+

☐ For the purposes of risk models, has this person had "bilateral" breast cancer?

Cancer	Age Diagnosed	Pathology	Side	
Breast Cancer	58			REMOVE

Breast Marker Test

ER	PR

HER2-IHC	HER2-FISH

CK14	CK5.6

Pancreatic Cancer	72			REMOVE

ADD CANCER

ADD CLINICAL FEATURE

Master Notes: This is a sample of notes to be displayed on the pedigree.

Style: Primary Colors

Size (Used for printing): Full Width

Legend Location: Top-Left

Hide

- ☐ Names
- ☑ "No Children"
- ☐ Ancestry
- ☐ Patient Name/MRN
- ☐ Individual cancers and features
- ☐ Notes
- ☐ Ages
- ☐ Legend
- ☑ Consanguinity
- ☐ Cancers
- ☐ Patient Arrow

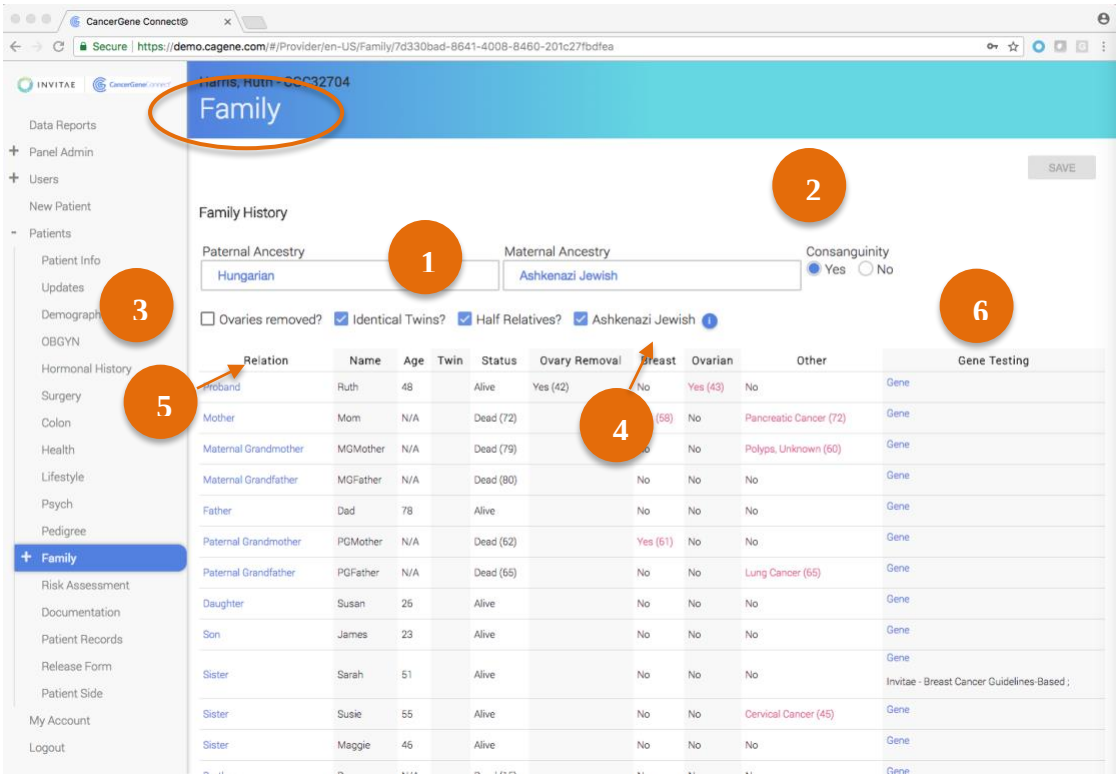
SAVE

*

FAMILY PAGE

The Family page provides a tabular view of the patient's family. Cancers are highlighted with pink font. This page includes several important provider features and functions.

1. Fields for entering paternal and maternal ancestries are at the top of the page.
2. Consanguinity can be noted.
3. If a patient answered "yes" to questions on the Family Questions page about having had an ovary removed, being an identical twin, or having half relatives, the corresponding checkbox is highlighted. This is a visual cue to follow up with the patient and to personally enter those details on the appropriate **Family** page to ensure that the information there is accurate.
4. A highlighted *Ashkenazi Jewish* checkbox indicates that a patient noted their Ashkenazy Jewish ancestry on the Demographics page. Follow up with the patient, then make that notation on their family member page (i.e., Proband page). ***Making the notation in the Proband page will ensure accurate risk modeling.***
5. Navigate into any Family Member page by clicking the family member's name in the Relation column. Make updates as needed.
6. Track genetic testing by clicking **Gene** in the Gene Testing column. This feature is also accessible from any family member's **Gene Testing page** using the sidebar menu.

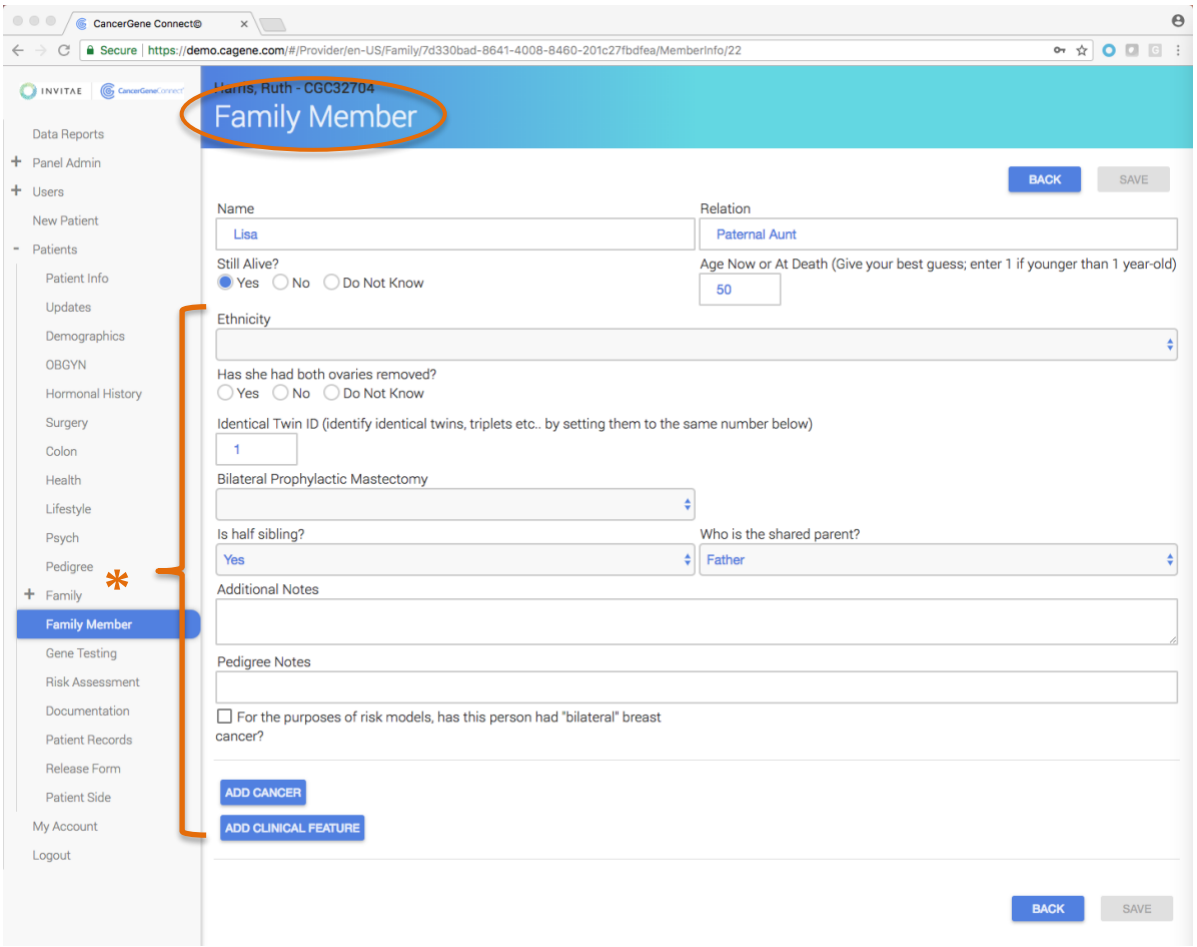


Family Member page

Every family member entered into the platform will have an individual Family Member page. This page allows the provider to add or edit information about that family member.

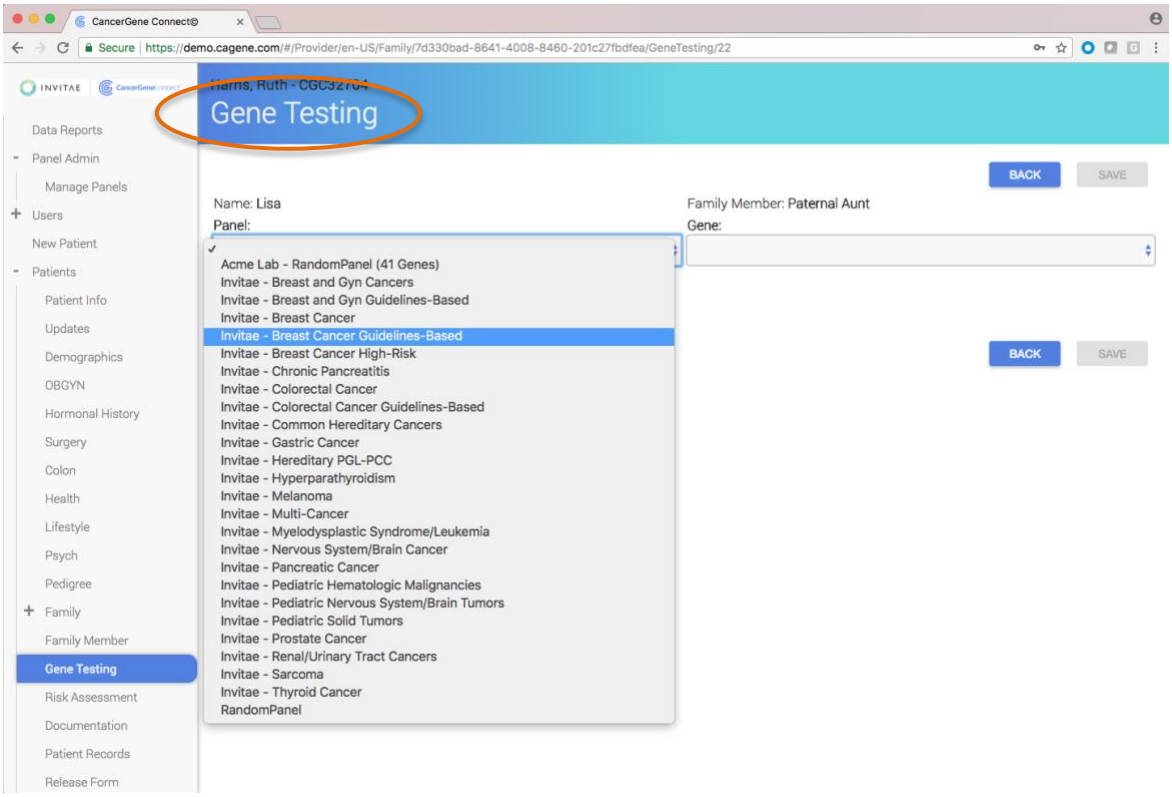
For each family member, you can provide additional information on ethnicity, ovary removal, twinning, half relatives, bilateral prophylactic mastectomies, bilateral breast cancer, pathology results, side indications of cancer results, any applicable test results, additional cancers, and clinical features. You also have the ability to add in a wide variety of notes, some of which can be displayed on the pedigree, others of which (i.e., "additional notes") that are for provider reference only.

You can also navigate to Family Member pages from the Pedigree page.



Gene Testing page

Every family member entered into the platform will have an individual Gene Testing page. This page allows the provider to track genetic testing that is ordered through Invitae or another genetic testing lab. You can choose from a prebuilt and pre-populated Invitae curated panel, an individual gene, or (if you ordered genetic testing from another lab) a custom panel that you build yourself.

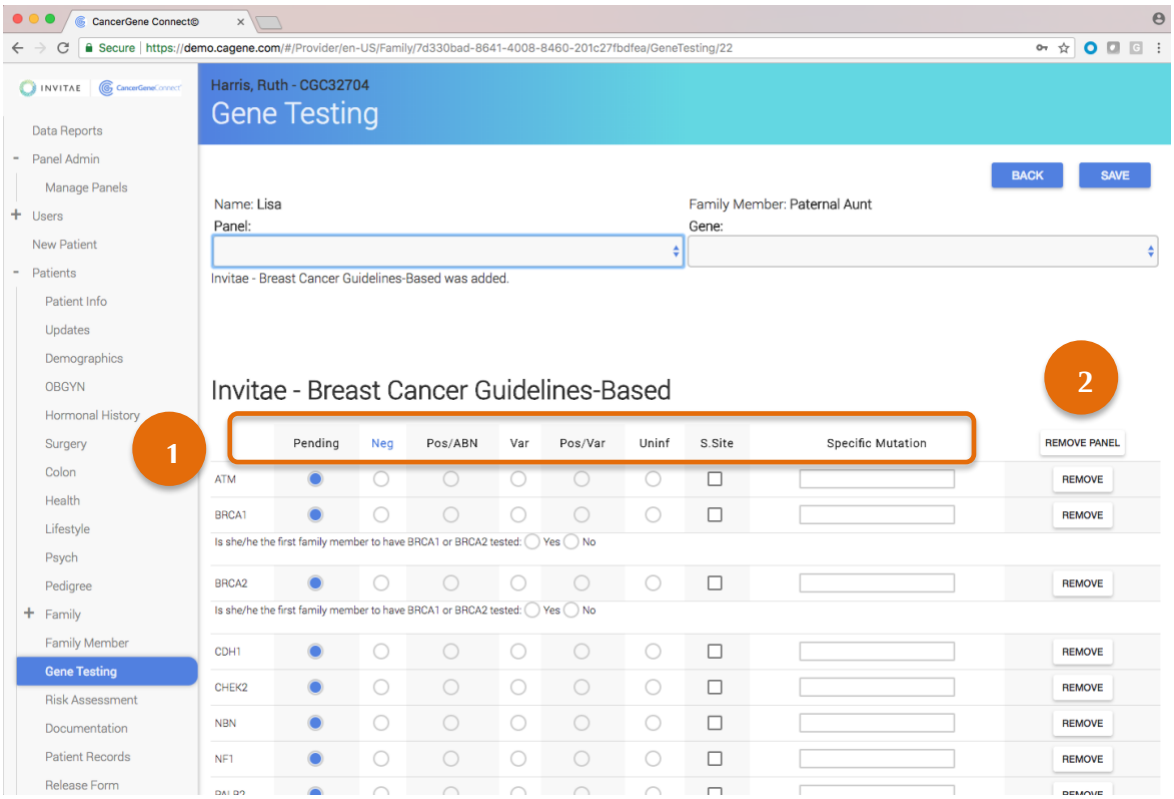


1. By default, a test is marked as *Pending*. Once results are received, you can choose from the following:

    - **Neg** – Negative or normal result
    - **POS/ABN** – Positive or abnormal result
    - **Var** – Variant result
    - **Pos/Var** – Variant result of unknown significance (VUS)
    - **Uninf –** Uninformative, Lynch-like result
    - **S. Site** – Single-site result

    You can enter details of a specific mutation in the freeform box.

2. Remove any tests or panels by clicking **Remove panel;** remove individual genes by clicking **Remove**.



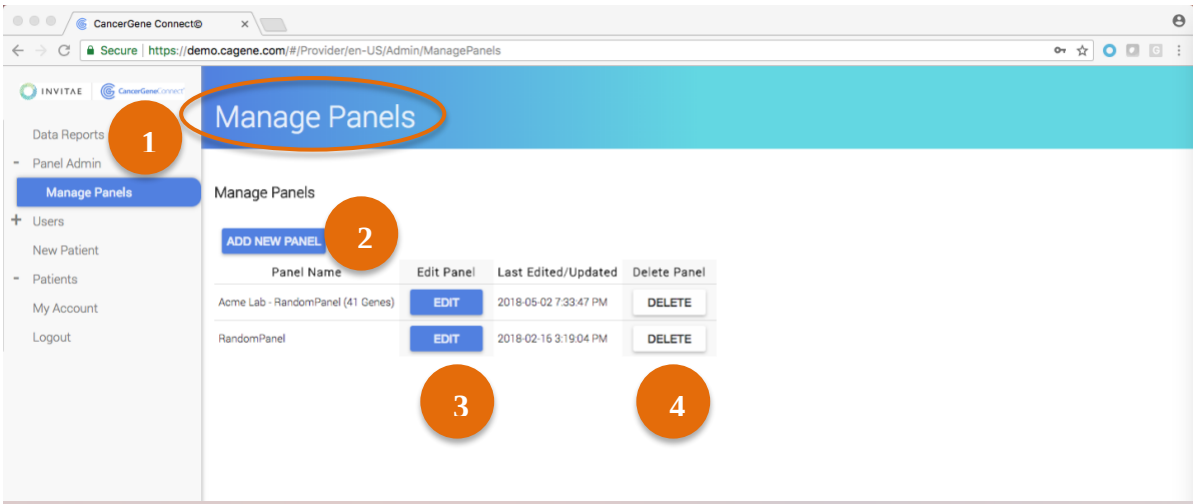
The Gene Testing pages are accessible from the Family page by clicking **Gene** in the Gene Testing column.

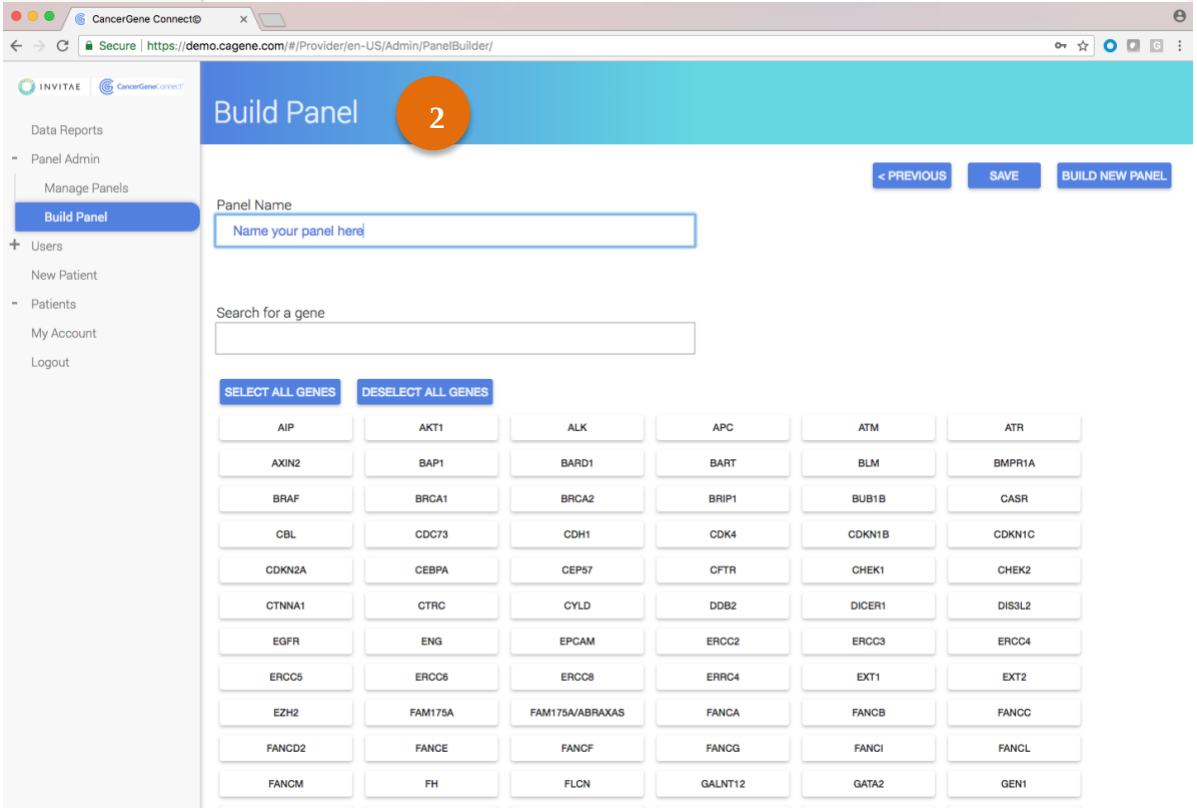
BUILDING AND EDITING A GENETIC TEST PANEL

You do not need to order from Invitae to use CancerGene Connect. If you routinely order from other genetic testing labs or have patients whose family members were tested elsewhere, you can build a genetic panel in Panel Admin and it will be added to the dropdown list on the Gene Testing page.

1. To add a new panel, click **Panel Admin** on the sidebar menu. Choose **Manage Panels**.
2. On the Manage Panels page, click **Add new panel**. This takes you to the Build Panel page. Enter a name for your panel, then search and choose from a directory of genes. Click **Save** when your panel is complete.
3. To edit an existing panel, click **Edit**. Search and choose from a directory of genes, or rename the panel. Click **Save** to save your updates.
4. To delete a panel, click **Delete**.

All panels are saved with a timestamp that include the date and time of creation or when it was last updated.


CancerGene Connect©
Secure | https://demo.cagene.com/#/Provider/en-US/Admin/ManagePanels
INVITAE
Data Reports
Panel Admin
Manage Panels
Users
New Patient
Patients
My Account
Logout
Manage Panels
1
Manage Panels
ADD NEW PANEL
2
Panel Name
Edit Panel
Last Edited/Updated
Delete Panel
Acme Lab - RandomPanel (41 Genes)
EDIT
2018-05-02 7:33:47 PM
DELETE
RandomPanel
EDIT
2018-02-16 3:19:04 PM
DELETE
3
4


CancerGene Connect©
Secure | https://demo.cagene.com/#/Provider/en-US/Admin/PanelBuilder/
INVITAE
Data Reports
Panel Admin
Manage Panels
Build Panel
Users
New Patient
Patients
My Account
Logout
Build Panel
2
< PREVIOUS
SAVE
BUILD NEW PANEL
Panel Name
Name your panel here
Search for a gene
SELECT ALL GENES
DESELECT ALL GENES
AIP
AKT1
ALK
APC
ATM
ATR
AXIN2
BAP1
BARD1
BART
BLM
BMPR1A
BRAF
BRCA1
BRCA2
BRIP1
BUB1B
CASR
CBL
CDC73
CDH1
CDK4
CDKN1B
CDKN1C
CDKN2A
CEBPA
CEP57
CFTR
CHEK1
CHEK2
CTNNA1
CTRC
CYLD
DDB2
DICER1
DIS3L2
EGFR
ENG
EPCAM
ERCC2
ERCC3
ERCC4
ERCC5
ERCC6
ERCC8
ERRC4
EXT1
EXT2
EZH2
FAM175A
FAM175A/ABRAXAS
FANCA
FANCB
FANCC
FANCD2
FANCE
FANCF
FANCG
FANCI
FANCL
FANCM
FH
FLCN
GALNT12
GATA2
GEN1

Risk Assessment page

The Risk Assessment page manages all the risk modeling that the system performs based on patient responses to the questionnaire. The platform has a built-in set of risk models, described below. As applicable, the risk models run in CancerGene Connect are licensed to Invitae by their intuitional owners; they are updated as needed.

Bayes-Mendel Package

1. The **BRCAPRO model** will tell you the probability of a patient carrying a mutation in the BRCA1 or BRCA2 gene. The patient's 5-year and lifetime risks for breast and ovarian cancer are based on the calculated probability that they carry a BRCA1 or BRCA2 gene mutation. The model takes into account family history (affected and unaffected relatives, breast and ovarian cancer history, male breast cancer, and bilateral breast cancer) up to second-degree relatives, breast pathology, and oophorectomy status. The BRCAPRO model also considers ethnicity for each family member, which allows for differing mutation allele frequencies in families of mixed ethnicity. Nonhereditary risk factors and noninvasive breast cancer are not considered in the BRCAPRO model.

   The BRCAPRO model uses Bayes' theorem and incorporates various facets of maternal and paternal family histories (including ages of affected and unaffected family members), published data on BRCA1 and BRCA2 mutation frequencies, and cancer penetrance in mutation carriers. The patient's breast and ovarian cancer probabilities are calculated based on the probability that the family has a mutation in either the BRCA1 or BRCA2 gene.

2. **MelaPRO** is a statistical model for assessing the probability that an individual carries a germline deleterious mutation of CDKN2A (p16) based on a family history of single primary and multiple primary melanomas. MelaPRO provides three separate prediction models using penetrances previously estimated from 1) high-risk melanoma families in high-baseline-incidence areas (Australia, the United States, and Sweden); 2) high-risk melanoma families in low-baseline-incidence areas (Europe, excluding Sweden); and 3) all melanoma families from Australia, the United States, and Italy. The model's results provide useful information on an individual's cutaneous melanoma risk, which can impact the individual's clinical decisions and enable researchers to enroll high-risk individuals in genetic studies.

3. **MMRpro** is a statistical model for assessing the probability that an individual carries a germline deleterious mutation of the MLH1, MSH2, and MSH6 MMR genes based on a family history of colorectal and endometrial cancer. The model's results provide useful information on an individual's colon cancer risk that the patient can use before deciding to undergo invasive screenings or expensive genetic testing.

4. **PancPRO** is a statistical model that estimates the probability that an individual carries a mutation in this major susceptibility gene (or gene effect) based on a family history of pancreatic cancer. The model further estimates the probability that an individual will develop pancreatic cancer in the future. The results will provide useful

information about a patient's pancreatic cancer risk before the individual decides to undergo invasive screenings. Researchers will be able to use the results to identify high-risk individuals for enrollment in screenings and genetic studies.

Gail

The Gail model estimates the probability that an individual develops breast cancer in the future. The Gail model is validated up to a lifetime age of 90 years.

Claus

The Claus model estimates the probability that an individual develops breast cancer in the future. The Claus model is validated up to a lifetime age of 79 years.

Tyrer-Cuzick v7.02

Also known as the International Breast Cancer Intervention Study (IBIS), the Tyrer-Cuzick model assesses the probability that an individual carries a hereditary breast cancer predisposition gene, then further estimates the probability that an individual develops breast cancer in the future. The Tyrer-Cuzick v7.02 model is validated up to a lifetime age of 85 years.

The Risk Assessment page has several important provider features and functions:

1. These models do not calculate automatically. To calculate risk, click the **Calculate risks** button. It may take up to a minute for the models to finish running. **NOTE: After making any relevant update to patient or family information, recalculate to ensure accurate modeling.**

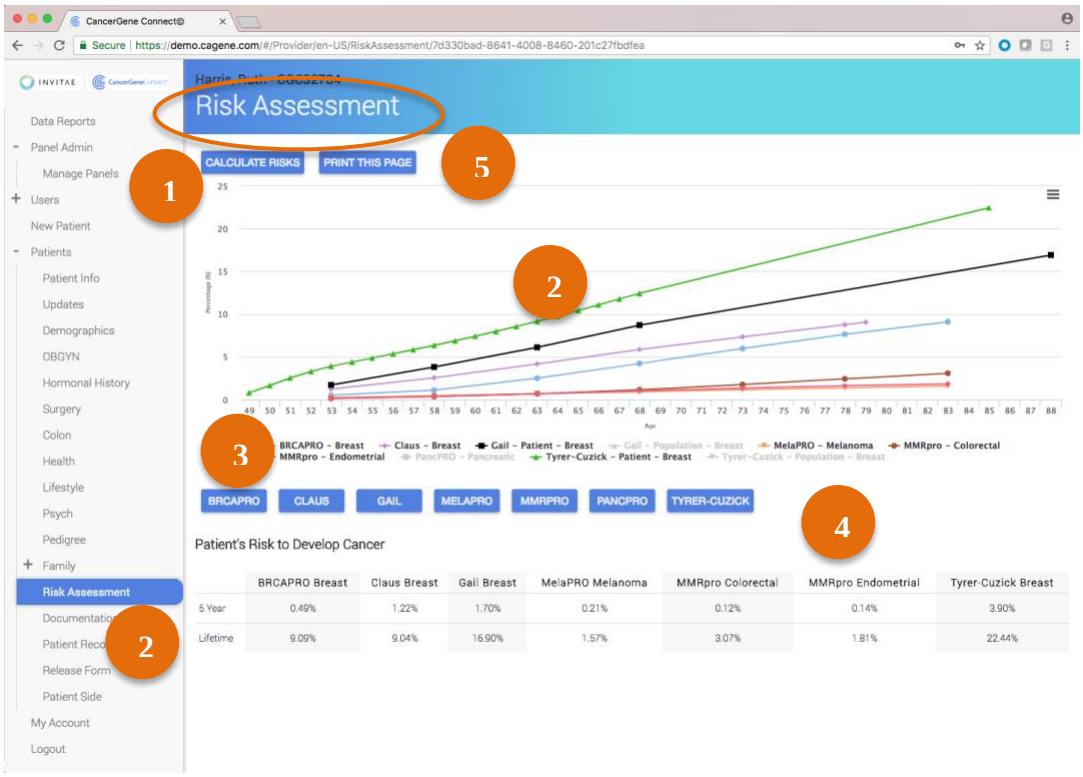
2. Once the risks have been calculated, you will see a combined model line graph displaying every model with a 5-year incremental risk overview. This information is also displayed in a tabular format, beneath the line graph.

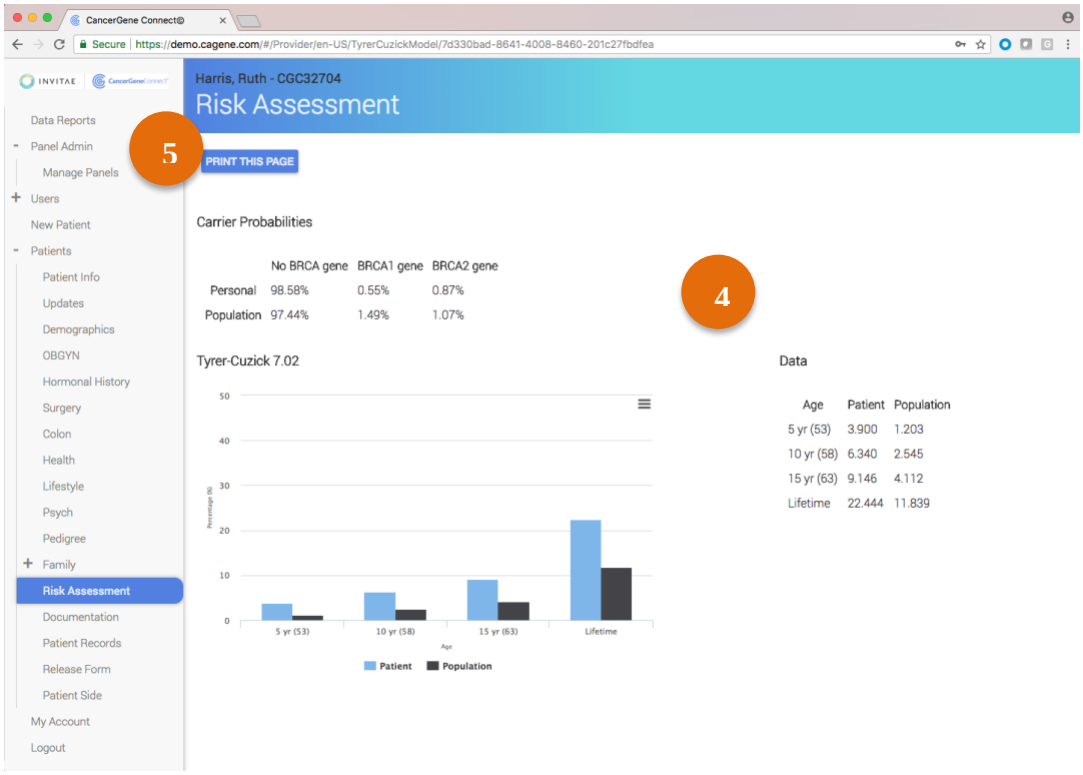
3. Toggle the models on and off by clicking each model's name in the legend, beneath the graph.

4. View details of a particular **model** by clicking on the blue model-designated buttons beneath the graph. This will open a separate page for that model with a bar graph and table that highlights 5-year incremental risk overview. If a model includes carrier probabilities, they will be displayed at the top of the individual model page. NOTE: To return to the line graph, click **Risk Assessment** in the sidebar menu.

   If a model-designated button beneath the graph is grey instead of blue, that particular model is not validated for this particular patient; however, the button is still clickable and will open a separate page for this model. Red warning text noting the particular reason for the model being invalid will display above the graph. A 5-year incremental risk overview will display as if it were ignoring the model-invalidating data.

5. Click the **Print this page** button to print the combined model graph and individual model pages.





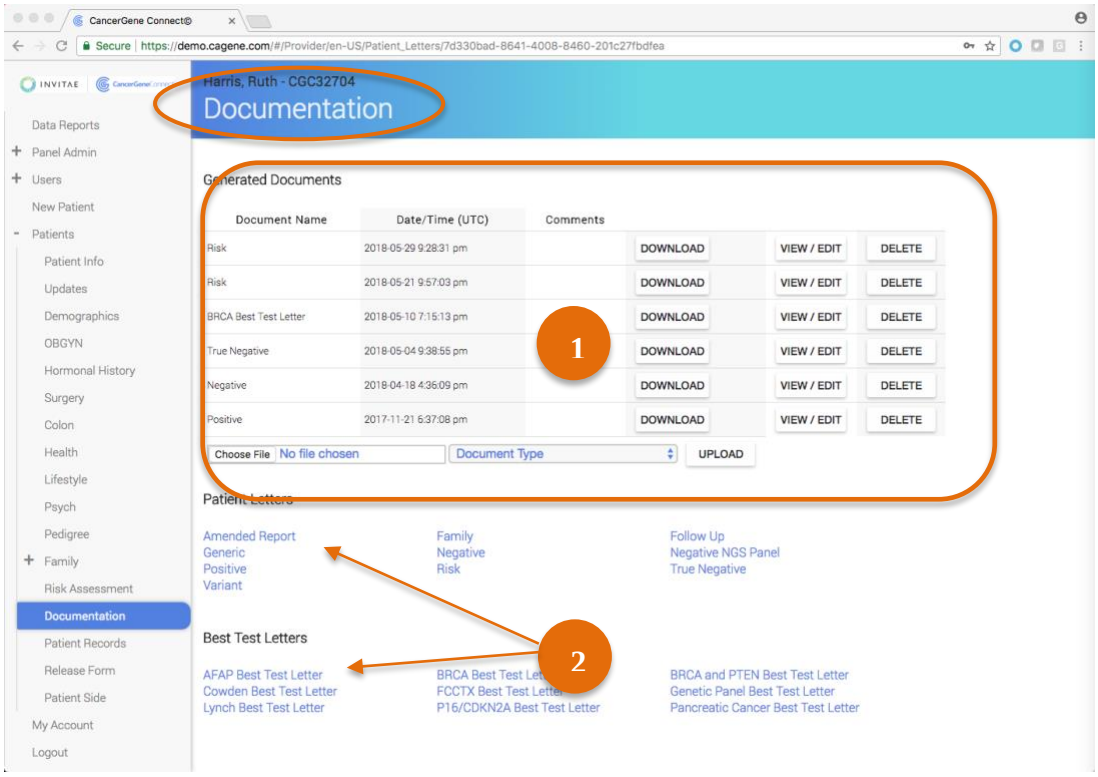
Documentation page

The Documentation page is designed to save time during general documentation creation. There are a number of templates built into the platform, including a variety of patient and family letters. All templates are customizable and editable within the platform. The templates pull in relevant patient information from the questionnaire and include freeform boxes and dropdowns for adding in patient information. The templates also incorporate macros that are designed to make providing recommendations or informing patients of a positive test result more efficient.

The Documentation page has several important provider features and functions:

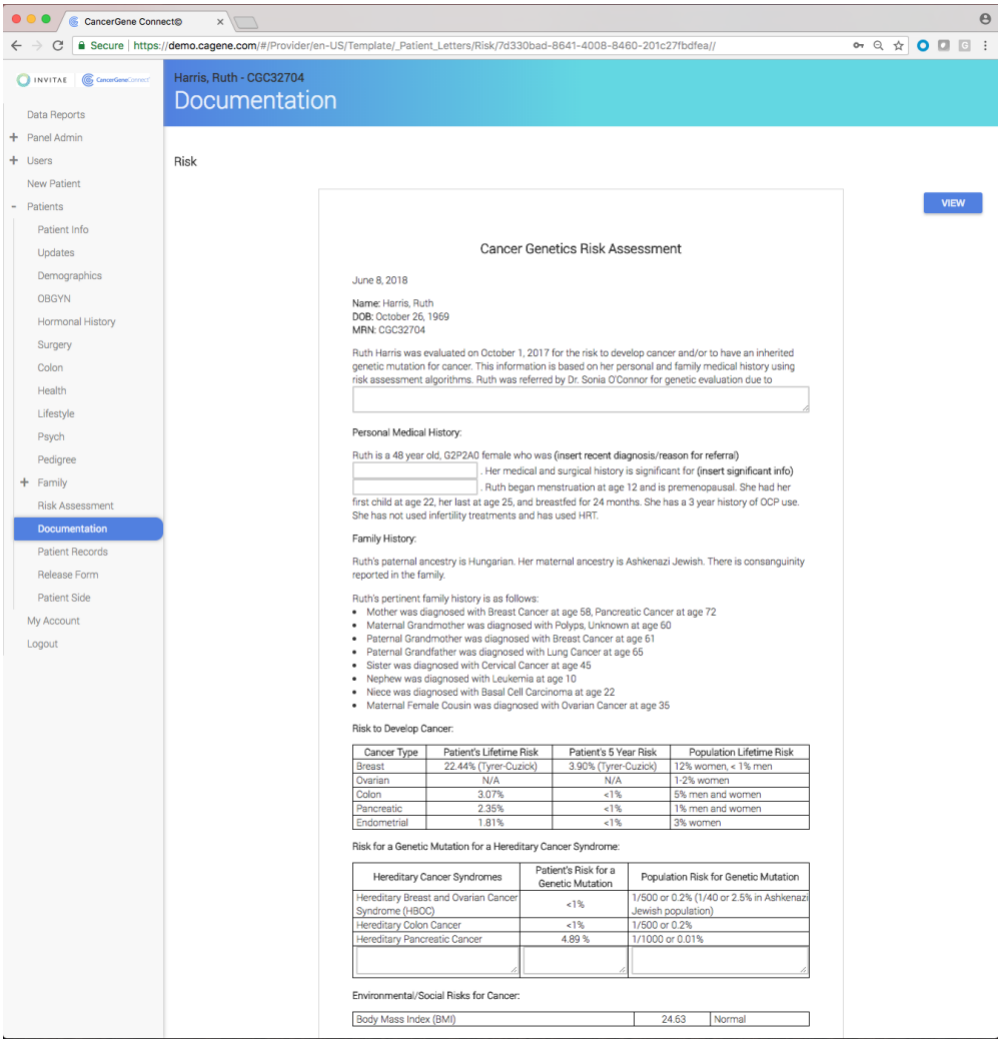
1. Save, view, and edit documentation within an individual letter. Download, view/edit, delete, and upload on the main documentation page.
    - All generated documentation is saved with a timestamp that includes the date and time of creation or most recent update.
    - Letters can be downloaded as a Word document with your institution's logo in the header and relevant clinic information (address, phone, and fax) in the footer if these materials are provided at the time of site configuration.

2. The platform includes a number of standard templates for patient letters (specific documentation directed towards your patient) and best test letters (geared toward a patient family member who would provide the "better" genetic test).



RISK LETTER EXAMPLE

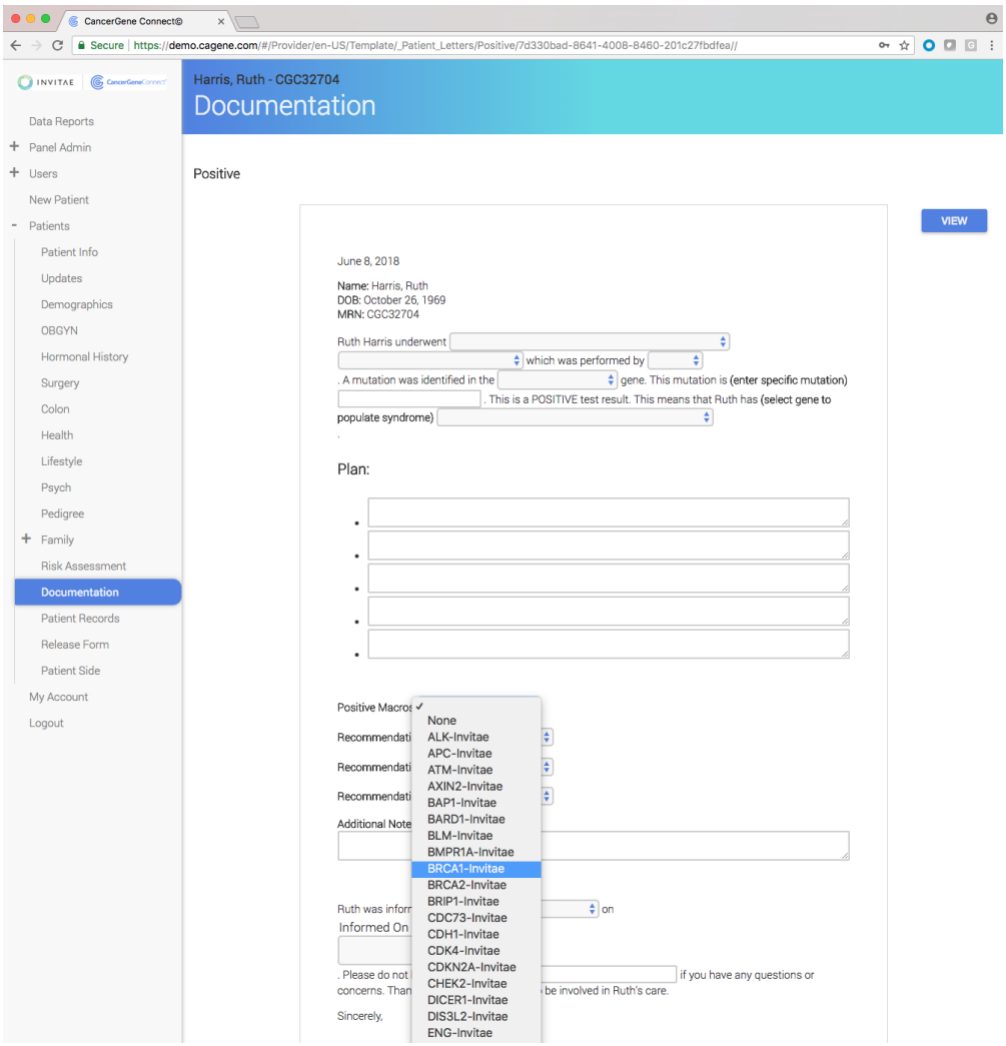
To send a risk letter using the template, select **Risk** from the Patient Letters section. The template will be populated with relevant patient information (e.g., personal information, health information, risk assessment). Use the text fields and dropdowns to include additional information in your letter, including recommendations, clinic names, and appointment time. Click **Generate document** to generate and save the letter. The letter will be listed on the Documentation page, in the Generated Documents table, with a timestamp; click **View/edit** to view or edit the letter.



NOTE: The platform includes recommendations for all of Invitae's hereditary cancer panels included on the Gene Testing pages. When a panel is selected, the letter will populate with the genes in the panel, insurance information (if it is provided), a collection date (tied to the date of service entered in the platform), and expected turnaround time for test results. Text that can be used to make general recommendations (for colonoscopy, breast MRIs, and the like) is built in.

POSITIVE LETTER EXAMPLE

To send a "positive letter" using the template, select **Positive** from the Patient Letters section. The template will be populated with relevant patient information. Use the text fields and dropdowns to include additional information in your letter, including relevant information about a positive test result. Click **Generate document** to generate and save the letter. The letter will be listed on the Documentation page, in the Generated Documents table, with a timestamp; click **View/edit** to view or edit the letter.

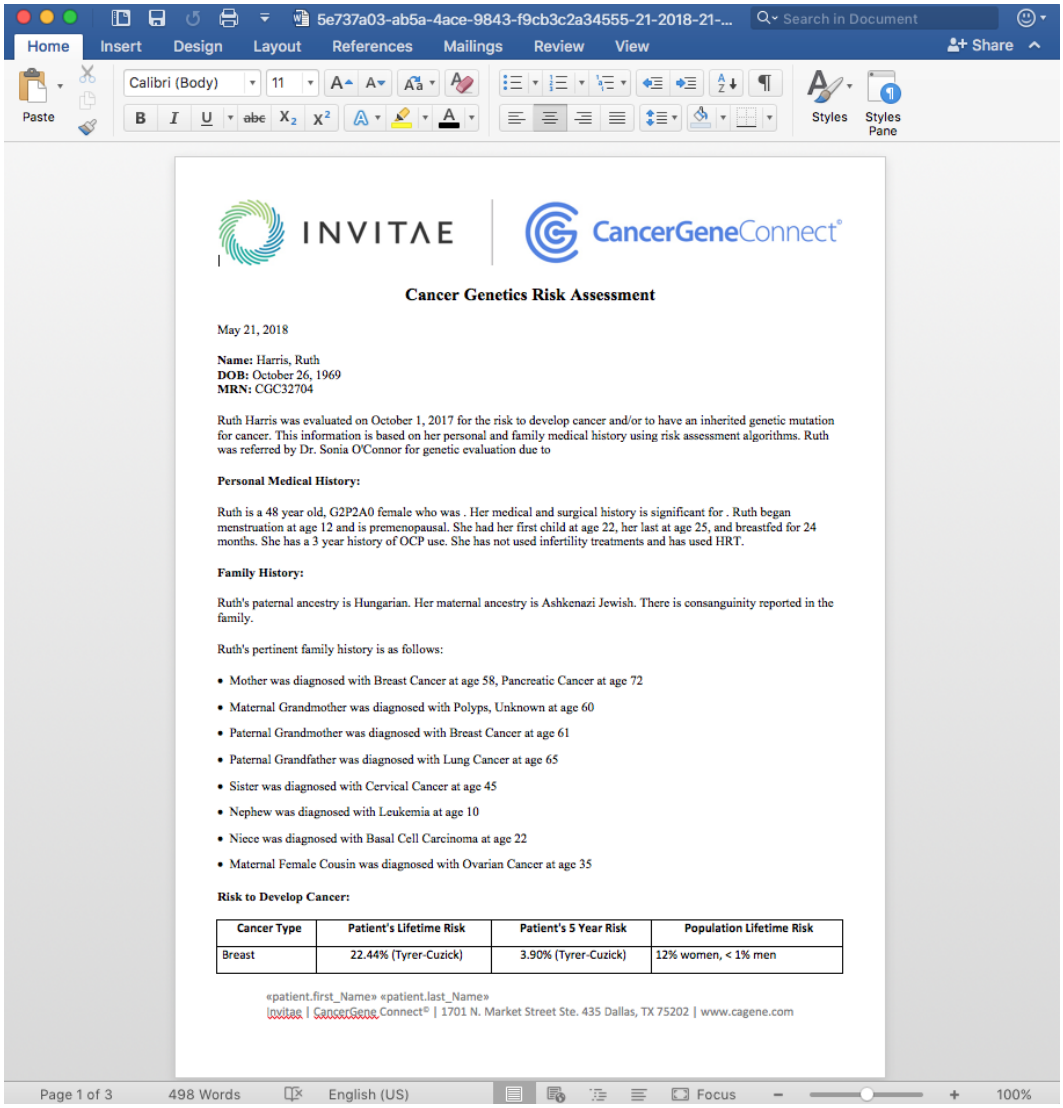


NOTE: The positive letter template includes positive macros for genes documented in studies on adult cancer. Macros are drawn from NCCN Guidelines and are maintained by Invitae's genetic counselors. When and if guidelines change, we are allowed 30 days to update the platform.

DOWNLOADED WORD DOCUMENT EXAMPLE

To download a Word document from the Documentation page, click the corresponding **Download** button. A Word version of that document will be generated. If you provided your institution's logo and related clinic information (e.g., address, phone, fax) at the time of site configuration, then these items will also appear in the Word document generated by the system.

You can edit the document within Word, then upload it back into the platform. The timestamped, edited document will be accessible from the Documentation page. **NOTE: You will not be able to open or otherwise view an uploaded document within the platform; you can only download it. View an edited document by downloading it, then opening it from your computer.**



INVITAE | CancerGeneConnect

Cancer Genetics Risk Assessment

May 21, 2018

Name: Harris, Ruth
DOB: October 26, 1969
MRN: CGC32704

Ruth Harris was evaluated on October 1, 2017 for the risk to develop cancer and/or to have an inherited genetic mutation for cancer. This information is based on her personal and family medical history using risk assessment algorithms. Ruth was referred by Dr. Sonia O'Connor for genetic evaluation due to

Personal Medical History:

Ruth is a 48 year old, G2P2A0 female who was . Her medical and surgical history is significant for . Ruth began menstruation at age 12 and is premenopausal. She had her first child at age 22, her last at age 25, and breastfed for 24 months. She has a 3 year history of OCP use. She has not used infertility treatments and has used HRT.

Family History:

Ruth's paternal ancestry is Hungarian. Her maternal ancestry is Ashkenazi Jewish. There is consanguinity reported in the family.

Ruth's pertinent family history is as follows:

- Mother was diagnosed with Breast Cancer at age 58, Pancreatic Cancer at age 72
- Maternal Grandmother was diagnosed with Polyps, Unknown at age 60
- Paternal Grandmother was diagnosed with Breast Cancer at age 61
- Paternal Grandfather was diagnosed with Lung Cancer at age 65
- Sister was diagnosed with Cervical Cancer at age 45
- Nephew was diagnosed with Leukemia at age 10
- Niece was diagnosed with Basal Cell Carcinoma at age 22
- Maternal Female Cousin was diagnosed with Ovarian Cancer at age 35

Risk to Develop Cancer:

Cancer Type	Patient's Lifetime Risk	Patient's 5 Year Risk	Population Lifetime Risk
Breast	22.44% (Tyrer-Cuzick)	3.90% (Tyrer-Cuzick)	12% women, < 1% men

«patient.first_Name» «patient.last_Name»
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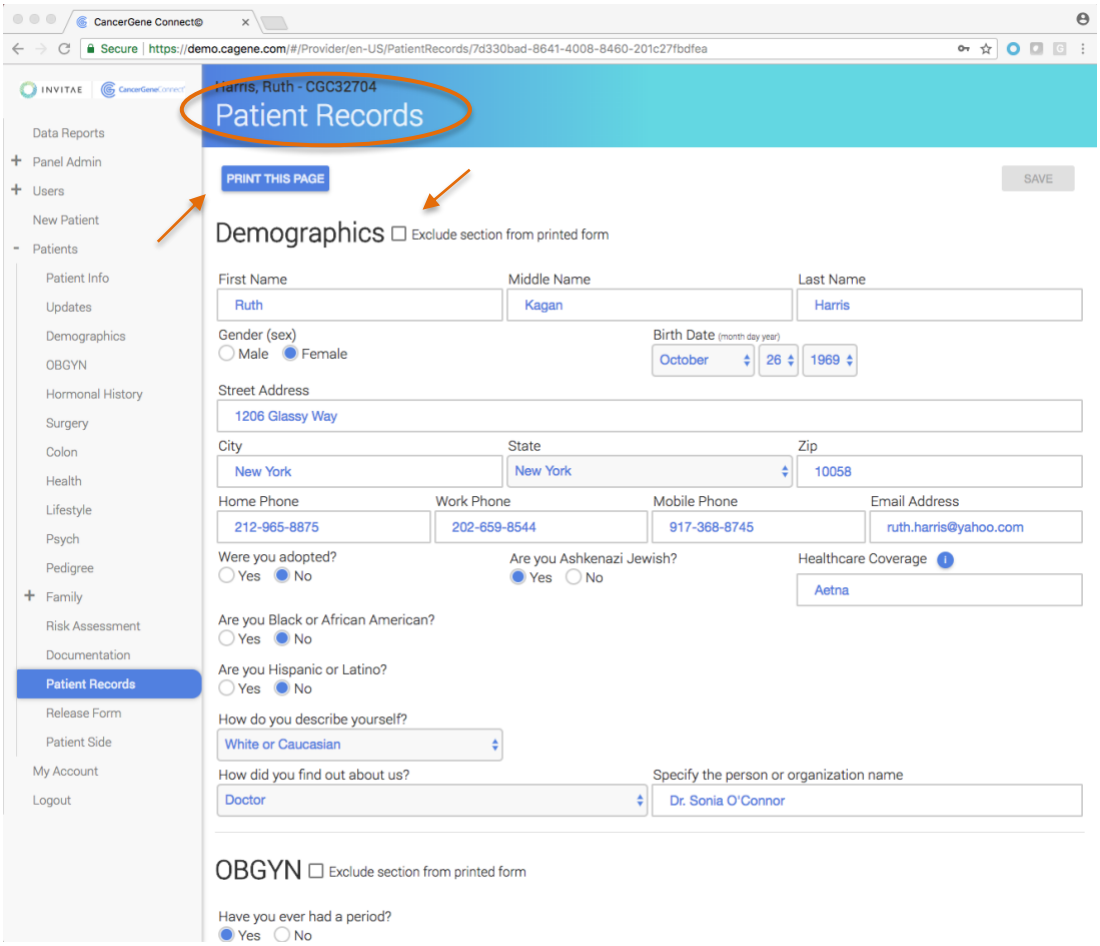
PATIENT RECORDS PAGE

The Patient Records page generates a printable version of the questionnaire. To exclude individual sections, click that section's **Exclude section from printed form** checkbox. Click the **Print this page** button to print the questionnaire.

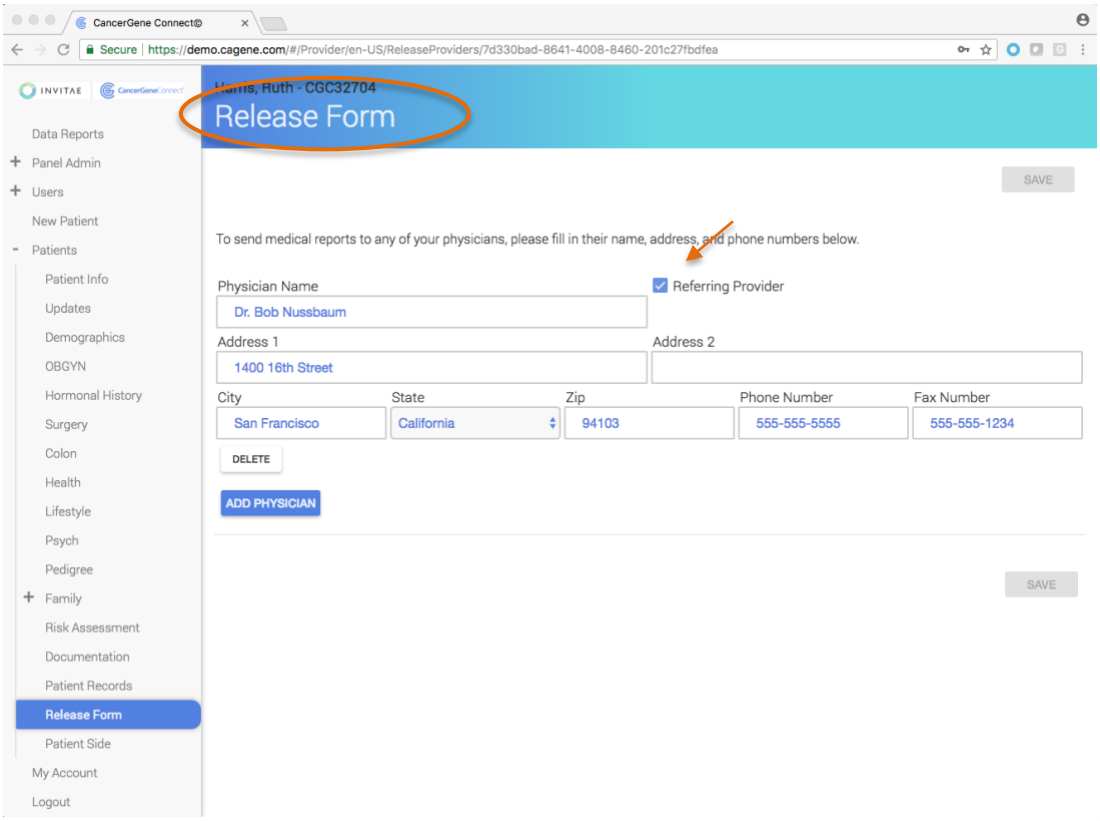


Release Form page

The Release Form page is an optional page that enables a patient to release information to another member of their medical care team who may want documentation (e.g., medical reports, consultation letters). There is no limit on the number of physicians that can be added. If physicians are included, their names will carbon copy on any documentation generated.-This Release Form page in the provider view is a mirror image of the Release Form page in the patient view.

You can select the referring provider from the list of physicians by checking the applicable **Referring Provider** box.

NOTE: This page does not auto-release any information.



APPENDIX

TABLE 1: DIRECTORY OF SIDEBAR MENUS, PATIENT VIEW

These are the pages included in the patient view of the questionnaires. Questionnaire pages marked with an asterisk (*) are not referenced in this user guide.

Questionnaire pages	Expanded questionnaire sections	Questionnaire options			
		Breast health	CancerGene Connect	Pedigree-only cancer	CancerGene Connect risk ready
Instructions		X	X	X	X
Demographics		X	X	X	X
*Appointment Reason		X			
OBGYN		X	X		X
Hormonal history		X	X		X
Surgery		X	X		X
Colon			X		
Health		X	X		
Lifestyle		X	X		X
Family questionnaire	Children	X	X	X	X
	Siblings	X	X	X	X
	Nieces/nephews	X	X	X	X
	Parent/grandparents	X	X	X	X
	Maternal aunts/uncles	X	X	X	X
	Paternal aunts/uncles	X	X	X	X
	Family questions	X	X	X	X
	Maternal cousins	X	X	X	X
	Paternal cousins	X	X	X	X
Family tree		X	X	X	X
Social history		X	X		
Release form		X	X		X
Finish		X	X	X	X
My account		X	X	X	X
Logout		X	X	X	X

TABLE 2: DIRECTORY OF SIDEBAR MENUS, PROVIDER VIEW

These are the pages included in the provider view of the questionnaires. Questionnaire sections marked with an asterisk (*) are not referenced in this user guide.

Questionnaire pages	Expanded questionnaire sections	Questionnaire options			
		Breast health	CancerGene Connect	Pedigree-only cancer	CancerGene Connect risk ready
Data reports		X	X	X	X
Panel admin	Manage panels	X	X	X	X
	Build panel	X	X	X	X
Users	New user	X	X	X	X
	Logs	X	X	X	X
Patients	Patient info	X	X	X	X
	Updates	X	X		X
	Demographics	X	X	X	X
	*Appointment Reason	X			
	OBGYN	X	X		X
	Hormonal history	X	X		X
	Surgery	X	X		X
	Health	X	X		
	Colon		X		
	Lifestyle	X	X		X
	Psych	X	X		
	Pedigree	X	X	X	X
	Family	X	X	X	X
	Children	X	X	X	X
	Siblings	X	X	X	X
	Nieces/nephews	X	X	X	X
	Parent/grandparents	X	X	X	X
	Maternal aunts/uncles	X	X	X	X
	Paternal aunts/uncles	X	X	X	X
	Maternal cousins	X	X	X	X
	Paternal cousins	X	X	X	X
	Grandchildren	X	X	X	X
	Extended family	X	X	X	X
	Great ancestors	X	X	X	X
	Family member	X	X	X	X
	Gene testing	X	X	X	X
	Risk assessment	X	X		X
	*Management	X			
	Documentation	X	X		X
	Patient records	X	X		X
	Release form	X	X		X
	Patient side	X	X	X	X
My account		X	X	X	X
Logout		X	X	X	X

SOCIAL HISTORY REFERENCES

The **Social History** and **Psych** pages include four informal psycho-social assessments that include validated measures for depression (CES-D), social support (ISEL), and personal and family cancer history impact (IES-R), as well as a fourth component that gauges cancer worries, which is not validated and does not contain a cutoff.

The questions included in CancerGene Connect were developed and reviewed by Dr. Heidi Hamann, a psychologist who is also a trained genetic counselor, and by Dr. Jeff Kendall, a psychologist who, at the time CancerGene Connect was developed, was practicing at University of Texas Southwestern and led the support services division. Explanations of each validated tool are below. NOTE that these assessments do not have a definitive clinical cut-off. If, for example, the patient scored a 9/30 on the Mood (CES-D) assessment, they may still warrant a referral.

1. **Mood (CES-D)** — Ten questions, three points each. Based on a paper from the *Journal of Aging and Health*. For the Common Depression Measure, a "yes" answer and an overall score greater than or equal to 10 indicate that the patient is at risk of depression. (The higher the score, the more severe the depression.) Items are totaled based on response, with the exception of the two "positive" items (questions 4 and 7), which are reverse-scored before summing.
2. **Social Support (ISEL)** — Four questions, three points each. This was adopted from Schonfeld's "Dimensions of functional social support and psychological symptoms" (1991). A score that is less than or equal to 6 indicates that a patient needs additional social support. The lower the score, the less social support there is. There are no clinical cutoffs, but, in general, scores lower than 6 should be flagged for follow-up, including a referral for support groups or other networks.
3. **Thoughts about Cancer (IES-R)** — Six questions, four points each. Based on Thoressen *et al.*, "Brief measure of posttraumatic stress reactions: impact of Event Scale-6" (2010). A score that is greater than or equal to 13 indicates that the patient has increased anxiety. The score is summed. There is no particular cutoff, but higher scores (>13) may indicate a need for follow-up or referral.

DATE AND TIME INFORMATION

The CancerGene Connect platform uses coordinated universal time (UTC). This increases the platform's functionality outside the US and in international time zones.

Patient edits made to CancerGene Connect after 6 pm CST will require a platform refresh. The search date must also be advanced by one day on the Patients page.