



Breast Disease and Cancer: Diagnosis

Effective Date: October 1, 2013

Scope

This guideline provides recommendations for:

- investigation of breast complaints and/or symptoms
- diagnosis for breast disease & cancer
- management of common breast diseases in women aged ≥ 19 years.

For breast cancer management recommendations, please refer to BCGuidelines.ca - *Breast Cancer: Management and Follow-up*. Refer to Appendix A for the algorithms associated with these guidelines.

Key Recommendations

- Screening for breast cancer in asymptomatic women as per the BC Cancer Agency's (BCCA) Screening Mammography Program (SMP).
- In order to ascertain the presence of a familial or inherited genetic risk, take a full family history and refer appropriate patients to the Hereditary Cancer Program (HCP) at BCCA.
- Core biopsy is the standard of care to establish a histological diagnosis.
- Women aged ≤ 30 years with breast complaints and/or symptoms (e.g., nipple discharge, mass) should have diagnostic ultrasound as the initial investigation.
- Women aged ≥ 30 years with breast complaints and/or symptoms should have diagnostic mammogram and ultrasound as the initial investigations.
- Pregnant and lactating women with lumps or breast complaints and/or symptoms should be investigated promptly. A diagnostic ultrasound is recommended as the initial investigation.

Screening

Screening for breast cancer in asymptomatic women should be offered as per BCCA's SMP; www.screeningbc.ca/Breast.

Women with breast implants, previous history of breast cancer, and/or breast symptoms are not screened under the SMP, but should be referred for a diagnostic mammogram¹ or other testing as appropriate. For women who do not meet the criteria of the SMP, refer to *Appendix B: Protocol for the Use of Mammography Services at Diagnostic Facilities*.

Advise patients the risks and benefits associated with screening mammograms. Risks include:

1. the possibility of a false-negative result - a mammogram result may be normal, but that does not rule out breast cancer: About 25-30% of breast cancers will not be detected in screening mammograms in women aged 40 to 49, and about 10% of breast cancers will not show up on a mammogram in women aged > 49 years.¹
2. the possibility of a false-positive result – a screening mammogram result that is abnormal that may result in more testing though no cancer was presented. A woman who has an annual mammogram between the ages of 40 – 49 has a 30% chance of receiving at least one false-positive during this time period.^{2,3}
3. radiation exposure – a mammogram is about 0.7 mSv, equivalent to 3 months of background radiation.²

Diagnosis

Women with any breast symptoms should be investigated as described below with diagnostic imaging, and not at screening centres. For descriptions on these procedures, refer to *Appendix C: Diagnostic Imaging Modalities and Procedures of the Breast*.

For breast lesions and/or symptoms arising during pregnancy or lactation, prompt investigation with breast imaging is recommended. Breast cancer during pregnancy is defined as breast cancer occurring during pregnancy or within the year after delivery.

► Investigations

1) Complete history and physical examination:

- a. Take full personal and family history, and ask patient about risk factors listed below.
- b. Conduct a complete breast and axillary lymph node examination.

Risk Factors for Breast Cancer: ¹

- early menarche (before 12 years old)
- late menopause (after 55 years old)
- nulliparity or late age at first birth
- use of hormone replacement therapy long-term
- increasing age
- breast density
- personal history of breast cancer, lobular carcinoma in situ (LCIS) or atypical ductal hyperplasia (ADH)
- family history of breast cancer and/or ovarian cancer, particularly in a patient's close relatives* on the same side of the family
- personal or family history of mutation of the *BRCA1/BRCA2* genes

Anyone from a family with a confirmed mutation in a hereditary cancer gene can be referred for genetic counselling at BCCA's HCP. If the patient's family history of close relatives reveals a possible familial or inherited mutation, consider referral for genetic counselling. For full referral criteria, refer to the *Associated Document: Hereditary Cancer Program Referral Form*.

2) Perform diagnostic imaging: ⁴

- a. For symptomatic women aged ≤ 30 years, **diagnostic ultrasound** is the recommended initial investigation. Mammography may be subsequently indicated.
- b. For symptomatic women aged ≥ 30 years, **diagnostic mammography and ultrasound** are recommended for initial investigation.
- c. For symptomatic women of any age who are pregnant or lactating, **diagnostic ultrasound** is the recommended initial investigation (not mammography).

3) Core biopsy is the standard of care to establish a histological diagnosis.

Include "request to proceed to core biopsy if indicated and feasible" on the same breast imaging requisition. Refer to the *Associated Document: Standard Out-Patient Breast Imaging Requisition*.

* Close relatives include: children, brothers, sisters, parents, aunts, uncles, grandchildren and grandparents on the same side of the family. History of cancer in cousins and more distant relatives from the same side of the family may also be relevant.

► Differential Diagnoses of Breast Diseases

For reference and general guidance, some common breast complaints, findings from physical exam and/or diagnostic imaging are listed below alphabetically. Clinical judgment should be applied in individual cases.

For atypical proliferative lesions, ductal carcinoma in situ (DCIS) and invasive disease, refer to BCGuidelines.ca - *Breast Cancer: Management and Follow-up*.

ABNORMALITY CHARACTERISTICS	MANAGEMENT
Breast Abscess and Infection	
<i>Lactational Infections</i>	
Present as mastitis or an abscess caused by the entry of bacteria (often <i>S. aureus</i>) through the nipple into the duct system. ^{5,6}	Treatment includes frequent breast emptying, antibiotics and drainage of abscess. If erythema and edema persist, inflammatory breast cancer must be ruled out.
<i>Periductal Mastitis</i>	
Occurs in non-lactating women and is associated with smoking, diabetes, ^{6,7} poor hygiene, rheumatoid arthritis, chronic steroid use, and trauma ⁶ . Often chronic, relapsing infections, the inflammatory changes can lead to nipple retraction, subareolar masses and fistula formation.	At the early stage, warm compresses and antibiotics covering aerobic and anaerobic bacteria may be adequate. If an abscess forms, incision and drainage along with antibiotics is required. Excision of the nipple areolar complex is rarely indicated. ⁶
<i>Sebaceous Cysts and Hidradenitis Suppurativa</i>	
Can occur on the breast. ⁶	Manage clinically.
<i>Candidal Infections</i>	
Common in women with large, pendulous breasts, ⁸ often in the area of the inframammary fold or lower breast.	Advise patient to keep the area clean and dry; use topical antifungal treatments. ^{6,8}
Cysts	
Fluid-filled, epithelial lined cavities which vary in size and can be influenced by ovarian hormones. The incidence is greatest in women aged > 35 and declines after menopause. ⁶	If a cyst is suspect, ultrasound is helpful in confirming diagnosis. If aspirated, send BLOODY fluid for cytology. If the cyst recurs more than twice, order ultrasound guided core biopsy of the solid component. Refer for excision if abnormal pathology/cytology, repeated recurrences or patient wishes excision. ⁹
Fibroadenoma	
Benign solid tumor that arises in the late teens and early reproductive years; rarely seen as a new mass in women aged 40 years. ⁶	Confirm diagnosis with ultrasound guided core biopsy. Surgical excision is not required unless symptomatic/request excision or the pathology is not consistent with a fibroadenoma. ¹⁰
Fibrocystic Change	
Characterized by "lumpy" breasts with ridges of tissue felt on palpation ⁶ and can be tender. Common in women between ages 30 and 50. ¹¹	If there is a dominant mass, diagnostic imaging and potentially a core biopsy may be required to rule out a malignancy. Symptoms improve with menopause or oral contraceptive use.
Mastalgia	
Often benign. ⁵ 1. Cyclical breast pain: occurs due to premenstrual changes in the breast. 2. Non-cyclical pain: tends to occur in older women and may be associated to medications listed in Table 1 in Appendix D.	Rule out infection and carcinoma with diagnostic imaging. Management suggestions include: reducing caffeine intake, a supportive bra, non-steroidal anti-inflammatory drugs (NSAIDs), evening primrose oil and flaxseed; (refer to Table 2 in Appendix D). ⁵ There is no surgical management for mastalgia. Women may require reassurance.

ABNORMALITY CHARACTERISTICS	MANAGEMENT
Nipple Discharge	
<i>Milky Discharge</i>	
Milky discharge is considered to be galactorrhea until proven otherwise. Medications associated with galactorrhea are listed in Table 3 in Appendix D.	If the discharge is milky, work-up for galactorrhea. Consider ordering prolactin and thyroid-stimulating hormone (TSH) levels. ⁵ Discourage self-induced discharge.
Dark Brown, Green Nipple or Bloody Discharge	
<i>Dark brown or green nipple discharge</i> is often associated with duct ectasia but can also occur with papillomas and ductal carcinoma in situ (DCIS). ⁶ <i>Bloody nipple discharge</i> is pathologic, most commonly with a solitary intraductal papilloma but DCIS and invasive carcinoma are in the differential. ⁶	The work-up includes diagnostic imaging, cytology of nipple discharge, request core biopsy if a solid lesion is identified. A referral to a surgeon [†] is recommended. ⁶
Nipple Inversion/Retraction	
Congenital nipple inversion occurs in one or both breasts in 10% of women. Acquired nipple inversion is due to duct ectasia, abscess and cancer. Benign causes yield a central, symmetric transverse slit in the nipple with a normal areola. Malignancy causes asymmetrical changes, changes to the areola, a possible palpable mass or flattening of the nipple and the retraction may vary with position of the breast.	Image new nipple changes with diagnostic imaging.
Paget's Disease	
Associated with a form of breast cancer and must be differentiated from eczema and dermatitis. Paget's presents as erythema, change in pigmentation, flaking or a non-healing sore on the nipple-areolar complex. ⁹	Does not respond to steroid treatment. ⁵ Diagnostic imaging is required to assess for an underlying lesion. Refer to a surgeon [†] for a possible biopsy. ⁹ Skin punch biopsy can be done by GP to expedite diagnosis.
Papillomas	
Solitary papillomas are most often close to the areola. Peripheral papillomas should be excised to differentiate from invasive papillary carcinoma.	Treatment involves diagnostic imaging, core biopsy, and excision to rule out any associated cancer.
Phyllodes Tumour	
A fibroepithelial lesion similar a fibroadenoma. Its growth is often more rapid than a fibroadenoma and it tends to be larger. Can be benign, borderline or malignant. Lungs are the most common site of distant metastases in malignant phyllodes. ¹²	A core needle biopsy (excisional in some cases) is required to differentiate it from a fibroadenoma. ¹⁰ Phyllodes have a low metastatic potential but tend to be locally recurrent. Refer patient to a surgeon [†] .
Radial Scar	
Complex sclerosing lesion which can mimic a cancer both mammographically and clinically. A radial scar itself is benign however it has been associated with breast cancer.	If a core biopsy reveals a radial scar, excisional biopsy is recommended to rule out any associated cancer. ⁶
Sclerosing Adenosis	
Proliferation of lobules with poorly formed lumina. It has no malignant potential.	May contain microcalcifications on mammograms which leads to a core biopsy. ^{6,9}

[†] Where possible, refer to a surgeon with experience or special interest in the breast.

► References

- 1 BC Cancer Agency. Available from www.bccancer.ca.
- 2 Canadian Association of Radiologists. Radiology for patients [Mammography]. Available from: www.radiologyinfo.ca.
- 3 Fitzpatrick-Lewis D, Hodgson N, Ciliska D, et al. Breast Cancer Screening. 2011. McMaster University, Hamilton, Ontario, Canada. Available from: canadiantaskforce.ca/wp-content/uploads/2012/09/Systematic-review.pdf?9d7bd4.
- 4 Canadian Association of Radiologists. CAR Diagnostic Imaging Referral Guidelines: Section M Breast disease. 2012. Available at www.car.ca/en.aspx.
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- 6 Townsend CM, Beauchamp RD, Evers BM, Mattox KL. Sabiston textbook of surgery (19th edition): The biological basis of modern surgical practice. 2012. ISBN: 978-1-4377-1560-6.
- 7 Dixon JM, RaviSekar I, Cheety U, Anderson TJ. Periductal mastitis and duct ectasia: different conditions with different aetiologies. *Br J Surg*. 1996; 83:820-2.
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- 10 Flint L (Ed.). Breast diseases. Selected readings in general surgery. 2010; 36(6).
- 11 Santen RJ, Mansel R. Benign breast disorders. *N Engl J Med*. 2005; 353(3);275-85.
- 12 Khosravi-Shahi P. Management of non metastatic phyllodes tumors of the breast: Review of the literature. *Surgical Oncology*. 2011; doi: 10.1016/j.suronc.2011.04.007.

► Resources

- BC Cancer Agency, Screening Mammography Program of BC, Hereditary Cancer Program, www.bccancer.bc.ca, which includes many patient resources.
- HealthlinkBC - Health information, translation services and dietitians, www.healthlinkbc.ca or by telephone 811.
- Canadian Cancer Society, www.cancer.ca

► Appendices

- Appendix A: Algorithms of Breast Cancer & Disease guidelines
- Appendix B: Protocol for the Use of Mammography Services at Diagnostic Facilities
- Appendix C: Diagnostic Imaging Modalities and Procedures of the Breast
- Appendix D: Medication Tables Associated with Mastalgia and Nipple Discharge

► Associated Documents

The following document accompanies this guideline:

- BCGuidelines.ca - *Breast Cancer: Management & Follow-up*
- Hereditary Cancer Program Referral Form (BCCA, October 2012)
- Standard Out-Patient Breast Imaging Requisition (HLTH 1906)

This guideline is based on scientific evidence current as of the Effective Date.

This guideline was developed by the Guidelines and Protocols Advisory Committee, approved by the British Columbia Medical Association, and adopted by the Medical Services Commission.

THE GUIDELINES AND PROTOCOLS ADVISORY COMMITTEE

The principles of the Guidelines and Protocols Advisory Committee are to:

- encourage appropriate responses to common medical situations
- recommend actions that are sufficient and efficient, neither excessive nor deficient
- permit exceptions when justified by clinical circumstances

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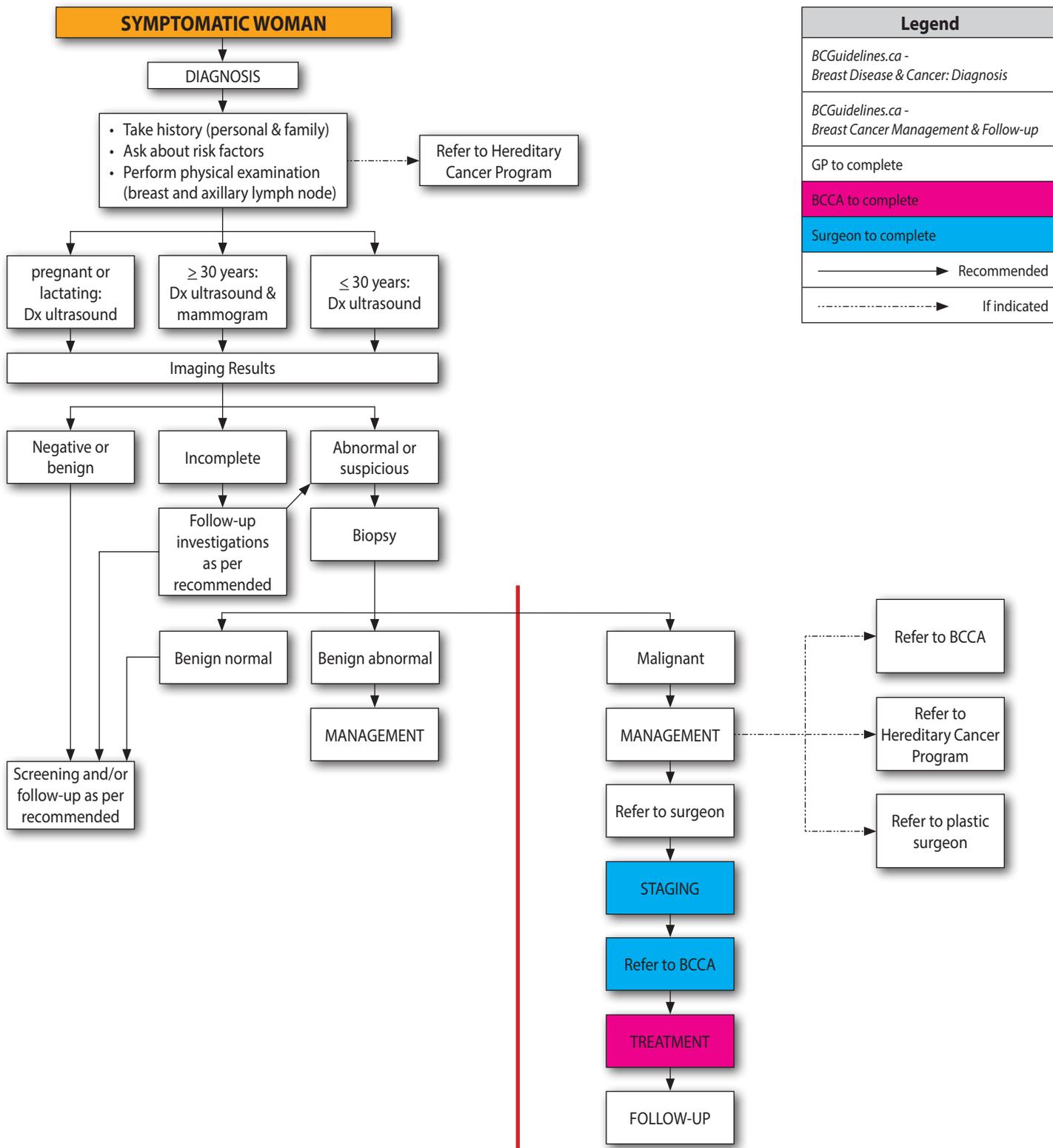
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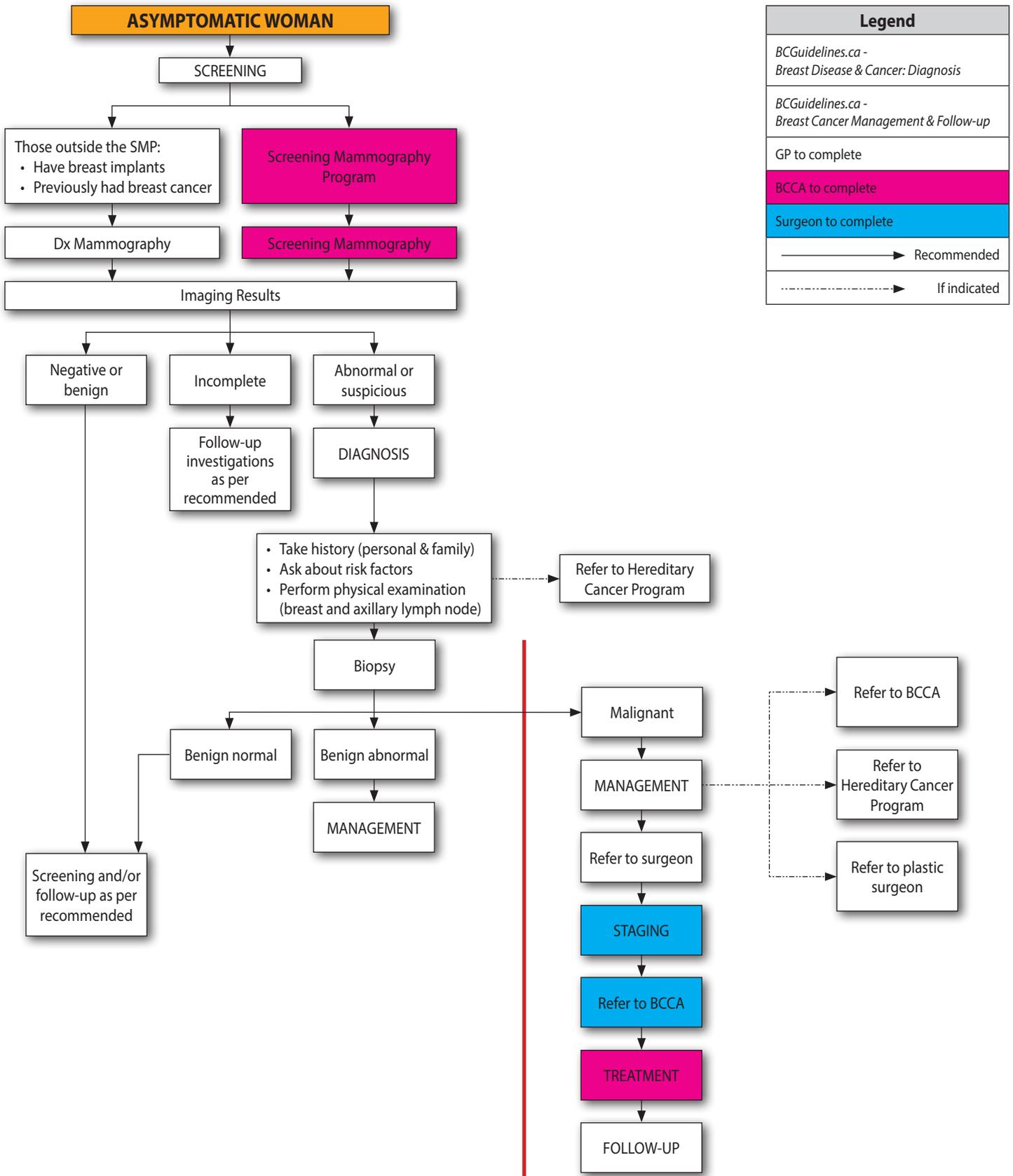
The Clinical Practice Guidelines (the "Guidelines") have been developed by the Guidelines and Protocols Advisory Committee on behalf of the Medical Services Commission. The Guidelines are intended to give an understanding of a clinical problem, and outline one or more preferred approaches to the investigation and management of the problem. The Guidelines are not intended as a substitute for the advice or professional judgment of a health care professional, nor are they intended to be the only approach to the management of clinical problem. **We cannot respond to patients or patient advocates requesting advice on issues related to medical conditions. If you need medical advice, please contact a health care professional.**



Appendix A: Algorithms of Breast Cancer & Disease Guidelines



Legend	
BCGuidelines.ca - Breast Disease & Cancer: Diagnosis	
BCGuidelines.ca - Breast Cancer Management & Follow-up	
GP to complete	
BCCA to complete	
Surgeon to complete	
→	Recommended
- - - - ->	If indicated





Appendix B: Protocol for the Use of Mammography Services at Diagnostic Facilities

This protocol applies to mammography services **not** provided by the BC Cancer Agency's (BCCA) Screening Mammography Program (SMP) and billed to the Medical Services Plan (MSP).

Diagnostic Mammograms

The indications for a diagnostic mammogram must be entered on the requisition form. Those patients requiring a diagnostic mammogram include:

1) Patients with breast complaints and/or symptoms.

Acceptable indications would include, for example:

- women with signs and symptoms suggestive of breast disease – to include lump or discrete thickening, localized nodularity, dimpling or contour deformity, suspicious nipple discharge, non-cyclical localized pain or tenderness
- work-up of patient with abnormal screening mammogram
- first postoperative mammogram following a benign biopsy
- search for unknown primary malignancy

2) Patients with breast implants.

Acceptable indications would include, for example:

- suspected complications of breast implants (e.g., rupture, pathological capsule)
- for screening purposes but otherwise following the SMP guidelines for women without implants (e.g., age, frequency, etc.).

3) Patients who have had breast cancer.

Acceptable indications would include, for example:

- follow-up of women with proven breast cancer, and those with previous biopsy result of atypia or proliferative disease and lobular carcinoma in situ (LCIS)
- surveillance follow-up as recommended based on diagnostic work-up

Mammograms for Screening Purposes

The indications for a screening mammogram outside the SMP must be entered on the requisition form. Those patients requiring a screening mammogram include:

1) Patients aged < 40 years who are asymptomatic but are considered to be in a high-risk group.

- Patients aged < 40 years who are considered high-risk **can be** referred to the SMP by their family physician and should be arranged with a radiologist at the SMP centre of choice.
- Patients that are considered high-risk include:
 - have personal or family history of mutations of the *BRCA1* or *BRCA2* genes,
 - have a very strong family history of breast cancer. A very strong family history of breast cancer may be defined as:
 - 2 cases of breast cancer in close female relatives on the same side of the family, both diagnosed before age 50; or
 - 3 or more cases of breast cancer in close female relatives on the same side of the family, with at least one diagnosed before age 50.

2) Patients who qualify for the SMP service but do not have reasonable access.

- Reasonable access is defined as: available appointment with the SMP (centre or mobile vans) within two months and travel time to a SMP facility of less than one hour under ideal conditions.

3) Patients with breast implants.

- Do not send patients with breast implant to SMP for screening purposes. These patients are screened at diagnostic facilities and should follow the SMP guidelines for women without implants (e.g., age, frequency, etc.)

Administration and Audit Implications

► Responsibility for Documentation

Referring/Ordering Physician

- **Diagnostic Mammograms**

Physician must document indications(s) for a diagnostic mammogram consistent with this protocol in the patient's clinical record, and on the requisition form.

- **Screening Mammograms**

Physician must provide adequate documentation in both the patient's clinical record and the requisition to show that the request is consistent within this protocol.

Diagnostic Facility

- **Diagnostic Mammograms**

In order for the service to be covered by MSP, the facility must ensure that the indication for a diagnostic mammogram is adequately documented on the patient's requisition form.

- **Screening Mammograms**

In order for the service to be covered by MSP, the facility must ensure the documentation on the patient's requisition form meets one or more of the criteria listed within this protocol.



Appendix C: Diagnostic Imaging Modalities and Procedures of the Breast

Screening mammography: an imaging examination (x-ray) of the breast performed to detect unsuspected breast cancer in asymptomatic women. Standard views consisting of a Medial–Lateral Oblique view and a Cranio–Caudal view of both breasts are obtained.¹

Diagnostic mammography: an imaging examination (x-ray) of the breast performed to evaluate symptomatic women, image findings of concern, or to follow-up from a previous image. Includes additional views to those in screening mammography such as magnification views (for characterization of calcifications) and spot compression views.¹

Breast Imaging Reporting and Database System (BI-RADS[®]) is a standardized classification system (scale 0-6) for radiologists to use to communicate mammogram findings to the family physician. Follow-up recommendations, including which method of sampling is required for the lesion(s) in question, will be suggested by the radiologist.

Table 1. Breast Imaging Reporting and Database System (BI-RADS[®]) – 4th Edition²

Category	Assessment	Finding	Follow-up Recommendation	
0	Incomplete	Need additional imaging evaluation and/or prior mammograms for comparison.	Additional imaging and/or obtain prior images for comparison	
1	Complete	Negative	Routine screening mammograms	
2		Benign finding(s)	Routine screening mammograms	
3		Probably benign finding	Follow-up 6-month mammogram	
4		Suspicious abnormality	Biopsy should be considered	
		<i>Optional subdivisions:</i>		
		<i>4A: Finding needing intervention with a low suspicion for malignancy</i> <i>4B: Lesions with an intermediate suspicion of malignancy</i> <i>4C: Findings of moderate concern, but not classic for malignancy</i>		
5	Highly suggestive of malignancy	Biopsy required		
6	Known biopsy-proven malignancy	Appropriate action should be taken		

Diagnostic ultrasound:³ an imaging examination of the breast performed to examine a targeted area for the evaluation of any abnormalities. It may be used as initial diagnostic investigation in women aged ≤ 30 years due to their denser breasts. It may also be performed in conjunction with a mammogram to assist in a diagnose. Ultrasound is useful for characterization of cysts (simple versus complex) and is very accurate for characterizing simple cysts which can then be aspirated if symptomatic. Ultrasound is not considered as an acceptable screening tool for breast cancer.^{3,4}

Core biopsy: a procedure that removes tissue samples from breast lesions using a hollow needle. An image-guided (ultrasound, MRI, stereotactic) core biopsy is the standard of care for the establishment of a histological diagnosis.⁵

Fine Needle Aspiration: a procedure that removes breast tissue samples using a very fine needle from an abnormal area. It is limited to sampling of lymph nodes suspected of metastatic disease or aspiration of symptomatic cysts.

Excisional biopsy: a procedure that removes the entire breast lesion by surgery. It is limited to instances where a core biopsy for diagnosis is not possible for physical reasons or patient preference.

Thermography: an imaging examination that uses infrared cameras to produce images of temperature variations within the breast. There is no scientific evidence to support the use of thermography as a screening or diagnostic tool for breast cancer. Thermography can miss an abnormality that requires further investigation, and has a high false-positive rate which may lead to unnecessary tests.⁶ Thermography equipment has not been licensed for breast cancer screening in Canada.⁷

Magnetic Resonance Imaging (MRI):⁴ an imaging examination of the breast performed to examine a targeted area for the evaluation of any abnormalities. However, the use of a breast MRI in any specific cancer indication lacks any strong supporting evidence. A breast MRI should only be considered after a mammogram and an ultrasound have been performed. Recommended uses of a breast MRI include screening of women with the *BRCA 1* and/or *BRCA 2* gene and for the evaluation of occult breast cancer. It is also appropriate for the assessment of rupture/integrity/complications of silicone implants. **A breast MRI is not appropriate for screening purposes in the general population**, or determining if the lesion is benign or not. For more information on who should receive a breast MRI, refer to BCCA, www.bccancer.bc.ca.

► References

- 1 American College of Radiology Joint Committee on Breast Imaging. ACR practice guideline for the performance of screening and diagnostic mammography. 2008 (Resolution 24).
- 2 D'Orsi CJ, Bassett LW, Berg WA, et al. BI-RADS: Mammography, 4th edition. In: D'Orsi CJ, Mendelson EB, Ikeda DM, et al. Breast Imaging Reporting and Data System: ACR BI-RADS – Breast Imaging Atlas, Reston, VA, American College of Radiology, 2003.
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Appendix D: Medication Tables Associated with Mastalgia and Nipple Discharge

Table 1. Medications associated with mastalgia ^{1,2}

Medications
oral contraceptives
hormone (estrogen) replacement therapy
antidepressants
digoxin
methyl dopa
spironolactone
oxymetholone
chlorpromazine

Table 2. Medications used to treat* mastalgia ^{1,2}

Medications
dietary flaxseed
acetaminophen
nonsteroidal anti-inflammatory drugs (e.g., diclofenac 2% gel)
oral contraceptives
tamoxifen
danazol
bromocriptine
evening primrose oil

Note: *Mastalgia often has a natural history or remission and relapse, placebo response in trials is often high and therefore the overall evidence is not strong to support a particular 'treatment'.

Table 3. Medications associated with mastalgia

Category	Medications
Medications that block dopamine receptor	Antipsychotics (especially the phenothiazine class. e.g., chlorpromazine, methotrimeprazine, thioridazine) and risperidone, domperidone, metoclopramide, selective serotonin reuptake inhibitors, tricyclic antidepressants
Medications that deplete dopamine	methyl dopa, reserpine
Medications that inhibit release of dopamine	codeine, heroin, morphine
Medications that stimulate lactotrophs	oral contraceptives, verapamil
Medications that block histamine H2-receptor	cimetidine, famotidine, ranitidine

► References

- 1 Meisner AL, Fekrazad MH, Royce ME. Breast disease: Benign and malignant. *Med Clin North Am* 2008;92:1115-4.
- 2 Rosolowich V, Saettler E, Szuck B, et al. Mastalgia. *J Obstet Gynaecol Can* 2006;28:49,71; quiz 58-60,72-4.
- 3 Pena KS, Rosenfeld JA. Evaluation and treatment of galactorrhoea. *Am Fam Physician* 2001;63:1763-70.
- 4 Leung AK, Pacaud D. Diagnosis and management of galactorrhoea. *Am Fam Physician* 2004;70:543-50.