Supplemental Appendix B – Recommendations for genetic counselling

Name of guideline/Organization	Country	Target population	Recommendation statement	Recommendation grade/evidence level
Australasia (one guideline)				
Cancer Australia 2014	Australia	Breast cancer patients (*BRCA* mutation) Women only	Offer genetic counselling to women diagnosed with breast cancer who are considered at high risk of a mutation in a breast cancer predisposition gene at the time of diagnosis. If possible, also offer women genetic testing shortly after their breast cancer diagnosis to inform decision-making.	Expert opinion/consensus Recommended/use
North America (six guidelines)				
Toward Optimized Practice 2013	Canada	Patients with familial risk Women only TNBC relative	Women with families (maternal or paternal) meeting the criteria below should be referred to Medical Genetics in Edmonton or Calgary for potential counselling: breast cancer that is hormone receptor negative and HER2 negative (a.k.a. triple negative)	Expert opinion/consensus Recommended/use
		Patients with familial risk Women only Ashkenazi Jewish	Women with families (maternal or paternal) meeting the criteria below should be referred to Medical Genetics in Edmonton or Calgary for potential counselling: breast or ovarian cancer in a family with Ashkenazi Jewish	
		Patients with familial risk Women only Relative with male breast cancer	Women with families (maternal or paternal) meeting the criteria below should be referred to Medical Genetics in Edmonton or Calgary for potential counselling: male breast cancer, age 65 or younger	
		Patients with familial risk Women only Relative with *BRCA*	Women with families (maternal or paternal) meeting the criteria below should be referred to Medical Genetics in Edmonton or Calgary for potential counselling: *BRCA1* or *BRCA2* mutation in the family.	

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		mutation		
ACMGG & NSGC 2015	USA	Patients with familial risk Women only	The following would warrant a referral for a cancer genetic consultation: breast cancer diagnosis at age ≤50; ≥2 primary breast cancers in the same person; ≥3 cases of breast, ovarian, pancreatic, and/or aggressive prostate cancer in close relatives, including the patient; breast cancer and one additional Li–Fraumeni syndrome tumor in the same person or in two relatives, one diagnosed at age ≤45; breast cancer and ≥1 Peutz–Jeghers polyp in the same person; lobular breast cancer and diffuse gastric cancer in the same person; lobular breast cancer in one relative and diffuse gastric cancer in another, one diagnosed at age <50; or breast cancer and two additional Cowden syndrome criteria in the same person	NR or unclear May use/option for use
		Patients with familial risk TNBC	Triple-negative breast cancer diagnosis at age ≤60 warrants a referral for a cancer genetic consultation	
		Patients with familial risk Ashkenazi Jews	Ashkenazi Jewish ancestry and breast cancer at any age warrants a referral for a cancer genetic consultation	
		Patients with familial risk Men only	A single case of breast cancer in a male would warrant a referral for a cancer genetic consultation.	
ACS/ASCO 2015	USA	Patients with familial risk Women only	It is recommended that primary care clinicians (a) should assess the patient's cancer family history; and (b) should offer genetic counselling if potential hereditary risk factors are suspected (eg women with a strong family history of cancer)	NCCN category 2A Recommended/use
NCCN Familial High-Risk v1.2018	USA	Patients with familial risk	Cancer risk assessment and genetic counselling is highly recommended when genetic testing is offered (pretest counselling) and after results are disclosed (post-test counselling); a genetic counsellor, medical geneticist, oncologist, surgeon, oncology nurse, or other health professional with expertise and experience in cancer genetics should be involved early in the	NCCN category 2A Recommended/use

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			counselling of patients	
			Pre-test counselling includes: collection of a comprehensive family history (up to 3rd degree relatives on each side of the family); evaluation of the patient's cancer risk; generating a differential diagnosis and educating the patient on inheritance patterns, penetrance, variable expressivity and possibility of genetic heterogeneity; preparing the patient for possible outcomes of testing including positive (pathogenic, likely pathogenic), negative and uncertain findings and obtaining informed consent	
			Post-test counselling includes discussion of: results along with their significance and impact and recommended medical management options; interpretation of results in context of personal and family history of cancer; informing and testing at-risk family members; available resources such as disease-specific support groups and research studies	
			Advise about possible inherited cancer risk to relatives, options for risk assessment, and management	
			Recommend genetic counselling and consideration of genetic testing for at-risk relatives	
			Individuals from a family with a known deleterious *BRCA1/BRCA2* gene mutation should have further personalized risk assessment, genetic counselling and often genetic testing and management	
		Breast cancer patients with familial risk Ashkenazi Jews	Individuals with a personal history of breast cancer and who have an ethnicity associated with higher mutation frequency (eg Ashkenazi Jewish), may not be required to have any additional family history in order to have further personalized *BRCA1/2* risk assessment and genetic counselling	
		Other cancer patients Men only	Individuals with a personal history of male breast cancer should have further personalized *BRCA1/2* risk assessment, genetic counselling and often genetic testing and management	
			Individuals with a personal history of high grade prostate cancer (Gleason score ≥7) at any age with ≥1 close blood relative with ovarian carcinoma at any age or breast cancer ≤50yrs or two relatives with breast, pancreatic, or prostate cancer (Gleason score ≥7 or metastatic) at any age should have further	

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			personalized *BRCA1/2* risk assessment, genetic counselling and often genetic testing and management	
			Individuals with a personal history of metastatic prostate cancer (radiographic evidence or biopsy-proven disease) should have further personalized *BRCA1/2* risk assessment, genetic counselling and often genetic testing and management	
		Other cancer patients Ashkenazi Jews	Individuals with a personal history of pancreatic cancer and Ashkenazi Jewish ancestry should have further personalized *BRCA1/2* risk assessment, genetic counselling and often genetic testing and management	
		Patients with *BRCA* mutation	Individuals with *BRCA1/2* pathogenic mutation detected by tumor profiling on any tumor type in the absence of germline mutation analysis should have further personalized *BRCA1/2* risk assessment, genetic counselling and often genetic testing and management	
			In *BRCA*-positive women counselling should include discussion the option of risk-reducing mastectomy, regarding degree of protection, reconstruction options, and risks; family history and residual breast cancer risk with age and life expectancy should also be considered during counselling	
			In *BRCA*-positive women psychosocial, social and quality of life aspects of undergoing risk-reducing mastectomy and/or salpingo-oophorectomy should be addressed	
			As part of cancer risk assessment and counselling *BRCA*-positive men and women should be advised about possible inherited cancer risk to relatives and options for risk assessment and management should be discussed	
			Genetic counselling and consideration of genetic testing should be recommended to at-risk relatives of *BRCA*-positive individuals	
			For *BRCA-positive* patients of reproductive age, advise about options for prenatal diagnosis and assisted reproduction, including pre-implantation genetic diagnosis; discussion should include known risks, limitations, and benefits of these technologies	
SGO 2015	USA	Patients with familial risk	Individuals with a likelihood of inherited predisposition to cancer based on personal or family history should be offered genetic	Expert opinion/consensus

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		Women only	counselling. Referral for counselling and consideration of genetic testing for HBOC genes should be offered to women who are unaffected with cancer but with a close relative carrying a known *BRCA1* or *BRCA2* mutation	Recommended/use
			Women should be offered genetic counselling if unaffected with cancer, but with: a first degree or several close relatives that meet one of the criteria for screening; including a close relative with male breast cancer	
			Women should be offered genetic counselling if unaffected with cancer, but with a close relative carrying a known *BRCA1* or *BRCA2* mutation	
		Other cancer patients Women only	Women should be offered genetic counselling if affected with: high grade epithelial ovarian/tubal/peritoneal cancer	
			Individuals with a personal history of ovarian carcinoma should have further personalized *BRCA1/2* risk assessment, genetic counselling and management	
		Breast cancer patients with familial risk Women only	Women should be offered genetic counselling if affected with: breast cancer ≤45 years; breast cancer with close relative with breast cancer ≤50 years or close relative with epithelial ovarian/tubal/peritoneal cancer at any age; breast cancer ≤50 years with a limited family history; breast cancer with ≥2 close relatives with breast cancer at any age; breast cancer with ≥2 close relatives with pancreatic cancer, aggressive prostate cancer (Gleason score ≥7); two breast primaries, with the first diagnosed prior to age 50	
		Breast cancer patients with familial risk TNBC	Women should be offered genetic counselling if affected with: triple negative breast cancer ≤60 years	
		Breast cancer patients with familial risk Ashkenazi Jews	Women should be offered genetic counselling if affected with breast cancer and Ashkenazi Jewish ancestry	
		Cancer patients with familial risk	Women should be offered genetic counselling if affected with: pancreatic cancer with ≥2 close relatives with breast,	

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		Women only	ovarian/tubal/peritoneal, pancreatic, or aggressive prostate cancer (Gleason score ≥ 7)	
USPSTF BRCA-Related Cancer 2013	USA	Patients with familial risk Women only	The USPSTF recommends that primary care providers screen women who have family members with breast, ovarian, tubal, or peritoneal cancer with 1 of several screening tools designed to identify a family history that may be associated with an increased risk for potentially harmful mutations in breast cancer susceptibility genes (*BRCA1* or *BRCA2*). Women with positive screening results should receive genetic counselling and, if indicated after counselling, BRCA testing.	USPSTF category B Recommended/use
Europe (eight guidelines)				
ESMO diagnosis & treatment 2015	Europe	Patients with familial risk	The possibility of hereditary cancer should be explored and, if needed, prophylactic procedures discussed, following appropriate genetic counselling and testing	Grade D Recommended/use
ESMO prevention & screening 2016	Europe	Patients with g*BRCA* mutation Women only	Follow-up counselling outlining options for screening for early detection, risk-reducing measures and issues pertaining to fertility in women who have not completed their family is fundamental	Grade B Recommended/use
			Women harboring a *BRCA1/2* mutation who have been diagnosed with a malignancy should be counselled about options for fertility preservation before the commencement of oncology treatment	
			Women should be advised there is no safety data are available about the use of HRT among *BRCA1/2* carriers with a previous diagnosis of breast cancer. The relationship between hormonal influences and the development of different breast cancer subtypes, including triple negative breast cancers, has not been fully elucidated, thus HRT in the setting of a past breast cancer diagnosis should be strongly discouraged - irrespective of endocrine status of the initial tumor	Grade B Not recommended/do not use
		Patients with g*BRCA* mutation	Discussion with individuals should address issues of quality of life and the psychosocial impact of risk-reducing interventions	Grade B Recommended/use
			BRCA1/2 carriers can be reassured that there is no convincing evidence that mutation carriers have reduced ovarian reserve or fertility	Grade C Recommended/use

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			BRCA1/2 mutation carriers (male and female) planning to conceive should be made aware of the options of prenatal diagnosis (via choriovillous or amniotic fluid sampling in week 11–20 of gestation) and pre-implantation genetic diagnosis	
ESO-ESMO ABC 3 2017	Europe	Advanced/metastatic breast cancer (*BRCA* mutation) TNBC	In patients with triple negative or luminal metastatic breast cancer, genetic counselling and possibly BRCA testing should be discussed with the patient, if the results can impact on treatment decisions and/or on clinical trials entry.	Expert opinion/consensus Recommended/use
ESO-ESMO BCY3 2017	Europe	Newly diagnosed breast cancer (*BRCA* mutation) Women <40 yrs	Every young woman with breast cancer should be offered genetic counselling preferably before starting treatment. Practice should follow national/international guidelines on a country-by-country basis. For those women who are not ready to consider genetic issues at diagnosis, access to genetic counselling should be offered again during follow-up, to address issues of surveillance and risk reduction of additional primary tumors for the patient, and risk issues for relatives.	Expert opinion/consensus Recommended/use
			Genetic testing should be conducted only following genetic counselling with a genetic counsellor (or other trained health professional) who explains the implications of the results. The patient must be made aware that the presence of a predisposing mutation may have an impact on her management, follow-up and decision making, as well as family members. Genes to be tested for are *BRCA1* and *BRCA2* (other additional high penetrance genes can be tested if deemed necessary by the geneticist).	
		Patients with familial risk Women <40 yrs	Genes to be tested for depend on personal and family history. Although *BRCA1/2* are the most frequently mutated genes, other additional moderate- to high-penetrance genes may be considered, if deemed appropriate by the geneticist/genetic counsellor. Development of quality-controlled genetic counselling services is strongly encouraged.	Expert opinion/consensus May use/option for use
AWMF Registry 2012	Germany	Patients with *BRCA* mutation Women only	Women with a *BRCA1* or *BRCA2* gene mutation, or with a high risk defined as a heterozygous risk > 20% or a permanent lifelong risk of developing the disease > 30%, should seek advice in specialist centers for hereditary breast and ovarian cancer and be	Expert opinion/consensus Recommended/use

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			counselled about an individual early detection strategy	
		Patients with familial risk Women only	Risk communication: Counselling should enable shared decision-making. This requires comprehensive information for the woman and clarifying and including preferences of the women in the decision process. Evidence-based decision aids can improve the decisions of the women. During risk counselling before genetic testing the following topics should specifically be considered: likelihood of the presence of a mutation; risk of developing the disease in case of a positive result; benefits and risks of preventive and therapeutic options including the option of doing nothing; likelihood of false negative results; significance of genetic testing for family members. After receiving the genetic testing results and before offering preventive measures, the following topics should be discussed in depth: risk of illness depending on genetic result, age and concomitant diseases (natural course); likelihood of false positive and false negative results of intensified screening; benefits of preventive options (intensified screening, prophylactic surgery, systemic therapy) with respect to reduction of mortality, morbidity and quality of life; risk of preventive options including long term effects; competing risks, prognosis and treatability in case of development of the disease without preventive measures, taking into account the specific characteristics of the genetically defined tumors subtype; if relevant, risks of associated tumors; availability of psycho oncological counselling	"Good clinical practice"
		Patients with familial risk	Multidisciplinary counselling and genetic testing should be carried out at special centers if one line of the family includes: at least three women who developed breast cancer; at least two women (including one below age 50) who developed breast cancer; at least one woman who developed breast cancer and one woman who developed ovarian cancer; at least two women who developed ovarian cancer; at least one woman who developed breast and ovarian cancer; at least one woman who developed breast cancer before age 36; at least one woman who developed cancer in both breasts before age 51; at least one man who	

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			developed breast cancer and one woman who developed breast or ovarian cancer	
IKNL 2012	Netherlands	Patients with familial risk Women only	The decision to pursue DNA testing should be shared by the clinical geneticist, the medical oncologist and the surgical oncologist, and referral to a center with expertise is advisable. The women must be told that prophylactic contralateral mastectomy (PCM) will barely affect survival, but will strongly reduce their risk of contralateral breast cancer.	Level 2 May use/option for use
LCA 2016	UK	Patients with familial risk Women only	In all families with moderate or high risk NICE referral group criteria should at present, genetic testing should be undertaken only after consultation and counselling by the genetics service.	Expert opinion/consensus Recommended/use
NICE (CG 14 & CG 41 update) 2017	UK	Patients with familial risk Women only	Support mechanisms (for example, risk counselling, psychological counselling and risk management advice) need to be identified, and should be offered to women not eligible for referral and/or surveillance on the basis of age or risk level who have ongoing concerns.	Recommended/use
			Women with no personal history of breast cancer meeting criteria for referral to a specialist genetic clinic should be offered a referral for genetic counselling regarding their risks and options.	
			Women attending genetic counselling should receive standardized information beforehand describing the process of genetic counselling, information to obtain prior to counselling session, the range of topics to be covered and brief educational material about hereditary breast cancer and genetic testing.	
			Offer support (for example, risk counselling, psychological counselling and risk management advice) to women who have ongoing concerns but are not eligible for surveillance additional to that offered by the national breast screening programmes45.	
			Women considering bilateral risk-reducing mastectomy should have genetic counselling in a specialist cancer genetic clinic before a decision is made	
			Pre-operative counselling about psychosocial and sexual consequences of bilateral risk-reducing mastectomy should be	

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			undertaken	
		Patients with familial risk	Predictive genetic testing should not be offered without adequate genetic counselling.	
			All eligible people should have access to information on genetic tests aimed at mutation finding.	
			Pre-test counselling (preferably two sessions) should be undertaken.	
			Discussion of genetic testing (predictive and mutation finding) should be undertaken by a healthcare professional with appropriate training.	
			Eligible people and their affected relatives should be informed about the likely informativeness of the test (the meaning of a positive and a negative test) and the likely timescale of being given the results.	
			Discuss the potential risk and benefits of genetic testing. Include in the discussion the probability of finding a mutation, the implications for the individual and the family, and the implications of either a variant of uncertain significance or a null result (no mutation found).	
			Inform families with no clear genetic diagnosis that they can request review in the specialist genetic clinic at a future date.[	
		Breast cancer patients with familial risk	Offer detailed consultation with a clinical geneticist or genetics counsellor to all those with breast cancer who are offered genetic testing, regardless of the timeframe for testing.	