ACT Genetic Service

Cancer genetic services

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Genetic Counsellor
ACT Genetic Service
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Our Team

- 5 genetic counsellors
- 1 cancer geneticist – Professor Kathy Tucker
- Outreach service
- Combination of face to face appointments and telehealth

Clinics

- Clinics
  - Canberra Region Cancer Centre at Canberra Hospital (weekly)
  - Gungahlin Community Health Centre (fortnightly)
  - Belconnen Community Health Centre (monthly)
- Referrals from GPs, cancer specialists (surgeons, medical oncologists and radiation oncologists), nurses
- Referrals are triaged
  - High risk and predictive test referrals are offered an appointment
  - Moderate risk and population risk referrals get a phone call from a GC to screen for high risk features in the family which would indicate if an appointment is required.
  - If no appt indicated, letter written back to referring clinician and patient with risk assessment and management guidelines

A few stats

- Up to Sept 2019 have received 407 cancer referrals – average of 45 referrals per month
- Highest peak in referrals was due to the Angelina Jolie effect in 2013 – referrals increased by 400%
- Each person offered a face to face appointment is likely to take at least 5 hours of genetic counsellor time

Characteristics of a cancer predisposition syndrome

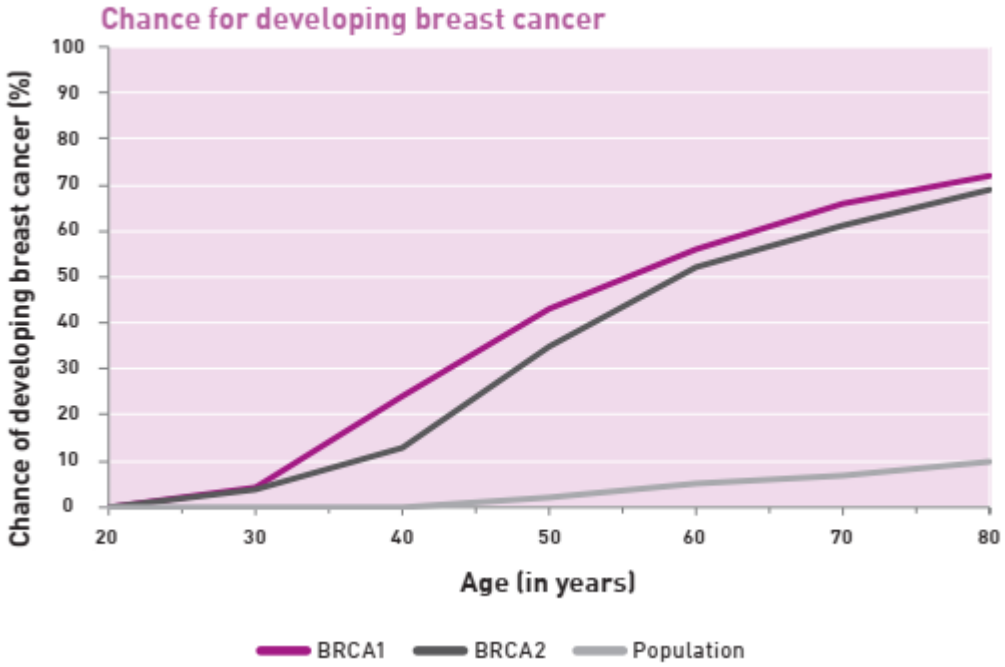
- Multiple affected individuals over multiple generations
- Pattern of cancer types
- Age of diagnosis
- Multiple primary cancers in the same individual
- Pathology characteristics

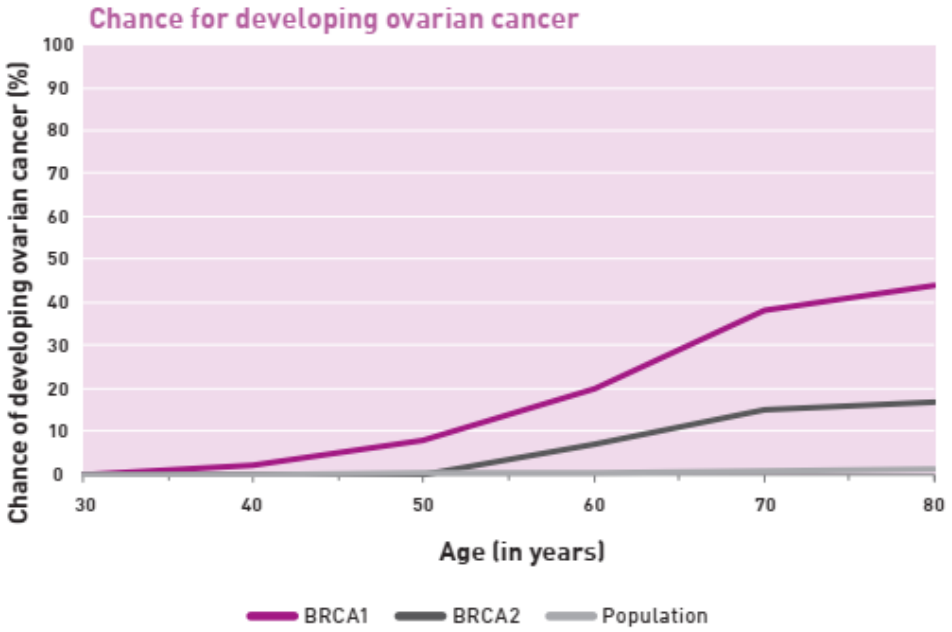
Genetic Risk Assessment

- Family History - information about relationships between individuals and the family's medical history, determine inheritance pattern, ethnicity
- Confirmation of family history
- Pathology Reports, Immunohistochemistry
- Computer Algorithms
- EviQ guidelines
- Review with clinical geneticist
- Genetic testing and/or screening and management advice
- Discussion of psychosocial issues
- Dissemination of information and genetic test results

Hereditary Breast and Ovarian Cancer

- Population risk of breast cancer = 1 in 8 (12%)
- Population risk of ovarian cancer = 1 in 100 (1%)
- 5-10% of cases of breast and ovarian cancer are due to an inherited predisposition
- Females with a mutation in the BRCA 1 or BRCA 2 genes have an increased risk of developing breast, ovarian or pancreatic cancer
- Males have an increased risk of developing breast, prostate or pancreatic cancer


Chance for developing breast cancer
Chance of developing breast cancer (%)
100
90
80
70
60
50
40
30
20
10
0
20
30
40
50
60
70
80
Age (in years)
BRCA1
BRCA2
Population


Chance for developing ovarian cancer
Chance of developing ovarian cancer (%)
100
90
80
70
60
50
40
30
20
10
0
30
40
50
60
70
80
Age (in years)
BRCA1
BRCA2
Population

Colorectal Cancer and Polyposis

- Population risk of bowel cancer in females – 1 in 17
- Population risk of bowel cancer in females – 1 in 12
- 5-10% of cases of colorectal cancer are due to an inherited predisposition
- Common referrals
  - Lynch syndrome – mutation in a Mis-Match Repair (MMR) gene – MLH1, PMS2, MSH6 and MSH2
  - Familial Adenomatous Polyposis – mutation in the APC gene
  - Polyposis

EviQ Guidelines

- National group of cancer genetic health professionals review international literature on regular basis and formulate best practise guidelines.
- https://www.eviq.org.au/
- Referral Guidelines
- Genetic Testing Guidelines
- Risk Management Guidelines
- Information Sheets for Individuals and Families

NSW GOVERNMENT | eviQ

Referral guidelines for breast cancer risk assessment and consideration of genetic testing

ID: 1620 v.3 **Endorsed**

Guideline

All of the people who fall into the categories below warrant a referral to a cancer genetic clinic for assessment.

Breast cancer
UNTESTED adult blood relative of a person with an identified mutation in a breast and/or ovarian cancer predisposition gene (e.g. BRCA1 or BRCA2, TP53, PTEN, STK11, PALB2, CDH1)

Tumour pathology
Characteristics that warrant **referral** irrespective of other factors
Triple negative breast cancer (TNBC) diagnosed <50 years (TNBC: oestrogen, progesterone and HER2 receptor negative)

For those with a personal history of cancer
Individual characteristics that warrant **referral** irrespective of other factors
Male breast cancer at any age
Breast cancer and Jewish ancestry
Two primary breast cancers in the same person, where the first occurred under age 60 years
Two or more different but associated cancers in the same person at any age (e.g. breast and ovarian cancer)
Breast cancer <40 years
Lobular breast cancer AND a family history of lobular breast or diffuse-type gastric cancer
Breast cancer <50 years with limited family structure or knowledge (e.g. adopted)
Breast cancer and a personal or family history suggestive of: • Peutz-Jegher syndrome (oral pigmentation and/or gastrointestinal polyposis) • PTEN hamartoma syndrome (macrocephaly, specific mucocutaneous lesions, endometrial or thyroid cancer) • Li Fraumeni syndrome (breast cancer <50 years, adrenocorticocarcinoma, sarcoma, brain tumours).

For those with a family history of cancer
Characteristics sufficient to warrant **referral** irrespective of other factors
Two 1st or 2nd degree relatives diagnosed with breast or ovarian cancer plus one or more of the following on the same side of the family:* • additional relative(s) with breast or ovarian cancer • breast cancer diagnosed <50 years • more than one primary breast cancer in the same woman • breast and ovarian cancer in the same woman • Jewish ancestry • breast cancer in a male • pancreatic cancer • high grade (>/= Gleason 7) prostate cancer.

If the type of ovarian cancer is not known consider referral: The family cancer clinic will attempt to verify the histological type of ovarian cancer and determine whether testing is appropriate.

**When possible, genetic testing should be performed first on the affected family member.*

Referral Guidelines – EviQ

Individual Characteristics

- Breast cancer diagnosed <40yrs of age (will be offered genetic testing)
- Bilateral breast cancer – first diagnosis before 60yrs
- Male breast cancer
- Epithelial ovarian cancer diagnosed ≤ 60yrs
- Individual with both breast and ovarian cancer diagnosed at any age

- Blood relative of known mutation carrier

Referral Guidelines – EviQ

Family history Characteristics

- Two 1st or 2nd degree relatives diagnosed with breast or ovarian cancer plus one or more of the following on the same side of the family:
  - Additional relatives with breast or ovarian cancer
  - Breast cancer dx <50yrs
  - More than 1 primary breast cancer in the same individual
  - Breast and ovarian cancer in the same individual
  - Male breast cancer
  - Ashkenazi Jewish Ancestry
  - Pancreatic cancer
  - High grade prostate cancer

Referral Guidelines – EviQ

Tumour Characteristics

- Triple negative breast cancer ≤ 50yrs of age (ER, PR and HER2 neg) – will be offered genetic testing
- High grade (grades 2 & 3) non-mucinous epithelial ovarian, fallopian tube or primary peritoneal cancer (will be offered genetic testing if ≤ 70yrs)
- Ovarian cancer that is MMR-deficient (Lynch Syndrome)

Referral guidelines for colorectal cancer or polyposis risk assessment and consideration of genetic testing

ID: 657 v.6 Endorsed

Guideline

All of the people who fall into the categories below warrant a referral to a family cancer clinic for assessment.

Colorectal cancer
• UNTESTED blood relative of a person with an identified pathogenic variant in a colorectal cancer predisposition gene (e.g. MLH1, MSH2, MSH6, PMS2, APC, STK11) • Sibling or partner of a person with 2 pathogenic variants in MUTYH

Tumour pathology characteristics
Characteristics that warrant **referral** irrespective of other factors
2 or more hamartomatous colorectal polyps at any age
2 or more juvenile colorectal polyps at any age
Any number of Peutz-Jeghers polyps (any site) at any age
20 or more (cumulative) adenomatous colorectal polyps at any age
10 or more (cumulative) adenomatous colorectal polyps by age 30 years
20 or more (cumulative) serrated colorectal polyps at any age
CRC or polyp where tumour testing detected microsatellite instability (MSI) or abnormal MMR immunohistochemistry (except where there is loss of expression of MLH1, and either hypermethylation of the MLH1 promoter or the BRAF V600E pathogenic variant is detected in the tumour)

For those with a personal history of cancer or colorectal polyps
Individual characteristics that warrant **referral** irrespective of other factors
Isolated colorectal cancer (CRC) diagnosed under the age of 50 yrs
Personal history of CRC and a second Lynch syndrome associated cancer (including 2 colorectal cancers)
Personal history of CRC AND a family history of 1 or more 1st or 2nd degree relatives with colorectal or endometrial cancer, with at least one of the cancers diagnosed under the age of 50 years
Personal history of CRC AND a family history of 2 or more 1st or 2nd degree relatives with a Lynch syndrome-associated cancer, regardless of the age the cancers were diagnosed
Personal history of intra-abdominal or abdominal wall desmoid tumour diagnosed under the age of 60 years
Personal history of numerous gastric fundic gland polyps in the absence of treatment with a proton pump inhibitor

For those with a family history of cancer
Characteristics sufficient to warrant **referral** irrespective of other factors
Family history of 2 or more 1st or 2nd degree relatives with colorectal or endometrial cancer, at least one of the cancers diagnosed under the age of 50 years
Family history of 3 or more 1st or 2nd degree relatives with a Lynch syndrome related cancer, regardless of the age the cancers were diagnosed

Lynch syndrome-associated cancer includes adenocarcinoma of the colorectum, endometrium, small intestine, stomach, ovary, or pancreas, transitional cell carcinoma of the ureter or renal pelvis, cholangiocarcinoma, brain tumour, sebaceous gland tumours, keratoacanthoma.

Computer Algorithms

- BOADICEA – Breast and Ovarian Analysis of Disease Incidence and Carrier Estimation Algorithm
  - Computer algorithm
  - Predicts chance of finding a mutation in BRCA1, BRCA2, PALB2 and ATM genes
  - Provides age specific risks of breast and ovarian cancer for target individual
- If chance of finding a mutation is ≥10% individual is eligible for medicare rebateable genetic testing
- Manchester Score = ≥15 (equivalent to ≥10%)

Advances in Genetic Testing

- Previously if no mutation found in BRCA1 and BRCA2 there was no other testing available – in approximately 70% of cases there is an inconclusive result
- Now offer BRCA1/2 Plus Panel to most patients
  - BRCA1
  - BRCA2
  - PALB2 – increased risk of breast and pancreatic cancer
  - ATM (c.7271T>G) - increased risk of breast and pancreatic cancer
  - TP53 – increased risk of multiple cancer types including breast, sarcomas, brain tumours, gastric, colorectal, lung, prostate, renal and pancreatic
- Shift in when testing in being requested
  - Previously was mainly offered after treatment was complete
  - Now being requested by clinicians early in treatment to assist with management eg surgical decisions, tailoring chemotherapy options

Types of Genetic Testing

- Medicare rebateable genetic testing
- Publically funded genetic testing
- Privately funded genetic testing – previously $2000 for BRCA1/2, now $450 for BRCA1/2 Plus Panel

Possible results

- Mutation Screen
  - Pathogenic variant – Predictive testing available for other family members
  - Inconclusive – no abnormalities detected
  - Variant of Unknown Significance (VOUS) - Predictive testing not available for other family members
- Predictive Genetic Testing
  - Positive – familial mutation present
  - Negative – familial mutation absent – at population risk of developing cancer

Contact

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