Transgender Primary Medical Care: Suggested Guidelines for Clinicians in British Columbia

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Copies of this manual are available for download from the Transgender Health Program website: http://www.vch.ca/transhealth. Updates and revisions will be made to the online version periodically. For more information or to contribute updates, please contact:

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Scope

The purpose of this guide is to assist the primary medical care provider (family physician or nurse) to give appropriate care to their transgender* patients. Some of the tasks outlined in these guidelines are specific to physicians' scope of practice, but many are also applicable to advanced practice nursing. This document is intended for primary care providers who have already taken transgender sensitivity/awareness training or have experience working with transgender individuals, and are seeking more advanced guidance on how to be clinically effective in providing care. In-depth guidance relating to endocrinologic, surgical, socioeconomic, and psychosocial care is beyond the scope of this document, but is discussed further in other documents in this series (*Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines*,[1] *Care of the Patient Undergoing Sex Reassignment Surgery,*[2] *Social and Medical Advocacy with Transgender People and Loved Ones: Recommendations for BC Clinicians*,[3] *Caring for Transgender Adolescents in BC: Suggested Guidelines,*[4] and *Counselling and Mental Health Care of Transgender Adults and Loved Ones*[5]).

Transgender medical care involves addressing two categories of concerns: general medical conditions and those related specifically to transgender issues. Primary care providers do not have to be experts in transgender medicine to meet the health needs of most transgender patients. With appropriate understanding of basic transgender issues and a little experience, non-expert primary care providers can offer health maintenance, acute illness and chronic disease management, and referral to specialists. Some transgender patients seek medical assistance to feminize or masculinize their bodies through hormones,§ surgery, or removal of hair through laser/electrolysis. While specialists are often involved in this level of care, the primary care provider plays a vital role in coordinating care, providing referrals, co-managing hormone treatment (including monitoring lab work and side effects, avoiding drug interactions, supporting smoking cessation, etc.), and providing post-surgical followup. Primary care physicians or nurse practitioners with appropriate training and expertise may choose to have sole responsibility for the provision of feminizing or masculinizing hormone therapy.†

As defined by the World Health Organization, *primary health care* includes a broad range of social, educational, and political interventions beyond the scope of the family physician or nurse practitioner.[7] We aim not to offer a complete discussion of transgender health, but rather to outline the range of issues commonly of concern in primary medical practice. Like every population the transgender community is diverse and health needs vary greatly from patient to patient. As with the non-transgender population, active consideration of biopsychosocial, socioeconomic, and spiritual health is encouraged as part of holistic primary care of transgender patients.

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* In these guidelines, *transgender* includes any person who: (a) has a gender identity that is different from their natal sex, and/or (b) who expresses their gender in ways that contravene societal expectations of the range of possibilities for men and women. This umbrella term includes crossdressers, drag kings/queens, transsexuals, people who are androgynous, Two-Spirit people, and people who are bi-gendered or multi-gendered, as well as people who do not identify with any labels.

§ As discussed in *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines,*[1] endocrine agents other than hormones may be used in feminizing/masculinizing regimens. However, "hormones" is the term most commonly used by patients and in the transgender literature, and we have therefore used "hormones" in this document.

† In BC, nurse practitioners can prescribe anti-androgens, estrogen, and progestins, but not testosterone.[6]

The recommendations in this document are based on published literature specific to transgender health wherever possible. More research is needed and for this reason some recommendations are based on current practices where the literature is inconclusive or absent. These guidelines are consistent with the Harry Benjamin International Gender Dysphoria Association (HBIGDA)'s *Standards of Care* (SOC).[8] Like the HBIGDA SOC, these guidelines are intended to be a flexible framework to guide the treatment of transgender individuals. We support the HBIGDA recommendation that clinical departures from the guidelines be recognized as such, explained to the patient, and documented to help the transgender medicine field evolve.

Introductory Comments

Transgender patients are a medically underserved population. Transgender identity and behavior is socially stigmatized, leading many transgender individuals to maintain a traditional gender role while keeping their transgender issues closeted. A Minnesota study of transgender health seminar participants found that 45% had not informed their family physician that they were transgender.[9] Experience with transphobia and discrimination in the health care setting, lack of access to trans-competent providers, and (for some) discomfort with the body can lead the transgender patient to avoid medical care altogether.[10] Thus, transgender individuals often lack access to preventive health services and timely treatment of routine health problems. To improve access to primary care, we encourage trans-sensitive providers to make themselves known to the community through the referral guide of the Transgender Health Program (Appendix A).

Patients best explore transgender issues in a setting of respect and trust. This requires referring to the transgender patient by their preferred name and pronoun, reassuring the patient about confidentiality, educating clinic staff and colleagues regarding transgender issues, and respecting the patient's wishes regarding potentially sensitive physical exams and tests (such as pelvic examinations or mammograms). Familiarity with commonly used terms and the diversity of identities (including fluid, non-binary identification) within the transgender community is essential.

Hormonal and surgical treatment can profoundly increase quality of life for transgender individuals who desire to bring their bodies into greater congruence with their gender identity.[11-13] If medical concerns emerge regarding hormonal interventions or planned surgeries, efforts should be made to try to control them where possible through behavior/lifestyle change or medication. Reduction or discontinuation of hormones should be a last rather than first resort and is not to be undertaken lightly as there can be serious psychological consequences.

It is vital for primary care providers to understand the diversity of the transgender community and to avoid a narrow idea of "transgender health". In these guidelines we have deliberately taken a broad approach to transgender health, but the limits of space prevent a full discussion of all relevant health issues. We strongly encourage primary care providers to consider these guidelines as a framework for trans-specific care, rather than a definitive, all-encompassing approach to transgender health.

Evidence-Based Decision-Making in Transgender Care

Currently, few prospective, large scale studies exist regarding transgender health care. The best available evidence comes from a Netherlands historical cohort involving 816 male-to-female (MTF) and 293 female-to-male (FTM) transsexual patients, with hormone use ranging over 2 months to 41 years.[14] Morbidity and mortality were compared to age-gender specific statistics in the general Dutch population. As the study did not track a specific cohort over a long period of time, particularly into the over age 65 range, the long term health effects of hormone therapy remain uncertain. Specific

results from this study are incorporated into the appropriate sections below. Smaller scale studies on specific issues such as osteoporosis do exist, along with non-trans-specific evidence (i.e. studies involving non-transgender men and women). In many areas, case reports or series are the major source of trans-specific data. Case studies serve to indicate that the condition is possible in the transgender setting; however, further research is needed to determine incidence and clinical significance.

In applying knowledge from the non-transgender setting to transgender patients, the primary care provider should look for rigorous studies that are highly relevant to the clinical context. For example, a large prospective study involving non-transgender women on postmenopausal hormone therapy may be relevant for MTFs over age 50 who are taking similar types of hormones for feminizing purposes. Evidence from non-transgender studies can be directly applied to similar transgender patients who have not had surgical or hormonal interventions: e.g., studies involving non-transgender women are applicable to individuals in the FTM spectrum who have not taken testosterone or had masculinizing surgery.

Recognizing Transgender Concerns

The transgender patient may present to your office in a variety of ways. Many transgender patients are open about their identity, and may specifically ask about your experience working with the transgender community. The “closeted” transgender patient may avoid elements of the physical exam, such as pelvic/testicular exams. Individuals who are questioning their gender or are confused about gender identity issues may be unsure how to articulate this or may express their concerns as confusion about sexual orientation. While transgender identity is not the only (or necessarily the most) important factor in primary care, knowing a patient is transgender is important in determining effective and appropriate care. Because transgender identity is not always obvious, and many transgender individuals are intensely private or fearful of negative consequences should they disclose this information, sensitive questioning is needed to create an environment conducive to discussion of any concerns relating to transgender issues and transgender-specific assistance that may be required.

While we encourage questions relating to transgender issues, care must be taken not to pressure the patient to discuss gender concerns. In some instances, even though you think a patient is transgender, this may be an incorrect assumption. In other cases the patient may not feel it’s the most relevant or pressing issue.

Transgender experience is not rare in the general population. A large study of randomly sampled Swedish adults (18-60 yrs) found > 3% reported having crossdressed at least once.[15] Transsexualism is estimated at 1 per 12,000 male-to-female and 1 per 30,000 female-to-male.[16] The primary care provider should be comfortable inquiring about gender concerns on a regular, if not routine, basis. For example:

- “Because so many people are impacted by gender issues, I have begun to ask everyone about it. Anything you do say about gender issues will be kept confidential. If this topic isn’t relevant to you, tell me and I’ll move on.”
- “Out of respect for my clients’ right to self-identify, I ask all clients what gender pronoun they’d prefer I use for them. What pronoun would you like me to use for you?”
- You can ask (after framing the question as mentioned above): “Do you identify as transgender?”
- If you use an intake form, asking a question about gender on the form can be a way to encourage disclosure of transgender identity. Some agencies use “Gender: _____”,

with the blank to be filled in by the patient (this allows the transgender patient to write in a description of identity such as “transgender”, “transsexual”, “MTF”, “androgynous”, etc.). Others use “Choose as many as apply: M / F / MTF / FTM / other (please specify)”.

Not all transgender individuals struggle with gender issues. Among those who do, there are varying concerns. Some individuals seek help because they are confused about their identity or are struggling with despair, shame, or guilt relating to crossdressing or transgender feelings; others are dysphoric about physical characteristics associated with sex/gender, the perceptions of others relating to gender, and/or roles associated with gender. Referral to a mental health professional experienced in gender identity issues is appropriate if distress is negatively impacting mental health or overall functioning. Gender concerns are discussed in greater detail in *Counselling and Mental Health Care of Transgender Adults and Loved Ones.*[5]

Gender concerns can affect individuals of all ages. Male-to-female transgender patients tend to seek psychological or medical intervention during middle age,[17] while female-to-male patients are typically younger. As the transgender population becomes more visible, however, patients ask for assistance at younger ages, including childhood and adolescence. Seniors may also present with previously untreated gender concerns.

Even patients who are open with you about being transgender may act in ways that are incongruous with their expressed identity (e.g., wearing clothes, cosmetics, or hairstyle that is opposite to their sense of self). Transphobia results in many transgender individuals being unable to freely express their identity with loved ones, at school, or in the workplace. Transgender patients who are transitioning to living in the desired gender role, or patients who self-identify as androgynous or bi-gendered, may express some elements of each gender. Patients may also vary their appearance from visit to visit either as part of exploring their identity or due to social pressures (e.g., going to work after their appointment). None of these behaviours necessarily signal ambivalence about being transgender, nor should they be considered a sign of mental illness; in most cases they are simply an accommodation to difficult circumstances.

Transgender Health Assessment

General medical history

The patient’s *general health history* should be reviewed, including all medications and the most recent physical exam (including Pap smear, testicular, and rectal exams, where appropriate). A thorough gynecologic and obstetric history is important in female-to-male patients, as there may be an increased incidence of polycystic ovarian syndrome (PCOS) in this population.[18-20]

The patient’s *family history* should be reviewed, with particular attention to history of clotting disorders, cardiovascular disease, hypertension, diabetes, and mental illness. Any family history for breast, ovarian, uterine, or prostate cancer should also be noted, as these cancers are known to be influenced by exogenous hormones and may require different or more frequent screening if patients are taking feminizing/masculinizing hormones.

Taking a *sexual health history* is an essential part of good primary care for all patients (not just those who are transgender). Sensitivity is needed in taking a sexual history; discussion should be initiated gradually and pacing should depend on patient comfort. A screening sexual history should cover sexual orientation, risk behaviors related to sexually transmitted infections (STIs), and sexual function.[21] If the screening history raises concerns, a more detailed sexual history is warranted.

Psychosocial history should be discussed, as a transgender patient's family, economic and larger social environment can be sources of support or stress. Societal stigma associated with transgenderism can make life challenging for the transgender person. Social isolation, rejection by family/community of origin, harassment, and discrimination can significantly impact the transgender individual's health.[22] Transphobia may be internalized, resulting in shame, guilt, and a loathing of oneself or other transgender individuals.[23] While an extended psychosocial evaluation is not within typical scope of practice for the primary care provider, it is useful for the primary care provider to gain a *basic* understanding of the psychosocial issues facing the patient as a transgender person.

Questions may include:

- How does the patient feel about being transgender?
- How does the patient feel being transgender has affected areas of life that are important to the patient (e.g., family relationships, social networks, employment)?
- What supports and resources does the patient have to cope with being transgender in a transphobic society?

Psychosocial dynamics may be complicated, especially during gender transition. Referral to peer-based or professional counselling and advocacy resources may be helpful for both the transgender person and loved ones if there are psychosocial concerns.

Social history includes evaluation of poverty and possible homelessness. As a result of employment discrimination and family abandonment, many transgender people live in poverty in both rural and urban areas, and housing concerns are not uncommon.[24-26] Referral to trans-experienced advocates (see *Social and Medical Advocacy with Transgender People and Loved Ones: Recommendations for BC Clinicians*[3]) may be helpful if the patient needs assistance with housing, application for health benefits, or application for social assistance. For the homeless transgender patient, the American National Health Care for the Homeless Council has published recommendations for modification to clinical practice to address the multiple challenges faced by homeless people in adhering to care plans.[27]

History of feminizing/masculinizing interventions

Some transgender individuals utilize hormonal, surgical, or other interventions to bring their bodies into greater congruence with their gender identity.[28,29] When establishing care with a transgender patient, a thorough history of these interventions is essential. For some transgender patients, hormonal and surgical concerns are less prominent, and this part of the history is accordingly brief. Questions may include:

1. **Has the patient ever taken cross-gender hormones? Are there any complications or concerns regarding past or current hormone use?**

Feminizing and masculinizing medications have the potential for numerous drug interactions and the primary care provider needs to be cognizant of these before prescribing anything new. Medically unsupervised use of hormones is common among transgender patients with limited access to care.[30,31] Patients may borrow hormones from friends or buy hormones illicitly. Increasingly, transgender persons are purchasing hormones over the internet, usually from foreign suppliers and with little to no clinician involvement. The primary care provider should also inquire about "herbal hormones" – phytoestrogens or androgen-like compounds sold as dietary supplements.

Transgender patients with coexisting chronic medical problems will need closer follow-up once they begin hormones. The effects of cross-sex hormones on chronic illnesses such as diabetes and coronary artery disease are not well defined. Potential risks and complications of cross-sex hormone use are discussed further in the next section of this document, and also in *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines.*[1]

2. Has the patient undergone any feminizing/masculinizing surgical procedures? Are there any complications or concerns regarding past surgeries?

For individuals in the female-to-male (FTM) spectrum, surgeries may include chest reconstruction, hysterectomy, salpingo-oophorectomy, vaginectomy, metaidoioplasty or phalloplasty (penile construction), urethroplasty, scrotoplasty, and procedures to masculinize facial and body contours. For individuals in the male-to-female (MTF) spectrum, surgery may include orchiectomy, penectomy, vaginoplasty, breast augmentation, facial feminization/tracheal shave and procedures to feminize body contours, and surgery to elevate voice pitch. Complications relating to genital surgery (for both MTFs and FTMs) are not infrequent, particularly in patients who underwent surgery many years ago when techniques were less sophisticated and followup care less consistent. A new comprehensive surgical program is being developed in BC, as discussed in *Care of the Patient Undergoing Sex Reassignment Surgery*[2] (along with more detailed information about surgical procedures and management of risks/complications).

3. Does the patient plan to pursue hormone therapy or surgeries in the future?

Awareness of future plans is useful in coordinating referrals and planning relating to care for any co-existing medical, social, or psychological concerns.

4. Are there any additional feminizing/masculinizing interventions sought by the patient?

Peer-based resources are often useful for assistance relating to appearance (clothing, hairstyle/makeup, footwear, etc.), change in legal name or sex designation (see *Social and Medical Advocacy with Transgender People and Loved Ones: Recommendations for BC Clinicians*[3]), and gender-specific mannerisms. Referrals to trans-competent clinicians may be sought for speech change (see *Transgender Speech Feminization/Masculinization: Suggested Guidelines for BC Clinicians*[32]), hair removal, or hair transplant. The Transgender Health Program (Appendix A) can assist with referrals and identification of local resources. Professional counselling can be useful for the patient who is just starting to explore gender identity or wants support adjusting to changes.

Transgender physical exam

Physical exams should be structured based on the organs present rather than the perceived gender of the patient. For example, if there is any significant breast tissue, the patient needs routine breast/chest exams. The prostate is not removed in vaginoplasty, and prostate exams should be performed for the MTF patient as indicated (see page 13). If the uterus and cervix are present in FTMs, pelvic exams and Pap smears typically need to be done on a regular basis, although these may be deferred for FTMs who have not had penetrative vaginal intercourse (see pages 11-12).

Transgender patients may be uncomfortable with their bodies and may find some elements of physical examination traumatic. Unless there is an immediate medical need, sensitive elements of the exam (particularly breast, genital and rectal exam) should be delayed until strong clinician-patient rapport has developed. Sensitive exams can be managed in a variety of ways, depending on patient preference; some patients prefer the exam to be done as quickly as possible, while others require a slow pace or even light sedation. Discuss with your patients when, where and how you might need to touch. When the purpose of the exam is explained clearly, most patients will

understand. The physical exam is an important opportunity to educate patients about their bodies, and the need for ongoing health maintenance.

You will see a range of development in patients undergoing hormone therapy. FTM patients may have beard growth, clitoromegaly, acne, and androgenic alopecia; those who have bound their breasts for numerous years may have rash or yeast infection of the skin under the breasts. MTF patients may have feminine breast shape and size, often with relatively underdeveloped nipples; breasts may appear fibrocystic if there have been silicone injections. Galactorrhea is sometimes seen in MTF patients with high prolactin levels, especially among those using breast pumps to stimulate development.[33] There may be minimal body hair, with variable facial hair (depending on length of time on hormones and manual hair removal treatments such as electrolysis). Testicles may become small and soft; defects or hernias at the external inguinal ring may be present due to the practice of “tucking" the testicles up near (or into) the inguinal canal. Particularly in the absence of hormone therapy, findings suggestive of intersex conditions should be further evaluated.

Physical findings in post-operative patients will depend on the types of surgeries which have been done, the quality of the surgical work, the impact of post-operative complications, and any revisions that have been performed after the initial surgery. FTM patients after chest surgery will have scar tissue consistent with the type of procedure, and may have large nipples or small grafted nipples (depending on the technique used). The FTM neophallus created from the release of an augmented clitoris looks like a very small penis; a grafted penis constructed by phalloplasty will be adult-sized but more flaccid than in the natal male (erection is obtained through use of a stiffener or pump). MTF patients may have undergone breast augmentation with implants. MTF genital surgery typically involves simultaneous removal of the penis/testicles and creation of a neovagina; some patients may just have the testes removed, prior to or instead of vaginoplasty. There may be varying degrees of labial reconstruction and clitoral hooding, depending on the completion of surgical revisions. The neovagina typically appears less moist than in natal women, and may be stenosed internally if the patient does not dilate daily or is not sexually active. For further details on surgical interventions and the management of common post-operative complications in the primary care setting, see *Care of the Patient Undergoing Sex Reassignment Surgery.*[2]

Laboratory requisition forms

Most requisition forms for laboratory tests ask for the sex of the patient to provide the primary care provider with normal ranges for the results (which are often sex-dependent) and to flag abnormal results. Normal values specifically for transgender persons who are undergoing or have completed gender transition have not been established for any laboratory test, and there is no consensus about how sex should be recorded on lab requests for the transgender patient. The primary care provider will need to balance consideration of the following issues: (a) the stress placed on the patient going into the lab with a sex on the form that doesn’t match their name/appearance, (b) getting the lab values most appropriate to the patient’s physiology, and (c) minimizing lab error in performing the correct test in the correct manner. Interpretation of lab results is dependent on the patient’s physiology and the specific test being performed.

As stated in the preceding paragraph, physiologic considerations are not the only (or necessarily the main) factor in determining the sex to be recorded on the requisition form; this decision should be made on a case-by-case basis. In terms of patient physiology, the following approach may be taken:

- For transgender patients who are not taking hormones and have not had surgical gonadal removal, use the natal sex for laboratory reference purposes.
- For transgender patients who have undergone orchiectomy/oophorectomy and are on a cross-sex hormonal regimen, use the sex opposite to their natal sex (i.e., M for FTMs and F for MTFs).

- For patients who are currently transitioning or have partially transitioned, one may need to vary the reported sex depending on the lab test. For example, for MTF patients beginning feminizing therapy, male laboratory norms may be more appropriate for creatinine and cholesterol, but female values may be more relevant for testosterone levels.

Regardless of the approach taken, the primary care provider should explain to the patient the challenges involved in laboratory testing and how their sex is coded for lab interpretation purposes. It is helpful to discuss the situation with the laboratory director, so that lab staff can understand the transgender context. Ideally, laboratory forms would include FTM and MTF categorization, as well as a checkbox for “male” or “female” reference ranges.

Vaccinations

Recommended vaccinations are the same for transgender and non-transgender patients. It is important to assess whether vaccinations are up to date, as transgender patients may lack regular primary care. While vaccination of all children for Hepatitis B is now recommended, many transgender adults are not immune and could benefit from vaccination – particularly persons with more than one sexual partner the last six months, patients with a recent STI, individuals who share needles to inject hormones or other substances, and those traveling to endemic areas.

In recent years there have public health campaigns targeting gay and bisexual men in BC for vaccination against Hepatitis A and Meningococcal C (in response to outbreaks among men who have sex with men). Mass vaccination campaigns do not depend on assessment of an individual’s sexual or social risks; membership in a population considered at risk is sufficient to warrant vaccination, regardless of whether an individual in that population is engaged in the activities that pose risk for transmission. Accordingly, it is recommended that vaccination campaigns for men who have sex with men (MSM) be extended to include transgender individuals (both FTM and MTF) who have sex with men (TSM), as TSM are at risk for many of the same reasons as MSM.[28] For joint MSM-TSM vaccination campaigns to be effective, (a) promotional materials must use language that will reach transgender individuals who do not identify as MSM, and (b) primary care providers with TSM patients should discuss vaccination as they would with MSM patients.

Primary Prevention, Screening, and Management

Risks and recommendations for screening depend on the patient’s hormonal and surgical status. In each section below we give recommendations specific to each population. Recommendations for males-to-females (MTFs) are summarized in Appendix B, and recommendations for female-to-males (FTMs) are summarized in Appendix C.

Cancer

Breast cancer

Male-to-female

MTF, no hormone use

- There is no evidence of increased risk of cancer compared to natal male patients, in the absence of other known risk factors (e.g., Klinefelter's syndrome). Routine screening, either in the form of regular breast exams or mammography, is not indicated for these patients.

MTF, past or current hormone use

- MTF patients who have taken feminizing hormones may be at increased risk of breast cancer compared to natal males, but likely have significantly decreased risk compared to natal females.
- The length of feminizing hormone exposure, family history, BMI >35 and use of progestins may further increase risk.
- Screening mammography for MTF patients receiving hormone therapy is not currently supported by the evidence, but screening mammography is advisable in patients over age 50 with additional risk factors (e.g., estrogen and progestin use > 5 years, positive family history, BMI >35).
- Annual clinical breast exam and periodic self-breast exam are not recommended.

Currently, there are no long term, prospective studies on the risk of breast cancer among male-to-female patients who have taken feminizing hormones. A retrospective study revealed no breast cancer cases,[14] but the population may not have been old enough or followed long enough to detect any difference. Published case reports exist regarding breast cancer among male-to-female transgender patients on feminizing hormone therapy.[33-36]

Multiple prospective studies have demonstrated an increased risk of breast cancer among menopausal women on hormone replacement therapy.[37-40] In these studies, risk appears to increase with combined estrogen and progestin use, and with length of therapy over five years. McPherson et al. (2000) suggest that that the risk of breast cancer appears related to age, age at menarche/menopause/first birth, and family history more so than exogenous hormone use among natal females.[41] Among transgender women, length of time exposed to exogenous estrogens may be more important, given the relative lack of endogenous estrogens.

Annual screening with mammography has shown a demonstrated significant benefit for natal women age 50 and over, and a lesser benefit for women ages 40 to 50 years.[42-44] However, the risk of breast cancer in the male-to-female population appears substantially lower, with accompanying increased risk of false positive findings resulting in potential harm (emotional distress, biopsies, cost).

Annual clinical breast exam and periodic self-breast exam have not been shown to decrease breast cancer morbidity or mortality in the natal female population. Current Canadian guidelines thus recommend against them as part of routine primary care.[45] However, clinical and self-breast exam may provide an opportunity for education regarding breast health, and this may be valuable for the MTF patient.

MTF, history of hormone use and breast augmentation

- Breast augmentation does not appear to increase risk of breast cancer, although it may impair the accuracy of screening mammography.

There are no studies on the long term effects of saline or silicone breast implants in transgender patients. Studies in natal women do not suggest an increased risk of breast cancer,[46] but implants may impair the accuracy of mammography[47-48] (without clinically significant delay in cancer diagnosis[49]).

Female-to-male

FTM, no chest surgery, with or without testosterone use

- Breast exams and screening mammography are recommended as for natal females.

There is no evidence of increased risk for FTMs compared to natal females. There is no strong evidence that testosterone either increases or decreases breast cancer risk.

FTM, after chest surgery, with or without testosterone use

- The risk of breast cancer is reduced with chest surgery, but appears higher in FTM patients than natal men, based on breast reduction studies in non-transgender women.
- Risk is affected by age at chest surgery and the amount of breast tissue removed.
- Pre-chest surgery mammography is not recommended unless the patient meets usual natal female recommendations.
- Yearly chest wall and axillary exams, along with education regarding the small but possible risk of breast cancer, are recommended.

Female-to-male patients who undergo breast reduction or mastectomy (chest reconstruction) retain some degree of underlying breast tissue for good cosmetic result. Multiple studies in non-transgender women after breast reduction surgery show reduced risk of breast cancer, directly related to the amount of tissue removed;[50-52] the risk remains higher than in non-transgender men. The greatest reduction in risk was seen when patients had the procedure after age 40. Pre-surgical mammography does not appear to significantly improve detection of occult cancers in these patients.[53]

Currently, there are no long term, prospective studies on the risk of breast cancer among FTM patients. A retrospective study revealed no breast cancer cases,[14] but the population may not have been old enough or followed long enough to detect any difference. Case series do exist of breast cancer among female-to-male patients, post-chest surgery and on hormones.[54-55] Of note, the incidence of breast cancer among natal males is 1/100th that of natal females. However, the breast cancer risk among persons with Klinefelter's syndrome is 50 times higher than among non-Klinefelter's men.[56] Persons with Klinefelter's syndrome have XXY chromosomes, and thus have lower testosterone levels, higher estrogen levels, higher gonadotropin levels, and increased gynecomastia compared to XY males. In this regard, FTM persons share some common features with Klinefelter's patients. While this situation is not necessarily analogous to the FTM patient, it again suggests the possibility of increased risk compared to natal males.

Annual clinical breast exam and periodic self-breast exam have not been shown to decrease breast cancer morbidity or mortality in the natal female population. Current Canadian guidelines thus recommend against them as part of routine primary care.[45] However, a yearly examination for chest masses and axillary adenopathy is a low-cost, low risk intervention which provides an opportunity for education regarding breast cancer risks.

Cervical cancer

Male-to-female

MTF, following vaginoplasty

- If the glans penis has been used to create a neocervix, Pap smear should follow guidelines for natal females.
- Consider vaginal Pap smear for MTFs with history of genital warts.

Cervical Pap smears are generally not indicated for MTF patients because a cervix is generally not present even after vaginoplasty. A case of intraepithelial neoplasia (carcinoma in situ) has been reported in an MTF patient who underwent vaginoplasty with the glans penis used to create a neocervix.[57] Pap smear of the neocervix should be done routinely in these cases, as (a) the glans appears to be more prone to carcinomatous change than the skin of the penile shaft, and (b) there appears to be greater risk of progression to invasive carcinoma with intraepithelial neoplasia of the glans compared to intraepithelial neoplasia of other penile skin.[57]

In natal women primary vaginal carcinoma is rare. Accordingly, Pap smear of the vaginal cuff is not indicated in natal women who have no history of cervical abnormality and have had cervical removal as part of hysterectomy.[58] There are also concerns that vaginal cytology is a poor screening tool, with a high false positive rate and a low sensitivity to vaginal neoplasia.[57] In the MTF patient at increased risk for vaginal cancer (due to HPV exposure – particularly if also immunocompromised) vaginal Pap smear may be considered.

Female-to-male

FTM, cervix intact (sub-total hysterectomy or no hysterectomy)

- Pap smears should follow recommended guidelines for natal females.
- There is no evidence that testosterone increases or reduces the risk of cervical cancer.
- As testosterone therapy can result in atrophic changes to the cervical epithelium mimicking dysplasia, the pathologist should be informed of the patient's hormonal status.
- Consider total hysterectomy in the presence of high grade dysplasia or if the patient is unable to tolerate Pap smears.

Current BC guidelines recommend that natal females under age 69 have a Pap smear at least every two years.[59] Pap smears can be traumatic for the FTM patient and should be kept to a minimum for patients at low risk of HPV transmission (i.e., little sexual activity involving the genitals).

Testosterone therapy causes significant atrophy in the cervical epithelium, mimicking dysplasia on the Pap smear.[60] For patients otherwise at low risk of cervical cancer, ASCUS and low-grade SIL Pap smears are unlikely to represent pre-cancerous lesions. However, these changes are not well characterized in the literature, and colposcopy may be indicated in patients at increased risk.

FTM, after total hysterectomy (cervix completely excised)

- If there is no prior history of high-grade cervical dysplasia and/or cervical cancer, no future Pap smears are needed.
- If there is prior history of high-grade cervical dysplasia or cervical cancer, patients should have annual Pap smears of the vaginal cuff until 3 normal tests are documented, then continue Pap smears every 2-3 years (as recommended for natal females).

Ovarian/uterine cancer

FTM, intact ovaries/uterus (no hysterectomy), with or without history of hormones

- Consider screening for signs and symptoms of polycystic ovarian syndrome (PCOS).
- Consider pelvic exams every 1-3 years in patients over age 40 or with a family history of ovarian cancer, or yearly if PCOS is present.
- Fully evaluate unexplained uterine bleeding, with trans-vaginal ultrasound, pelvic ultrasound, and/or endometrial biopsy if bleeding is prolonged.
- Consider preventive total hysterectomy and oophorectomy if fertility is not an issue, the patient is < 40 years, and the patient's health will not be adversely affected by surgery.

Increased incidence of polycystic ovarian syndrome (PCOS) has been noted among FTMs even in the absence of testosterone use.[18-20] PCOS is a hormonal syndrome complex characterized by some or all of the following: failure to ovulate, absent or infrequent menstrual cycles, multiple cysts on the ovaries (thus the name), hyperandrogenism, hirsuitism, acne, hidradenitis suppurativa, acanthosis nigricans, obesity, and glucose intolerance or diabetes. We include discussion of PCOS in these guidelines not to suggest that PCOS is related to the development of FTM identity, but rather because reports of increased incidence of PCOS are relevant in considering primary health care needs in FTM patients. PCOS is associated with infertility as well as increased risk of cardiac disease, high blood pressure and ovarian cancer.[61-63]

No recommended screening tests for ovarian cancer exist for any population. Some studies suggest an increased risk of ovarian cancer among female-to-male patients on testosterone therapy[64,65] and non-transgender women with PCOS.[63] The risk of ovarian cancer increases with age, and pelvic exams are currently the only screening modality utilized in any patient population. As pelvic exams may be distressing for female-to-male patients, a hysterectomy should be considered if patients cannot tolerate ongoing pelvic exams.

The risk of endometrial cancer increases above age 40. While there does not appear to be an increased risk of endometrial carcinoma specifically among patients on masculinizing hormone therapy, dysfunctional uterine bleeding is not uncommon. While usually related to missed doses or changes in a patient's testosterone therapy, otherwise unexplained bleeding should be fully evaluated, especially in previously amenorrheic patients. If bleeding is prolonged, the endometrium should be evaluated with trans-vaginal ultrasound, pelvic ultrasound, and/or endometrial biopsy, particularly if the patient is above age 35.

Prostate cancer

MTF, no current/past hormones, no surgery

- There is no evidence currently supporting PSA screening in any usual risk population. The risks and possible benefits of PSA screening should be discussed with all patients, and routine screening considered in high risk patients (African-Canadian, family history of prostate cancer) starting at age 45.
- Digital rectal exams should be performed as for natal males.

MTF, past or current hormones, with or without surgery

- The prostate is not removed in male-to-female genital surgery.
- Feminizing hormone therapy appears to decrease the risk of prostate cancer, but the degree of reduction is unknown.
- PSA screening is not recommended as PSA levels may be falsely low in an androgen-deficient setting, even in the presence of prostate cancer. Consider screening in high risk patients only.
- Digital rectal exams should be performed as per natal males, along with education regarding the small but possible risk of prostate cancer.

Cases of prostate cancer have been reported in male-to-female patients on feminizing hormones, both before and after genital surgery.[14,66-69] Prostate cancer was noted in 14% of non-transgender men with naturally acquired testosterone deficiency, prior to testosterone replacement.[70] It is unclear how this rate compares to MTFs who have reduced gonadal function as a result of exogenous estrogen.

Even in non-transgender individuals, PSA screening is limited. A recent study demonstrated that 15% of participants with PSA levels less than 4 (within the normal range) had prostate cancer.[71] Androgen antagonists may decrease serum levels of PSA, further complicating interpretation of PSA results in the MTF patient who is taking feminizing hormones.[72,73]

Other cancers

Currently, there is no evidence that transgender persons are at either increased or decreased risk of other cancers. Screening recommendations for other cancers (including colon cancer, lung cancer, and anal cancer) should be followed as with non-transgender patients.

Cardiovascular disease

All transgender patients

- Screening and treatment of known, modifiable cardiovascular risk factors is recommended for all transgender patients.
- It is recommended that cardiovascular risk factors be reasonably controlled before initiating feminizing/masculinizing hormone therapy.
- Consider stress testing among patients at very high risk or with any cardiovascular symptoms before initiating hormone therapy.
- Consider daily aspirin therapy in patients at high risk for CAD.

Assessing and treating cardiovascular risk factors is an essential primary care intervention for transgender patients. Regardless of hormone status, the transgender population as a whole has several risk factors for cardiovascular disease; feminizing/masculinizing hormone therapy further increases cardiovascular risks. Smoking is a concern for both FTM and MTF persons (see pages 24-25). MTF patients tend to present for transgender care at an older age (i.e., early 40's),[17] and with hypertension, diabetes, hyperlipidemia, or other conditions common in middle age male bodies. FTM patients who present with PCOS are at increased risk for hypertension, insulin resistance and hyperlipidemia. Finally, cardiovascular risk factors are often undiagnosed or undertreated among transgender patients due to their relative lack of primary care. Early diagnosis and treatment of cardiovascular risk factors, ideally prior to the onset of cardiovascular disease, may decrease risks associated with hormone therapy in these patients. Diet and exercise, including consultation with a dietician or nutritionist as needed, may be helpful initial steps in controlling many risk factors (including hypertension, hyperlipidemia and diabetes).

CAD, cerebrovascular disease, and hormones

Male-to-female

MTF, currently taking feminizing hormones

- Close monitoring for cardiac events or symptoms is recommended for MTFs with risk factors, especially during the first 1-2 years of feminizing hormone therapy.
- In patients with pre-existing CAD, there is increased risk of future events using estrogen and/or progestin.
- It may be possible to reduce risks by using transdermal estrogen, reducing the estrogen dose, and omitting progestin from the regimen.

The effects of feminizing hormones on CAD and cerebrovascular disease are not well characterized. There are several case reports of myocardial infarction and ischemic stroke among MTFs taking estrogen,[14,74-76] and increased risk has been noted among women on oral contraceptives. However, the retrospective 1997 Netherlands study found no increased incidence of CAD/cerebrovascular disease compared to rates in the general population.[14] Both the HERS and WHI trials, prospective studies of hormone replacement among postmenopausal women, indicated no benefit and a probable increased risk for cardiovascular events with combined estrogen and progesterone therapy.[40,77] The estrogen-only arm of the WHI trial demonstrated an increase in cerebrovascular events but not cardiac events. The HERS and WHI trials were conducted using oral conjugated estrogen; it is unclear whether these effects extend to other oral or transdermal estrogens (which show reduced risk of venous thromboembolic events[78]). In both the HERS trial and the observational Nurses Health Study,[79] an increased number of cardiac events occurred in the first 1-2 years and decreased in subsequent years of hormone replacement.

In MTFs with pre-existing CAD who are using estrogen and/or progestin, there is increased risk of future events. The extent of risk, resulting morbidity, and mortality is unclear; it may be substantial given that doses used for feminization in MTFs are typically much higher than post-menopausal hormone replacement therapy.

Female-to-male

FTM, currently taking testosterone

- Close monitoring for cardiac events or symptoms is recommended for FTMs at moderate to high risk for CAD.
- In FTMs with pre-existing CAD, there may be increased risk of future events.
- Individualized decision-making is key, but CAD and risk factors should be tightly controlled.

The effect of testosterone on cardiovascular events in female-to-male patients is unclear. While both exogenous testosterone and hyperandrogen states (e.g., PCOS) clearly increase cardiac risk factors (see above), current evidence of increase in cardiac morbidity or mortality with PCOS is limited.[14,61,62,80,81] Studies in non-transgender men and women indicate that low endogenous androgens appear to increase the risk for men, while higher endogenous androgens increase the risk for women.[82]

In FTMs with pre-existing CAD who are using testosterone, there may be increased risk of future events. The extent of risk, resulting morbidity, and mortality is unclear, given the contradictory effects of testosterone replacement/increased androgens in non-transgender men and women.

Hypertension

Male-to-female

MTF, not currently taking estrogen

- Screen and treat hypertension as recommended in guidelines for non-transgender patients.
- Consider a systolic blood pressure goal of ≤ 130 mm Hg and a diastolic goal of ≤ 90 mm Hg if planning to begin feminizing hormone therapy within 1-3 years.

MTF, currently taking estrogen

- Monitor blood pressure every 1-3 months.
- A systolic blood pressure goal of ≤ 130 mm Hg and a diastolic goal of ≤ 90 mm Hg is recommended.
- Consider using spironolactone (an anti-androgen) as part of an antihypertensive regimen.

Exogenous estrogen can increase blood pressure, and transgender patients at risk may develop overt hypertension. While a significantly higher incidence compared to the non-transgender population was not noted in the Netherlands study,[14] the researchers defined hypertension as pressures greater than 160/95 mm Hg, considerably higher than current North American guidelines. Hypertension increases the risk of cardiovascular events and strokes, in addition to the independent risk that may be posed by estrogen itself.[40] Studies suggest that these risks are reduced proportionately to the reduction in blood pressure.[83] The recommendations above are similar to those from *The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (JNC 7) for patients with compelling indications, such as diabetes.[84]

The anti-androgen spironolactone is a diuretic and can therefore lower blood pressure.[85-89] One study reported a significant reduction of systolic blood pressure when spironolactone was added to

the regimen of patients who had been on high-estrogen doses, with a decrease from a baseline of 127.8 mm Hg (SD 13.6) to 120.5 mg Hg after one year ($p < 0.05$).[90]

Female-to-male

FTM, not currently taking testosterone

- Screen and treat hypertension as recommended in guidelines for non-transgender patients.
- Consider a systolic blood pressure goal of ≤ 130 mm Hg and a diastolic goal of ≤ 90 mm Hg if planning to begin masculinizing hormone therapy within 1-3 years.

FTM, currently taking testosterone

- Monitor blood pressure every 1-3 months.
- A systolic blood pressure goal of ≤ 130 mm Hg and a diastolic goal of ≤ 90 mm Hg is recommended, especially in patients with PCOS.

The risk of hypertension in FTMs is unclear. Exogenous testosterone can increase blood pressure,[88,91] and natal females with PCOS, itself a hyperandrogen syndrome, are at increased risk of hypertension.[61] However, a prospective study (n=28) found no significant change in blood pressure after an average of 18 months testosterone administration – even among subjects on double the normal dose of testosterone.[92] A retrospective chart review of 293 FTM patients reported hypertension in 4.1% of FTMs, slightly below norms for natal females and well below norms for natal males.[14] However, as noted earlier, this study defined hypertension as > 160/95 mm Hg, which is considerably higher than current North American guidelines.

As noted above, hypertension increases the risk of cardiovascular events and strokes.

Lipids

Male-to-female

MTF, not currently taking estrogen

- Screen for and treat hyperlipidemia according to guidelines for non-transgender patients.
- Consider LDL goal <3.5 mmol/L if planning to start feminizing hormones within 1-3 years.

MTF, currently taking estrogen

- An annual fasting lipid profile is recommended.
- Transdermal estrogen is recommended for patients with hyperlipidemia, particularly hypertriglyceridemia.
- Treat high cholesterol to an LDL goal of <3.5 mmol/L for low-moderate risk patients and <2.5 mmol/L for high risk patients.

Studies in both non-transgender women and MTFs demonstrate increased HDL and decreased LDL cholesterol on estrogen therapy (PEPI trial, 1995).[93-96] However, both the HERS and WHI trials, prospective studies of hormone replacement among postmenopausal women, indicated no benefit and a probable increased risk for cardiovascular events with combined estrogen and progesterone therapy.[40,77] Oral estrogen therapy, both in postmenopausal women and MTF patients, is known to

increase triglycerides, and has precipitated pancreatitis in several cases.[97] The targets outlined on the previous page are consistent with the most recent Canadian recommendations for the prevention of cardiovascular disease.[98] Exercise is recommended in all groups to treat low HDL levels.

Female-to-male

FTM, not currently taking testosterone

- Screen for and treat hyperlipidemia according to guidelines for non-transgender patients.
- Consider LDL goal <3.5 mmol/L if planning to start masculinizing hormones within 1-3 years.

FTM, currently taking testosterone

- An annual fasting lipid profile is recommended.
- Avoid supraphysiologic testosterone levels for patients with hyperlipidemia. Daily topical or weekly intramuscular testosterone regimens are preferable to bi-weekly intramuscular injection.
- Treat high cholesterol to an LDL goal of <3.5 mmol/L for low-moderate risk patients and <2.5 mmol/L for high risk patients.

Patients on masculinizing regimens experience increases in LDL and decrease HDL cholesterol, putting them at increased risk of atherosclerotic disease.[99-101] However, no extra cardiovascular morbidity was seen in the retrospective Netherlands study.[14] Both female-to-male patients and natal women with PCOS are at increased risk of dyslipidemias, although the effect on the risk of cardiac events is undetermined.[61,62,80,81] The targets outlined above are consistent with the most recent Canadian recommendations for the prevention of cardiovascular disease.[98] Exercise is recommended in all groups to treat low HDL levels.

Diabetes Mellitus

Male-to-female

MTF, not taking estrogen

- Follow diabetes screening and management guidelines as for the non-transgender population.

MTF, currently taking estrogen

- Patients taking estrogen may be at increased risk for Type 2 diabetes, particularly those with family history of diabetes or other risk factors.
- Recommend annual fasting glucose test in patients with family history of diabetes and/or greater than 5 kg weight gain. Consider glucose tolerance testing (or A1c in patients unable to perform a GTT) in patients with evidence of impaired glucose tolerance without diabetes.
- Diabetes should be managed according to guidelines for non-transgender patients, but insulin sensitizing agents are recommended if medications are indicated.
- Decrease in estrogen dose may be indicated if glucose is difficult to control or the patient is unable to lose weight.

Estrogen is known to impair glucose tolerance[102-104] and there have been case reports of new onset type 2 diabetes among male-to-female transgender patients on estrogen.[105] Studies of women on oral contraceptives and hormone replacement therapy have shown decreased glucose tolerance but no increased incidence of diabetes.[106-108] However, these data may not apply to biologically male transgender patients who have other risk factors for Type 2 diabetes. A study of glucose tolerance among hyperandrogenic women on oral contraceptives demonstrated a significant reduction in glucose tolerance and the development of diabetes in two of the sixteen women,[109] suggesting that the presence of endogenous androgens plays a role in glucose metabolism. In addition, patients on feminizing hormones often gain weight and body fat, which may contribute to glucose intolerance. Given the underlying mechanism of insulin resistance, treatment with an insulin sensitizing agent may be warranted for treatment of glucose intolerance and Type 2 diabetes if dietary change is not sufficient.

Female-to-male

All FTMs

- Consider screening (by patient history) for polycystic ovarian syndrome (PCOS). Diabetes screening is indicated if PCOS is present.
- Guidelines for screening and managing diabetes mellitus are the same as for the non-transgender population.

As noted above, there is limited evidence of a higher incidence of PCOS among female-to-male persons, which carries an increased risk of glucose intolerance. There is no current evidence of an altered risk of Type 2 diabetes in FTMs who are taking testosterone. Testosterone does increase visceral fat among female-to-male patients,[110] and older non-transgender women with high testosterone levels are at increased risk of developing Type 2 diabetes as well.[111] Further research is needed to clarify how these findings affect the risk of diabetes in the FTM population.

HIV and Hepatitis B/C

Because HIV and Hepatitis B/C are transmitted by blood as well as through sex, we consider prevention and screening of HIV and Hepatitis B/C separate from sexually transmitted infections (discussed on pages 22-23).

All transgender patients

- In patients with ongoing risk behaviors for sexual or blood-borne transmission (unprotected penile-vaginal or penile-anal intercourse, history of prior STIs, sharing needles for injection of hormones or illicit drugs, etc.), consider HIV and Hepatitis B/C screening every 6 months.
- In all other patients, consider HIV and Hepatitis B/C screening at least once during the lifetime.
- Treat all patients with STIs and their partners according to recommended guidelines for non-transgender patients to reduce risk of HIV/Hepatitis B transmission.
- Offer Hepatitis B vaccination to all patients who are not already immune.

As a whole, the transgender population appears to have a disproportionately high rate of HIV/AIDS,[112-114] although prevalence varies greatly across gender identity. Reported HIV rates from seroprevalence studies in the U.S. range from 20-35% among individuals in the MTF spectrum, with 2-3% incidence among FTMs.[115-122] Although there is significant variation in sexual behaviours and

risks among transgender individuals, psychosocial cofactors relating to unsafe sex (e.g., poor self-esteem, lack of safety in a romantic relationship, substance use, compulsive sex to affirm identity) have been noted as issues of concern in American studies of transgender women (MTF).[23,116,118,123,124] The reported prevalence of HIV among FTMs is thus far low, but studies suggest three risk factors of particular concern for possible sexual transmission: lack of knowledge relating to HIV transmission and prevention, misperception that FTMs are intrinsically at low risk for HIV, and failure to consistently use a latex barrier during receptive anal or vaginal intercourse.[118,125]

Although prevalence of Hepatitis B and C among transgender individuals is not known, the common co-infection of HIV and Hepatitis B/C among individuals who have contracted HIV through blood-borne transmission is cause for concern. Needle-sharing with injectable hormones (or silicone) is a trans-specific potential risk factor for transmission of HIV and Hepatitis B/C,[126] and patients need to be educated regarding the risks as well as safe handling of needles and syringes. The local prevalence of needle-sharing for injection of street drugs is not known. One American study found that 20% of MTF participants had injected street drugs at least once in the past six months, and that nearly 50% of those reporting injection drug use having shared syringes.[116]

Prevention of HIV and Hepatitis B/C involves education and behavioral change specifically tailored to the economic, psychosocial and physical circumstances of transgender persons.[127-132] Trans-specific considerations in prevention of sexually transmitted infections is discussed further in the section on STIs on pages 22-23. HIV testing has been shown to be an effective element in reducing transmission and gaining access to life-extending treatment in all populations. Recent analysis suggests that at least one-time HIV screening for all patients, regardless of risk, is a cost-effective public health strategy.[133] Hepatitis C is primarily transmitted through blood contact, and patients at risk benefit from testing and treatment. Hepatitis B vaccination, recommended for all children and adolescents, is highly effective and should be offered to all adult transgender patients as well. Care should be taken to monitor liver enzymes in patients who have chronic hepatitis and are taking feminizing/masculinizing hormones.[14,85,89]

Some HIV medications increase/decrease serum estrogen levels (list available from the Transgender Health Program), but there is no evidence that cross-sex hormones interfere with the effectiveness of HIV medication or negatively affect the progression of HIV/AIDS. Protease inhibitors increase the risk of hyperglycemia and hyperlipidemia, and these patients may need to be monitored closely, especially if taking estrogen. Little has been published regarding the risks of reassignment surgery among patients with HIV/AIDS. HIV-positive persons have an increased risk of infection with any major surgery, with the number and severity of complications related to CD4 count. SRS outcomes appear to be good with adequate patient selection and pre-operative preparation.[134,135]

Mental health

All transgender patients

- All transgender patients should be screened for depression.
- Refer patients, if needed, to a trans-competent mental health provider.

Although studies are limited, there is no increased incidence of major psychopathology in individuals with gender dysphoria compared to the general population.[136] However, the impact of psychosocial stresses (including the transphobic harassment, discrimination, and violence experienced by many transgender individuals[24]) is cause for concern. Depression is not uncommon among transgender patients, with 30-40% of the respondents in a San Francisco study reporting having been prescribed medication for a mental health condition, and 32% reporting prior suicide attempts (Clements et al,

1999). Forty-two percent of respondents in a BC-wide survey reported needing mental health assistance in the past, with 39% stating a current need for mental health services.[25]

The primary care provider should routinely screen for mental health concerns and refer to trans-competent mental health professionals as needed. Peer support resources may also be appropriate (see Appendix A). Management of co-existing gender concerns and mental health concerns is discussed in greater detail in *Counselling and Mental Health Care of Transgender Adults and Loved Ones*.[5]

Musculoskeletal health

All transgender patients

- Exercise may help MTFs taking feminizing hormones to maintain muscle tone.
- To avoid tendon rupture, FTMs who are involved in strength training and are taking testosterone should increase weight load gradually, with an emphasis on repetitions rather than weight.

The effects of estrogen, anti-androgens, and testosterone on lean muscle mass are well-known, from both transgender and non-transgender studies.[137,138] It is estimated that approximately 4 kg lean body mass is lost following initiation of androgen deprivation in MTFs, and approximately 4 kg gained following initiation of testosterone in FTMs.[139] Case reports exist on tendon rupture in both FTM patients on testosterone and natal men taking anabolic steroids.[140,141]

Osteoporosis

Male-to-female

MTF, no hormone use, no surgery

- There is no evidence of increased risk of osteoporosis. No screening is recommended except as indicated by additional risk factors.

MTF, past or present feminizing hormones, pre-orchiectomy

- There is no current evidence that feminizing therapy increases risk of osteoporosis, but long-term prospective studies have not been done.
- No screening is recommended except as indicated by additional risk factors.
- Calcium and Vitamin D supplementation is recommended.

MTF, after orchiectomy

- Estrogen therapy is advised to reduce the risk of osteoporosis. If there are contraindications to estrogen therapy, supplemental calcium (1200 mg daily) and Vitamin D (600 units daily) are recommended to limit bone loss. If there are additional risk factors for bone loss, consider weekly bisphosphonate (35-70 mg alendronate, 35 mg risedronate) for osteoporosis prevention.
- Consider bone density screening for patients over age 60 who have been off estrogen therapy for longer than 5 years.

The effect of feminizing hormones on bone density is controversial. Studies in MTF patients suggest that feminizing hormone therapy does not result in loss of bone mineral density.[142,143] It is unclear how much estrogen is needed following gonadal removal to protect against bone loss, but studies in postmenopausal women suggest that very low dose estrogen (.025 mg transdermal estradiol or .3 mg CEE) may be sufficient.[144,145] Loss of bone density is most likely after orchiectomy in those patients with other risk factors (e.g., Caucasian or Asian ethnicity, smoking, family history, high alcohol use, hyperthyroidism), those who are not fully adherent to hormone therapy.

Female-to-male

FTM, no hormone use, no surgery

- There is no evidence of increased or decreased risk. Follow recommended guidelines for natal females.

FTM, past or present hormone use, no surgery

- Opinion is mixed on the impact of testosterone on bone density prior to oophorectomy. Some studies found increased BMD or no change, while others have found BMD loss.
- Consider bone density screening in FTMs over age 50 (or sooner in patients with additional risk factors for osteoporosis) who have been on testosterone therapy over 5 years.
- Supplemental calcium (1200 mg daily) and Vitamin D (600 units daily) are recommended to help maintain bone density.

FTM, past or present hormone use, post-oophorectomy (or total hysterectomy)

- Limited evidence suggests an increased risk of bone density loss after oophorectomy, particularly if testosterone is reduced or discontinued.
- Testosterone therapy is advised to reduce the risk of bone density loss.
- If there are contradictions to testosterone therapy, consider weekly bisphosphonate (35-70 mg alendronate, 35 mg risedronate) for osteoporosis prevention.
- Consider bone density screening in all FTMs over age 60.
- Consider bone density screening in FTMs over age 50, or sooner in patients with additional risk factors for osteoporosis who have been on testosterone therapy over 5 years.
- Supplemental calcium (1200 mg daily) and Vitamin D (600 units daily) are recommended to help maintain bone density.

The effect of masculinizing hormones on bone density is controversial. Although studies have found that exogenous testosterone maintains bone density to some degree in FTMs[142,143,146,147] it may not be sufficient, especially after oophorectomy.[143,148] It is unclear how much testosterone is needed following gonadal removal to protect against bone loss. Some FTM patients may use Depo-Provera™ to produce amenorrhea, which appears to result in bone density loss with long term use in non-transgender women.[149]

Loss of bone density is most likely in those patients with other risk factors (e.g., Caucasian or Asian ethnicity, smoking, family history, high alcohol use, hyperthyroidism) and those who are not fully adherent to hormone therapy. There are no long term studies in transgender patients examining the degree to which loss of bone density correlates to the risk of clinical fractures; however, data in non-transgender men and women strongly support this conclusion.[150]

Calcium and vitamin D supplementation and weight bearing exercise are indicated for all transgender patients on hormones who are at risk for osteoporosis. Densitometry screening may be indicated for patients at increased risk of osteoporosis, although normative data for transgender patients have not been established. Regardless of hormonal or surgical status, if a transgender patient shows significant bone loss compared to natal sex norms, further intervention is warranted. Bisphosphonates have been demonstrated to increase bone density and decrease fracture risk in non-transgender men and women.[151]

Sexual health

Sexually transmitted infections (STIs)

All transgender patients

- Test all sexually active transgender patients yearly for gonorrhea, chlamydia, and syphillis.
- If the patient reports ongoing risk factors (recurrent STIs, unprotected sex with a partner who might be at risk, unprotected anal/vaginal sex with more than one partner, or psychosocial cofactors relating to unsafe sex) consider testing every 6 months.
- Treat all transgender patients with STIs and their partners according to recommended guidelines for non-transgender patients.

According to the most recent Canadian STI guidelines,[152] the primary care provider's recommendation to test for STIs depends on prevailing epidemiology and assessment of individual risk. Individual risk is considered to include signs and symptoms of a specific STI, history of sexual activity known to pose risk for STI transmission, and membership in a population known to be at heightened risk for STI transmission. If the category "men who have sex with men" (MSM) is extended to include transgender individuals (of any gender) who have sex with men (TSM),[28] many transgender individuals would be considered in a population that is at increased risk for STIs (identified in the Canadian STI guidelines as youth under 25, street-involved individuals, men who have sex with men, and commercial sex trade workers).

Data on the rates of STIs (other than HIV) among transgender populations is limited. In a 1999 San Francisco study, 53% of MTF participants and 31% of FTM participants reported a prior sexually transmitted infection,[114] with 36% reported for both groups in a New York survey.[121] While from a population health perspective a significant percentage of the transgender community is at risk for STIs, sexual practices among transgender individuals vary greatly[153-156] and assumptions should not be made about the gender of a patient's sexual partner(s), sexual activities, or individual risks.

Sexual activities vary depending on the patient's anatomy and preferences, as well as that of their partner(s). While some transgender individuals are strongly dysphoric about their genitals, others enjoy using them sexually. Both MTFs and FTMs may engage in receptive or insertive oral, vaginal, and anal intercourse. While digital penetration/touching or use of dildos is considered low risk for transmission of HIV, Hepatitis B, syphillis, gonorrhea, and chlamydia, other STIs (e.g., herpes, trichomonas, HPV) can be transmitted by sharing of sex toys or by unprotected genital touching. Potentially high-risk sexual behaviours reported by transgender research participants include unprotected sex, sex while intoxicated, and sex with multiple partners.[114,121,157-160] Cofactors related to unsafe sex, such as depression, suicidal ideation, and physical or sexual abuse, are also increased among the transgender population.[23,116,118,123,124] Studies indicate the need to affirm one's gender identity can drive high-risk sexual behaviors.[114,127,161]

Ideally, STI prevention and screening is based on a thorough understanding of the specific sexual activities a patient engages in. However, it is often awkward for both the clinician and patient to discuss explicit sexual details in the primary care setting.[162-166] As patient trust is particularly fragile in transgender care, discussion of genitals is sensitive for many transgender patients, and there is a paucity of clinical language to discuss sex in a way that is trans-inclusive and respectful, we feel it is more practical to recommend that any transgender patient who is sexually active be tested regularly for the STIs that are most common locally. If there is strong clinician-patient rapport and the patient is comfortable talking about sexuality, more detailed discussion of sexual activities is preferable to facilitate individualized prevention and testing.

STI prevention should reflect the patient's anatomical and psychosocial needs. For example, non-penetrative sexual activities or penetration with a dildo can be recommended for MTF patients who are taking feminizing hormones and therefore unable to sustain an erection sufficiently firm for condom use. To prevent condom breakage, supplemental lubrication should be made available to MTFs who have had vaginoplasty (as the neovagina is not self-lubricating) and FTMs who take testosterone (as decreased estrogen can result in vaginal atrophy and dryness). The unique difficulties faced by transgender people in negotiating safe sex should be acknowledged and explored.[154]

Sex trade workers are often mistakenly assumed to be at intrinsically higher risk for STIs due to failure to use condoms with clients. Like non-transgender women in the sex trade, MTFs in the sex trade report using condoms relatively consistently with clients, but far less consistently with romantic partners.[161,167-170] Counselling and screening for STI transmission in romantic relationships should not be overlooked in primary care of transgender individuals involved in the sex trade.

The variable anatomy of transgender patients affects how screening or diagnostic tests for gonorrhea and chlamydia are performed. A urine-based test of a non-clean catch specimen of the first 25 ml of urine (e.g., Gen-Probe™) can be used regardless of anatomy, making this the ideal testing method for most transgender patients. Alternatively, a urethral sample can be taken in patients with a natal penis (MTF pre-surgery), or a vaginal (MTF post-vaginoplasty, FTM pre-vaginectomy) or cervical sample (FTM pre-hysterectomy) may be appropriate. Rectal and pharyngeal samples can be used in patients with symptoms in these areas.

Treatment of STIs should follow the Canadian STI guidelines[152] or recent updates by the Centre for Disease Control. Hormone therapy does not affect treatment of STIs in the transgender individual.

Fertility issues

Transgender patients considering or currently taking hormones

- Discuss fertility issues with patients considering hormone therapy.
- Testosterone is not a fail-safe contraceptive for FTM patients.

Cross-sex hormones may reduce fertility and this may be permanent even if hormones are discontinued. In BC, cryopreservation of unfertilized ova is not available. Sperm banking is available for MTF patients at the Genesis Fertility Centre (http://www.genesis-fertility.com), the UBC Centre for Reproductive Health (http://www.ubcfertility.com), or the Victoria Fertility Centre (http://www.victoriafertility.com). Sperm banking is most useful prior to initiation of hormone therapy, as feminizing hormones can permanently impact fertility. Ideally, several samples should be banked. With the patient's permission, an introductory letter should be sent by the primary care provider alerting the centre that the patient is transgender so the MTF who is already cross-living will be treated in a respectful manner.

FTMs may continue to ovulate on testosterone therapy, even if menses have stopped; the risk of pregnancy is reduced but not predictably. Additionally, testosterone can adversely affect a developing fetus. Depo-Provera®, barrier methods, and spermicides are possible contraceptive options for FTMs at risk of pregnancy who are on or considering testosterone therapy.

Sexual function

Transgender patients considering or currently taking hormones

- Testosterone therapy tends to increase libido among FTM patients.
- Feminizing hormone therapy tends to reduce libido, reduce erectile function, and decrease ejaculation among MTF patients.

Following genital surgery

- Sexual function (libido, arousal, pain with sex, and orgasm) after genital surgery is variable and depends on pre-operative sexual function, the type of surgery performed, and hormonal status.

If an MTF patient is concerned about limiting erectile dysfunction while undergoing feminizing hormone therapy, the prescribing clinician should first consider adjusting the dose of hormones, while addressing the patient's desires regarding the degree of feminization and level of erectile function. If this is unsuccessful, erection-enhancing drugs (e.g., Viagra®) may be considered.

One of the clinicians in the project noted an increased incidence of acute prostatitis among MTF patients in the first few years of transition, and speculated this could be caused by cessation of ejaculation resulting in stagnant prostate secretions. There may also be increased risk for acute prostatitis or urinary tract infection after vaginoplasty (due to the shortened urethra).

Sexual function is discussed further in *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines*[1] and *Care of the Patient Undergoing Sex Reassignment Surgery.*[2]

Substance use

Smoking

All transgender patients

- Screen (by history) all transgender patients for past and present tobacco use.
- Inclusion of smoking cessation as part of comprehensive transgender care has been highly successful, particularly in association with hormone therapy. Buproprion, nicotine replacement, and behavioral modification techniques may be appropriate.

Little is known about smoking prevalence or cessation patterns in the transgender population. Thirty-seven percent of transgender patients presenting to a Minnesota clinic for hormone therapy were current smokers, compared to 20% for the Minnesota population overall.[171] Among the transgender population there are commonly multiple identified risk factors for smoking (poverty, stressful living and work environments, societal marginalization, etc.).[172-174]

The trans-specific risks associated with smoking include an increased risk of venous thromboembolic events with estrogen therapy and reassignment surgery, possible increased risk of cardiovascular disease with both feminizing and masculinizing hormone therapy (especially over age 50), and delayed healing following surgery. Smoking cessation interventions can be effective, particularly if they are incorporated into a comprehensive transgender care program. This approach involves consistent smoking cessation messages from all staff, frequent supportive follow-up of cessation efforts, and direct communication of the limitations and risks that smoking imposes on hormone therapy.[87]

Alcohol and drug use

All transgender patients

- Screen (by history) all transgender patients for alcohol and drug use.
- Refer, if needed, to a trans-competent chemical dependency program.

Rates of alcohol and drug use among transgender individuals are not known, but may be increased due to self-medication for depression, as well as high rates of exposure to discrimination and abuse. While patterns of substance use are regionally influenced and change over time, a 1999 study of 209 MTFs in San Francisco found that 45% had used drugs or alcohol within the previous 30 days, and alcohol, marijuana, crack/cocaine, and methamphetamines were the drugs most commonly used.[175] Reported substance use ranged from 20-30% in several trans-specific U.S. studies.[9,114,136,176]

In all referrals, care should be taken to ensure the service is trans-competent prior to referral (the Transgender Health Program can assist with this). In referral to residential addiction programs that have gender-specific programming or facilities, particular attention is needed to ensure the transgender person will be welcomed and that appropriate accommodations will be made in sleeping arrangements, shower use, bathroom use, and group activities.

Venous thrombosis/thromboembolism and feminizing hormones

MTF patients, considering or currently taking estrogen

- Estrogen therapy is contraindicated in MTF patients with a history of venous thromboembolic events (VTE) or underlying thrombophilia (e.g. anticardiolipin syndrome, Factor V Leiden, etc).
- MTF patients over age 40, smokers, and highly sedentary patients are at particular risk and may benefit from lifestyle change, transdermal estrogen and lower estrogen doses.
- Consider daily aspirin therapy in patients with risk factors for VTE who are taking estrogen.

As noted in *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines,*[1] MTF patients on any form of estrogen are at increased risk of venous thromboembolic events – potentially as high as a 20-fold increase.[14] These risks increase with age (greater than 40), smoking, and sedentary lifestyle, but may be reduced somewhat by use of transdermal estrogen in lower doses.[14,78] Patients should be warned regarding the risks of VTE, along with the signs and symptoms.

Transgender Hormone Therapy

Transgender hormone therapy – the provision of exogenous endocrine agents to induce feminizing or masculinizing changes – is a strongly desired medical intervention for many transgender individuals. In addition to inducing physical changes, the act of using transgender hormones is itself an affirmation of gender identity – a powerful incentive for this population.[10,28] Studies of presurgical transsexuals indicate improved psychological adjustment and quality of life with hormone therapy.[177,178] There is great variation in the extent to which hormonal changes are undertaken or desired. Some individuals seek maximum feminization/masculinization, while others experience relief with an androgynous presentation resulting from hormonal minimization of existing secondary sex characteristics.

Transgender patients desiring hormone therapy may ask the family physician or nurse practitioner* to provide this treatment. Primary care providers can increase their experience and comfort in providing transgender hormone therapy through a variety of means. First, simply caring for transgender patients in your practice will improve your understanding of transgender health care needs. In addition, you can become more familiar with the hormone regimens and the transition process by co-managing care or consulting with a more experienced provider (the Transgender Health Program can assist with this). Clinicians can gain personal experience by providing post-operative and/or pre-operative maintenance hormones before progressing to initiation of hormone therapy. As the field of transgender medicine is evolving, primary care providers should become familiar and keep current with the medical literature, and discuss emerging issues with colleagues (through, for example, networks established by the Transgender Health Program and the Harry Benjamin International Gender Dysphoria Association).

Ideally, the prescribing clinician and the patient will work with a therapist trained in treating gender identity issues. According to the HBIGDA *Standards of Care*,[8] psychotherapy is not a requirement prior to initiation of hormone therapy. However, the process of gender transition involves profound mental, social, emotional, economic, and legal changes in a patient's life. Hormone therapy can be both an enriching and complicating element in this transition, and trans-competent mental health professionals can provide a wide variety of resources to assist the transgender patient (and hormone provider) in this complex process. If a therapist is involved, with the patient's consent regular communication is advised to ensure that the transition process is proceeding smoothly, both physically and psychosocially. Physicians and nurse practitioners with appropriate training and expertise (see *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines*[1]) may prescribe hormones without third-party involvement.

The following section briefly explains the range of potential roles for the GP/NP in hormone care.

Bridging

Patients may present for care already on hormones, whether prescribed by a clinician or obtained through other means (e.g., purchased over the Internet). If you are uncomfortable providing long-term hormone therapy, you can provide a 1-3 month prescription for hormones while assisting the patient in finding a clinician who can provide long-term hormone therapy. You should assess the patient's current regimen for safety and drug interactions (using *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines*[1]) and substitute safer medications or doses when indicated. If hormones were previously prescribed, with the patient's permission the previous medical records should be requested and the history of hormone prescription documented in the

* In BC, nurse practitioners can prescribe anti-androgens, estrogen, and progestins, but not testosterone.[6]

current chart. Primary care providers who prescribe bridging hormones need to work with the patient to establish limits as to the time length of bridging therapy.

Hormone therapy following gonad removal

Hormone replacement with estrogen or testosterone is usually continued lifelong after oophorectomy/orchiectomy, unless medical contraindications arise. Guidelines for post-operative hormone therapy are provided in *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines.*[1] Laboratory monitoring can be done yearly for otherwise healthy patients.

Hormone maintenance prior to gonad removal

Once patients have achieved maximal feminizing or masculinizing benefit from hormones (typically two or more years) they remain on a maintenance dose. Maintaining body changes generally requires lower hormone doses compared to initial induction. The maintenance dose is then adjusted for change in health conditions, aging, or other considerations (e.g., lifestyle changes).

Upon presenting for maintenance hormones, you should assess the patient's current regimen for safety and drug interactions and substitute safer medications or doses when indicated. The patient should be monitored by physical exam and laboratory testing every six months. For MTFs over age 40, transdermal rather than oral estrogen is recommended; over age 50, consider decreasing the estrogen dose to 100 mcg twice per week or less, depending on the patient's health status (particularly cardiovascular risk). For FTMs, testosterone doses should be sufficient to maintain free testosterone levels in the low-normal male range.

Patients may occasionally need to reduce or temporarily stop their hormone therapy in anticipation of upcoming medical procedures, such as surgery or sperm banking. MTF patients, in particular, should discontinue estrogen 2-4 weeks prior to any major surgery to reduce the risk of thromboembolic events. It is helpful to discuss any temporary interruption of hormones with the patient well in advance.

Refer to *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines*[1] for detailed recommendations on adjusting and monitoring maintenance hormone therapy.

Initiating hormonal feminization/masculinization

While some transgender individuals obtain feminizing/masculinizing hormones from an endocrinologist, primary care providers are well-suited to provide safe and effective masculinizing or feminizing hormone therapy in the setting of comprehensive health care. It is not necessary for the prescribing clinician to be an endocrinologic expert, but it is important to be familiar with relevant medical and psychosocial issues.

Hormone therapy must be individualized based on the individual's goals, the risk/benefit ratio of medications, the presence of other medical conditions, and consideration of social and economic issues. In general we recommend that hormone therapy be consistent with the Harry Benjamin International Gender Dysphoria Association (HBIGDA)'s *Standards of Care* (SOC), available online at http://www.hbigda.org. The HBIGDA SOC are intended as a flexible framework to guide the treatment of transgender individuals.[8] Detailed recommendations regarding complete hormone therapy are provided in *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines.*[1]

Concluding Remarks

Transgender persons represent an underserved community in need of sensitive, comprehensive health care. Primary medical care providers will likely encounter patients with gender identity issues at some point in their practice, whether or not they choose to provide hormone therapy. Whether helping transgender patients navigate the marvels and challenges of transition, or simply enabling them to lead healthier lives, we hope this document helps family physicians and advanced practice nurses in BC to feel more confident in clinical practice with the transgender community.

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Appendices

Appendix A: Resources

Appendix B: Recommendations for MTF patients

- **B1: Summary by area of health**
- **B2: Summary by patient group**

Appendix C: Recommendations for FTM patients

- **C1: Summary by area of health**
- **C2: Summary by patient group**

Appendix A: Resources

Transgender Health Program

The Transgender Health Program is an anonymous and confidential free service for anyone in BC who has a transgender health question or concern.

Services for clinicians include:

- training in transgender health and transgender medicine
- assistance in care planning for transgender clients/patients and loved ones
- information about best practice guidelines and standards of care
- assistance with development of trans-inclusion policies and procedures
- information about transgender health research findings and implications for practice
- joint program planning and research initiatives

Services for transgender people and loved ones include:

- help finding health/social services, and assistance to navigate health/social service systems
- information about best practice guidelines, standards of care, and client/patient rights
- peer-based exploration of gender identity, gender expression, and life stresses in a non-judgmental setting
- support and information for family members, partners, friends, and other loved ones
- free condoms and needle exchange
- outreach to transgender people working in the survival sex trade
- free training sessions for peer support volunteers
- information about transgender community groups

The Transgender Health Program is an initiative of Vancouver Coastal Health.

For more information, contact:

Transgender Health Program
Three Bridges Community Health Centre
#301-1290 Hornby Street, Vancouver, BC V6Z 1W2
Phone/TTY/TDD: 604-734-1514 or 1-866-999-1514 (toll-free in BC)
Fax: 604-633-4241
Email: transhealth@vch.ca
Web: http://www.vch.ca/transhealth

Harry Benjamin International Gender Dysphoria Association

http://www.hbigda.org

The Harry Benjamin International Gender Dysphoria Association (HBIGDA) is a professional organization devoted to the understanding and treatment of gender identity disorders, with 350 members from around the world in fields such as psychiatry, endocrinology, surgery, psychology, sexology, counseling, sociology, and law. HBIGDA provides opportunities for scientific interchange among professionals through biennial conferences and publications, and develops and publishes Standards of Care for the treatment of gender identity disorders.

Appendix B: Recommendations for MTF Patients

Table B1: Summary by Area of Health

Health history (new patient)	**General health history** • review general health history, including medications • review family history, with particular attention to history of breast cancer, clotting disorders, cardiovascular disease, diabetes, hypertension, mental illness, prostate cancer • assess psychosocial supports/stresses (e.g., family, work environment) • sexual history: sexual orientation, risks related to STIs, sexual function • assess whether vaccinations are up-to-date (including Hepatitis B) **Trans-specific health history** • Has the patient ever taken feminizing hormones? Is the patient currently taking hormones? Are there any complications or concerns regarding past or current hormone use? • Has the patient undergone any feminizing surgical procedures (e.g., breast augmentation, facial feminization, genital surgery)? Are there any complications or concerns regarding past surgeries? • Does the patient plan to pursue hormone therapy or feminizing surgeries in the future? • Are there any additional feminizing interventions sought by the patient?
Routine physical exam	*All MTFs, regardless of hormone use/surgery:* • prostate evaluation: digital rectal exam as for natal males *Current hormone use:* • annual manual breast exam • blood pressure every 1-3 months
Recording sex on lab requisition and interpreting lab results	*No past/current hormone use, no orchiectomy:* • use M reference values *Some degree of feminization based on past/current hormone use:* • use F or M reference values depending on specific test and length of time/recency of hormone use *Following orchiectomy:* • use F reference values
Cancer screening	
1. Breast	*No past or current hormone use:* • no screening needed *Past or current hormone use* • screening mammography in patients over age 50 with additional risk factors (e.g., estrogen and progestin use > 5 years, positive family history, BMI > 35) • annual clinical breast exam and periodic self-breast exam not recommended
2. Prostate	*No past or current hormone use:* • consider PSA screening in high-risk patients (e.g., African-Canadian, family history of prostate cancer) after age 45 • digital rectal exam as for natal males *Past or current hormone use* • PSA is falsely low in androgen-deficient setting even in presence of cancer; only consider PSA screening in high risk patients • digital rectal exam as for natal males
3. Other	*All MTFs, regardless of hormone use/surgery:* • follow standard screening recommendations for other cancers (e.g., colon cancer, lung cancer, anal cancer) *Following vaginoplasty, regardless of hormone use:* • if glans penis was used to create neo-cervix, do cervical Pap as per guidelines for natal females • if no neocervix, consider vaginal Pap for patient with history of genital warts

Cardiovascular screening/ treatment	*All MTFs, regardless of hormone use/surgery* • aggressively screen for and treat known, modifiable cardiovascular risk factors • consider daily aspirin therapy in patients at high risk for CAD *Before initiating feminizing hormone therapy* • control cardiovascular risk factors • consider stress testing among patients at very high risk for cardiovascular disease or with any cardiovascular symptoms
1. CAD/ Cerebro-vascular disease	*Currently taking estrogen and/or progestin* • closely monitor for cardiac events or symptoms, esp. during first 1-2 years of hormone therapy • in patient at high risk (including pre-existing CAD), use transdermal estrogen, reduce estrogen dose, and omit progestin from the regimen
2. Hypertension	*Not currently taking estrogen:* • screen and treat hypertension as with non-transgender patients • if planning to start feminizing hormone therapy within 1-3 years, try to bring systolic pressure to ≤ 130 mm Hg and diastolic pressure to ≤ 90 mm Hg *Currently taking estrogen:* • monitor blood pressure every 1-3 months • goal: systolic pressure ≤ 130 mm Hg, diastolic pressure ≤ 90 mm Hg • consider using spironolactone as part of antihypertensive regimen
3. Lipids	*Not currently taking estrogen:* • screen and treat hyperlipidemia as with non-transgender patients • if planning to start feminizing hormone therapy within 1-3 years, try to bring LDL to ≤ 3.5 mmol/L *Currently taking estrogen:* • annual fasting lipid profile • transdermal estrogen is recommended for patients with hyperlipidemia, esp. hypertriglyceridemia • treat high cholesterol to LDL goal of ≤ 3.5 mmol/L for low-moderate risk patients and ≤ 2.5 mmol/L for high risk patients
Diabetes screening/ treatment	*Not currently taking estrogen* • screen and treat as with non-transgender patients *Currently taking estrogen* • consider annual fasting glucose test, esp. if family history of diabetes and/or > 5 kg weight gain • consider glucose tolerance testing and/or A1C test if evidence of impaired glucose tolerance without diabetes • treat diabetes according to guidelines for non-transgender patients; if medications are indicated, include insulin sensitizing agent • consider decreasing estrogen if glucose is difficult to control or patient is unable to lose weight
HIV and Hepatitis B/C screening/ prevention	*All MTFs, regardless of hormone use/surgery* • if ongoing risk behaviours for sexual or blood-borne transmission (e.g., unprotected penile-vaginal or penile-anal intercourse, history of prior STIs, sharing needles for injection of hormones/illicit drugs), consider HIV and Hepatitis B/C screening every 6-12 months; otherwise consider HIV and Hepatitis B/C screening at least once during lifetime • treat all patients with STIs and their partners according to recommended guidelines for non-transgender patients • offer Hepatitis B vaccination if patient is not already immune
Mental health screening/ treatment	*All MTFs, regardless of hormone use/surgery* • screen for depression • refer, if needed, to trans-competent mental health provider
Musculoskeletal health	*Currently taking feminizing hormones* • exercise may help maintain muscle tone

Osteoporosis screening/ prevention	*Pre-orchiectomy (regardless of hormone use)* • no screening unless additional risk factors • recommend calcium and vitamin D supplementation *Post-orchiectomy* • either maintain estrogen therapy or consider combination of calcium/Vitamin D supplementation and weekly bisphosphonate • consider bone density screening for patients > age 60 who have been off estrogen for > 5 years
Sexual health	
1. STI screening/ treatment	*All MTFs, regardless of hormone use/surgery* • test all sexually active MTFs yearly for gonorrhea, chlamydia, and syphillis • if patient reports ongoing risk factors (recurrent STIs, unprotected sex with a partner who might be at risk, unprotected anal/vaginal sex with more than one partner, psychosocial cofactors relating to unsafe sex), screen every 6 months for gonorrhea, chlamydia, and syphilis • treat all patients with STIs and their partners according to recommended guidelines for non-transgender patients
2. Fertility	*Prior to initiation of feminizing regimen* • discuss impact of feminizing agents on fertility, possibility of permanent sterility, and options for sperm banking
3. Sexual function	*Prior to initiation of feminizing regimen* • discuss typical impact of feminizing agents on libido, erectile function, and ejaculation
Substance use screening/ treatment	*All MTFs, regardless of hormone use/surgery* • screen (by history) for past and present use of tobacco, alcohol, and other drugs • refer, if needed, to trans-competent chemical dependency program
Venous thrombo-embolism/ Pulmonary embolism	*MTFs considering estrogen or currently taking estrogen* • estrogen therapy is contraindicated in MTF patients with a history of venous thromboembolic events (VTE) or underlying thrombophilia (e.g. anticardiolipin syndrome, Factor V Leiden, etc). • MTF patients over age 40, smokers, and highly sedentary patients are at particular risk and may benefit from lifestyle change, transdermal estrogen and lower estrogen doses • consider daily aspirin therapy in patients with risk factors for VTE who are on estrogen therapy • educate patients about the risks, signs, and symptoms of VTE

Table B2: Summary by MTF Patient Group

MTF, no current/past hormone use, no orchiectomy	
Health history (new patient)	**General health history** • review general health history, including medications • review family history, with particular attention to history of breast cancer, clotting disorders, cardiovascular disease, diabetes, hypertension, mental illness, prostate cancer • assess psychosocial supports/stresses (e.g., family, work environment) • sexual history: sexual orientation, risks related to STIs, sexual function • assess whether vaccinations are up-to-date (including Hepatitis B) **Trans-specific health history** • Has the patient undergone any feminizing surgical procedures (breast augmentation, facial feminization)? Are there any complications or concerns regarding past surgeries? • Does the patient plan to pursue hormone therapy or feminizing surgeries in the future? • Are there any additional feminizing interventions sought by the patient?
Routine physical exam	• prostate evaluation: digital rectal exam as for natal males
Lab results	• use M reference range
Cancer screening	• breast: no screening needed • prostate: consider PSA screening in high-risk patients (e.g., African-Canadian, family history of prostate cancer) after age 45; digital rectal exam as for natal males • follow screening recommendations for other cancers as for natal males (e.g., colon cancer, lung cancer, testicular cancer, anal cancer)
Cardiovascular screening/ treatment	• aggressively screen for and treat known cardiovascular risk factors • screen and treat hypertension as with non-transgender patients • screen and treat hyperlipidemia as with non-transgender patients • consider daily aspirin therapy in patients at high risk for CAD *If patient is planning to start feminizing hormone therapy within 1-3 years:* • before initiating hormones aim to control cardiovascular risk factors; consider stress testing if patient is at very high risk for cardiovascular disease or has cardiovascular symptoms • try to bring systolic BP to ≤ 130 mm Hg and diastolic BP to ≤ 90 mm Hg • try to bring LDL cholesterol to ≤ 3.5 mmol/L
Diabetes screening/treatment	• screen and treat as with non-transgender patients
HIV and Hepatitis B/C screening/ prevention	• if ongoing risk behaviours for sexual or blood-borne transmission (e.g., unprotected penile-vaginal or penile-anal intercourse, history of prior STIs, sharing needles for injection of hormones/illicit drugs), consider HIV and Hepatitis B/C screening every 6-12 months; otherwise consider HIV and Hepatitis B/C screening at least once during lifetime • treat STIs according to recommended guidelines for non-transgender patients • offer Hepatitis B vaccination if patient is not already immune
Mental health screening/treatment	• screen for depression • refer, if needed, to trans-competent mental health provider
Osteoporosis screening/prevention	• no screening unless additional risk factors • recommend calcium and vitamin D supplementation
Sexual health	• if sexually active, test yearly for gonorrhea, chlamydia, and syphillis; if patient reports ongoing risk factors for STI transmission, screen every 6 months • treat STIs according to recommended guidelines for non-transgender patients *If patient is planning to start feminizing hormone therapy:* • discuss likely impact on fertility, possibility of permanent sterility, and options for sperm banking • discuss typical impact of feminizing agents on libido, erectile function, and ejaculation
Substance use screening/treatment	• screen (by history) for past and present use of tobacco, alcohol, and other drugs • refer, if needed, to trans-competent chemical dependency program
Venous thrombo-embolism/ Pulmonary embolism	*If patient is planning to start feminizing hormone therapy* • discuss lifestyle issues with MTF patients over age 40, smokers, and highly sedentary patients to reduce risks before starting estrogen • educate patients about the risks, signs, and symptoms of VTE

MTF, past (but not current) hormone use, no orchiectomy	
Health history (new patient)	**General health history** • review general health history, including medications • review family history, with particular attention to history of breast cancer, clotting disorders, cardiovascular disease, diabetes, hypertension, mental illness, prostate cancer • assess psychosocial supports/stresses (e.g., family, work environment) • sexual history: sexual orientation, risks related to STIs, sexual function • assess whether vaccinations are up-to-date (including Hepatitis B) **Trans-specific health history** • Which feminizing hormones were taken, for how long, and at what doses? Are there any complications or concerns regarding past use? • Has the patient undergone any feminizing surgical procedures (breast augmentation, facial feminization)? Are there any complications or concerns regarding past surgeries? • Does the patient plan to pursue hormone therapy or feminizing surgeries in the future? • Are there any additional feminizing interventions sought by the patient?
Routine physical exam	• blood pressure every 1-3 months • prostate evaluation: digital rectal exam as for natal males
Lab results	• use F or M reference values depending on specific test and length of time/recency of hormone use
Cancer screening	• if breast growth: screening mammography in patients over age 50 with additional risk factors (long-term estrogen and progestin use, positive family history, BMI > 35) • prostate: digital rectal exam as for natal males; only consider PSA screening in high risk patients (PSA is falsely low in androgen-deficient setting even in presence of cancer) • follow screening recommendations for other cancers as for natal males (e.g., colon cancer, lung cancer, testicular cancer, anal cancer)
Cardiovascular screening/treatment	• aggressively screen for and treat known, modifiable cardiovascular risk factors • screen and treat hypertension as with non-transgender patients • screen and treat hyperlipidemia as with non-transgender patients • consider daily aspirin therapy in patients at high risk for CAD *If patient is planning to restart feminizing hormone therapy within 1-3 years:* • before initiating hormones aim to control cardiovascular risk factors; consider stress testing if patient is at very high risk for cardiovascular disease or has cardiovascular symptoms • try to bring systolic BP to ≤ 130 mm Hg and diastolic BP to ≤ 90 mm Hg • try to bring LDL cholesterol to ≤ 3.5 mmol/L
Diabetes screening/treatment	• screen and treat as with non-transgender patients
HIV and Hepatitis B/C screening/prevention	• if ongoing risk behaviours for sexual or blood-borne transmission (e.g., unprotected penile-vaginal or penile-anal intercourse, history of prior STIs, sharing needles for injection of hormones/illicit drugs), consider HIV and Hepatitis B/C screening every 6-12 months; otherwise consider HIV and Hepatitis B/C screening at least once during lifetime • treat all patients with STIs and their partners according to recommended guidelines for non-transgender patients • offer Hepatitis B vaccination if patient is not already immune
Mental health screening/treatment	• screen for depression • refer, if needed, to trans-competent mental health provider
Osteoporosis screening/prevention	• no screening unless additional risk factors • recommend calcium and vitamin D supplementation
Sexual health	• if sexually active, test yearly for gonorrhea, chlamydia, and syphillis; if patient reports ongoing risk factors for STI transmission, screen every 6 months • treat patient with STI (+ partner[s]) according to guidelines for non-transgender patients *If patient is planning to restart feminizing hormone therapy:* • discuss impact of feminizing agents on fertility, possibility of permanent sterility, and options for sperm banking
Substance use screening/treatment	• screen (by history) for past and present use of tobacco, alcohol, and other drugs • refer, if needed, to trans-competent chemical dependency program

MTF, currently taking feminizing regimen that includes estrogen, no orchiectomy	
Health history (new patient)	**General health history** • review general health history, including medications • review family history, with particular attention to history of breast cancer, clotting disorders, cardiovascular disease, diabetes, hypertension, mental illness, prostate cancer • assess psychosocial supports/stresses (e.g., family, work environment) • sexual history: sexual orientation, risks related to STIs, sexual function • assess whether vaccinations are up-to-date (including Hepatitis B) **Trans-specific health history** • Which feminizing hormones are being taken, for how long, and at what doses? Are there any complications or concerns regarding past or current use? • Has the patient undergone any feminizing surgical procedures (breast augmentation, facial feminization)? Are there any complications or concerns regarding past surgeries? • Does the patient plan to pursue any surgeries in the future? • Are there any additional feminizing interventions sought by the patient?
Routine physical exam	• blood pressure every 1-3 months • prostate evaluation: digital rectal exam as for natal males
Lab results	• use F or M reference values depending on specific test and length of time of hormone use
Cancer screening	• breast: screening mammography in patients over age 50 with additional risk factors • prostate: digital rectal exam as for natal males; only consider PSA screening in high risk patients (PSA is falsely low in androgen-deficient setting even in presence of cancer) • follow screening recommendations for other cancers as for natal males (e.g., colon cancer, lung cancer, testicular cancer, anal cancer)
Cardiovascular screening/treatment	• aggressively screen for and treat known cardiovascular risk factors • CAD: closely monitor for cardiac events or symptoms, esp. during first 1-2 years of hormone therapy; in patient at high risk (including pre-existing CAD) use transdermal estrogen, reduce estrogen dose, omit progestin from the regimen, and consider daily aspirin therapy • hypertension: monitor blood pressure every 1-3 months, treat hypertension to goal of systolic pressure ≤ 130 mm Hg and diastolic pressure ≤ 90 mm Hg, consider using spironolactone as part of anti-hypertensive regimen • lipids: annual fasting lipid profile, use transdermal estrogen if hyperlipidemia, treat high cholesterol to LDL goal of ≤ 3.5 mmol/L for low-moderate risk patients and ≤ 2.5 mmol/L for high risk patients
Diabetes screening/treatment	• annual fasting glucose test, esp. if family history of diabetes and/or > 5 kg weight gain • GTT and/or A1C test if evidence of impaired glucose tolerance without diabetes • treat diabetes according to guidelines for non-transgender patients; if medications are indicated, include insulin sensitizing agent • decrease estrogen if glucose is difficult to control or patient is unable to lose weight
HIV and Hepatitis B/C screening/ prevention	• if ongoing risk behaviours for sexual or blood-borne transmission (e.g., unprotected penile-vaginal or penile-anal intercourse, history of prior STIs, sharing needles for injection of hormones/illicit drugs), consider HIV and Hepatitis B/C screening every 6-12 months; otherwise consider HIV and Hepatitis B/C screening at least once during lifetime • treat STIs according to recommended guidelines for non-transgender patients • offer Hepatitis B vaccination if patient is not already immune
Mental health screening/treatment	• screen for depression • refer, if needed, to trans-competent mental health provider
Osteoporosis screening/prevention	• no screening unless additional risk factors • recommend calcium and vitamin D supplementation
Sexual health	• if sexually active, test yearly for gonorrhea, chlamydia, and syphillis; if patient reports ongoing risk factors for STI transmission, screen every 6 months • treat STIs according to recommended guidelines for non-transgender patients
Substance use screening/treatment	• screen (by history) for past and present use of tobacco, alcohol, and other drugs • refer, if needed, to trans-competent chemical dependency program
Venous thrombo-embolism/Pulmonary embolism	• MTF patients over age 40, smokers, and highly sedentary patients are at particular risk and may benefit from lifestyle change, transdermal estrogen and lower estrogen doses • consider daily aspirin therapy in patients with risk factors for VTE who are taking estrogen • educate patients about the risks, signs, and symptoms of VTE
Note: If primary care provider is hormone prescriber, add exams and labs as in *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines*[1]	

MTF, post-orchiectomy/genital surgery	
Health history (new patient)	**General health history** • review general health history, including medications • review family history, with particular attention to history of breast cancer, clotting disorders, cardiovascular disease, diabetes, hypertension, mental illness, prostate cancer • assess psychosocial supports/stresses (e.g., family, work environment) • sexual history: sexual orientation, risks related to STIs, sexual function • assess whether vaccinations are up-to-date (including Hepatitis B) **Trans-specific health history** • Which feminizing hormones are being taken, for how long, and at what doses? Are there any complications or concerns regarding past or current use? • Has the patient undergone any other feminizing surgical procedures (breast implants, facial feminization)? Are there any complications or concerns regarding past surgeries? • Does the patient plan to pursue any feminizing surgeries in the future? • Are there any additional feminizing interventions sought by the patient?
Routine physical exam	• blood pressure every 1-3 months • prostate evaluation: digital rectal exam as for natal males
Lab results	• use F reference values
Cancer screening	• breast: screening mammography in patients over age 50 with additional risk factors • prostate: digital rectal exam as for natal males; only consider PSA screening in high risk patients (PSA is falsely low in androgen-deficient setting even in presence of cancer) • after vaginoplasty: consider vaginal Pap for patient with history of genital warts; follow Pap smear guidelines for natal females if glans penis has been used to create neocervix • follow screening recommendations for other cancers as for natal males
Cardiovascular screening/treatment	• aggressively screen for and treat known cardiovascular risk factors • CAD: closely monitor for cardiac events or symptoms; in patient at high risk use transdermal estrogen, reduce estrogen dose, omit progestin, and consider daily aspirin therapy • hypertension: monitor blood pressure every 1-3 months, treat hypertension to goal of systolic pressure ≤ 130 mm Hg and diastolic pressure ≤ 90 mm Hg, consider using spironolactone • lipids: annual fasting lipid profile, use transdermal estrogen if hyperlipidemia, treat high cholesterol to LDL goal of ≤ 3.5 mmol/L (or ≤ 2.5 mmol/L if high risk)
Diabetes screening/treatment	• annual fasting glucose test, esp. if family history of diabetes and/or > 5 kg weight gain • GTT and/or A1C test if evidence of impaired glucose tolerance without diabetes • treat diabetes according to guidelines for non-transgender patients; if medications are indicated, include insulin sensitizing agent • decrease estrogen if glucose is difficult to control or patient is unable to lose weight
HIV and Hepatitis B/C screening/ prevention	• if ongoing risk behaviours for sexual or blood-borne transmission (e.g., unprotected penile-vaginal or penile-anal intercourse, history of prior STIs, sharing needles for injection of hormones/illicit drugs), consider HIV and Hepatitis B/C screening every 6-12 months; otherwise consider HIV and Hepatitis B/C screening at least once during lifetime • treat all patients with STIs and their partners according to recommended guidelines for non-transgender patients • offer Hepatitis B vaccination if patient is not already immune
Mental health screening/treatment	• screen for depression • refer, if needed, to trans-competent mental health provider
Osteoporosis screening/prevention	• either maintain estrogen therapy or consider combination of calcium/Vitamin D supplementation and weekly bisphosphonate • consider bone density screening if over age 60 and off estrogen therapy for > 5 years
Sexual health	• if sexually active, test yearly for gonorrhea, chlamydia, and syphillis; if patient reports ongoing risk factors for STI transmission, screen every 6 months • treat STIs according to recommended guidelines for non-transgender patients
Substance use screening/treatment	• screen (by history) for past and present use of tobacco, alcohol, and other drugs • refer, if needed, to trans-competent chemical dependency program
Venous thrombo-embolism/Pulmonary embolism	• MTFs over age 40, smokers, and highly sedentary patients are at particular risk of VTE and may benefit from lifestyle change, transdermal estrogen and lower estrogen doses • consider daily aspirin therapy in patients with risk factors for VTE who are taking estrogen • educate patients about the risks, signs, and symptoms of VTE
Note: If primary care provider is hormone prescriber, add exams and labs as in *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines*[1]	

Appendix C: Recommendations for FTM Patients

Table C1: Summary by Area of Health

Health history (new patient)	General health history • review general health history, including medications and menstrual/gynecologic/obstetric history • review family history, with particular attention to history of breast cancer, cervical cancer, clotting disorders, cardiovascular disease, diabetes, hypertension, mental illness, ovarian cancer, uterine cancer • assess psychosocial supports/stresses (e.g., family, work environment) • sexual history: sexual orientation, risks related to STIs, sexual function • assess whether vaccinations are up-to-date (including Hepatitis B) Trans-specific health history • Has the patient ever taken testosterone? Is the patient currently taking testosterone? Are there any complications or concerns regarding past or current testosterone use? • Has the patient undergone any masculinizing surgical procedures (e.g., breast reduction/chest reconstruction, hysterectomy/oophorectomy, vaginectomy, creation of neophallus, urethro-plasty, scrotoplasty)? Are there any complications or concerns regarding past surgeries? • Does the patient plan to pursue hormone therapy or masculinizing surgeries in the future? • Are there any additional masculinizing interventions sought by the patient?
Routine physical exam	• annual breast exam • Pap smear: see cervical cancer section • pelvic exam: every 1-3 years in patients over age 40 or with a family history of ovarian cancer, or yearly if PCOS is present
Recording sex on lab requisition and interpreting lab results	*No past/current hormone use, no oophorectomy:* • use F reference values *Some degree of masculinization based on past/current hormone use:* • use F or M reference values depending on specific test and length of time/recency of hormone use *Following oophorectomy:* • use M reference values
Cancer screening **1. Breast**	*All FTMs, regardless of hormone use/surgery:* • annual chest wall/axillary exam • screening mammography as for natal females (not necessary following chest reconstruction, but should be considered if only a reduction performed)
2. Cervical	*Sub-total hysterectomy or no hysterectomy* • Pap smears should follow the recommended guidelines for natal females; may be deferred if no risk of exposure to HPV (little sexual activity involving genitals) • if patient is taking testosterone the pathologist should be informed of this, as testosterone can result in atrophic changes to the cervical epithelium mimicking dysplasia • consider total hysterectomy in the presence of high grade dysplasia or if the patient is unable to tolerate Pap smears *After total hysterectomy* • if no prior history of high-grade cervical dysplasia and/or cervical cancer, no future Pap smears are needed • if prior history of high-grade cervical dysplasia or cervical cancer, patients should have annual Pap smears of the vaginal cuff until 3 normal tests are documented, then continue Pap smears every 2-3 years
3. Ovarian/Uterine	*No hysterectomy* • consider screening for history of signs and symptoms of polycystic ovarian syndrome (PCOS) • consider pelvic exams every 1-3 years in patients over age 40 or with a family history of ovarian cancer, or yearly if PCOS is present

3. Ovarian/Uterine *cont.*	• consider preventive total hysterectomy if fertility is not an issue, the patient is < 40 years, and the patient's health will not be adversely affected by surgery • after menstrual cessation (whether from menopause or induced by testosterone), fully evaluate unexplained uterine bleeding, with trans-vaginal ultrasound, pelvic ultrasound, and/or endometrial biopsy if bleeding is prolonged
4. Other	*All FTMs, regardless of hormone use/surgery* • follow standard screening recommendations for other cancers (e.g., colon cancer, lung cancer, anal cancer)
Cardiovascular screening/treatment	*All FTMs, regardless of hormone use/surgery* • aggressively screen for and treat known, modifiable cardiovascular risk factors • consider daily aspirin therapy for patients at high risk of CAD *Before initiating masculinizing hormone therapy* • control cardiovascular risk factors • consider stress testing among patients at very high risk for cardiovascular disease or with any cardiovascular symptoms
1. CAD	*Currently taking testosterone* • closely monitor for cardiac events or symptoms for FTMs at moderate or high risk of CAD • CAD and risk factors should be tightly controlled
2. Hypertension	*Not currently taking testosterone* • screen and treat hypertension as with non-transgender patients • if planning to start masculinizing hormone therapy within 1-3 years, try to bring systolic pressure to ≤ 130 mm Hg and diastolic pressure to ≤ 90 mm Hg *Currently taking testosterone* • monitor blood pressure every 1-3 months • goal: systolic pressure ≤ 130 mm Hg, diastolic pressure ≤ 90 mm Hg – esp. in patients with PCOS
3. Lipids	*Not currently taking testosterone* • screen and treat hyperlipidemia as with non-transgender patients • if planning to start masculinizing hormone therapy within 1-3 years, try to bring LDL to ≤ 3.5 mmol/L *Currently taking testosterone* • annual fasting lipid profile • if hyperlipidemia: avoid supraphysiologic testosterone levels; daily topical or weekly IM testosterone regimens are preferable to bi-weekly IM injection • treat high cholesterol to LDL goal of ≤ 3.5 mmol/L for low-moderate risk patients and ≤ 2.5 mmol/L for high risk patients
Diabetes screening/treatment	*All FTMs, regardless of hormone use/surgery* • screen and treat as with non-transgender patients • consider screening (by patient history) for polycystic ovarian syndrome (PCOS); diabetes screening is indicated if PCOS is present
HIV and Hepatitis B/C screening/ prevention	*All FTMs, regardless of hormone use/surgery* • if ongoing risk behaviours for sexual or blood-borne transmission (e.g., unprotected penile-vaginal or penile-anal intercourse, history of prior STIs, sharing needles for injection of hormones/illicit drugs), consider HIV and Hepatitis B/C screening every 6-12 months; otherwise consider HIV and Hepatitis B/C screening at least once during lifetime • treat all patients with STIs and their partners according to recommended guidelines for non-transgender patients • offer Hepatitis B vaccination if patient is not already immune
Mental health screening/treatment	*All FTMs, regardless of hormone use/surgery* • screen for depression • refer, if needed, to trans-competent mental health provider
Musculoskeletal health	*Currently taking testosterone* • to avoid tendon rupture, FTMs who are involved in strength training should increase weight load gradually, with an emphasis on repetitions rather than weight

Osteoporosis screening/prevention	*No hormone use, no oophorectomy* • follow screening recommendations for natal females *Taking testosterone for > 5-10 years, no oophorectomy* • consider bone density screening if age 50+, earlier if additional risk factors for osteoporosis • recommend supplemental calcium (1200 mg daily) and Vitamin D (600 units daily) to help maintain bone density *Past or present hormone use, post-oophorectomy (or total hysterectomy)* • continue testosterone therapy to reduce risk of bone density loss; if contradictions to testosterone therapy, consider weekly bisphosphonate • consider bone density screening if 60+ if taking testosterone for < 5-10 years; if taking testosterone for > 5-10 years consider at age 50+, earlier if additional risk factors for osteoporosis • recommend supplemental calcium (1200 mg daily) and Vitamin D (600 units daily) to help maintain bone density
Sexual health **1. STI screening/ treatment**	*All FTMs, regardless of hormone use/surgery* • if sexually active, test yearly for gonorrhea, chlamydia, and syphillis; if patient reports ongoing risk factors for STI transmission, screen every 6 months • treat all patients with STIs and their partners according to recommended guidelines for non-transgender patients
2. Fertility	*Currently taking testosterone or planning to take testosterone in future* • advise that testosterone is not a fail-safe contraceptive *Prior to initiation of masculinizing regimen* • discuss impact of masculinizing agents on fertility and possibility of permanent sterility
3. Sexual function	*Prior to initiation of masculinizing regimen* • discuss typical impact of masculinizing agents on libido
Substance use screening/treatment	*All FTMs, regardless of hormone use/surgery* • screen (by history) for past and present use of tobacco, alcohol, and other drugs • refer, if needed, to trans-competent chemical dependency program

Table C2: Summary by FTM Patient Group

FTM, no current/past hormone use, no oophorectomy	
Health history (new patient)	**General health history** • review general health history, including medications and menstrual/gynecologic/obstetric history • review family history, with particular attention to history of breast cancer, cervical/ovarian/uterine cancer, clotting disorders, cardiovascular disease, diabetes, hypertension, mental illness • assess psychosocial supports/stresses (e.g., family, work environment) • sexual history: sexual orientation, risks related to STIs, sexual function • assess whether vaccinations are up-to-date (including Hepatitis B) **Trans-specific health history** • Has the patient undergone any masculinizing surgical procedures (chest reconstruction, partial hysterectomy)? Are there any complications or concerns regarding past surgeries? • Does the patient plan to pursue hormone therapy or masculinizing surgeries in the future? • Are there any additional masculinizing interventions sought by the patient?
Routine physical exam	• annual chest wall/axillary exam • Pap smear: follow guidelines for natal females; may defer if no history of genital sexual activity • pelvic exam: every 1-3 years in patients over age 40 or with a family history of ovarian cancer, or yearly if patient history suggests PCOS
Lab results	• use F reference values
Cancer screening	• breast: annual chest wall/axillary exam; screening mammography as for natal females (not needed following chest reconstruction, but should be considered if only a reduction performed) • cervical: follow Pap guidelines for natal females; may defer if no history of genital sexual activity • ovarian: pelvic exams every 1-3 years in patients over age 40 or with a family history of ovarian cancer, or yearly if patient history suggests PCOS • uterine: follow standard guidelines for natal females if dysfunctional or postmenopausal bleeding • consider total hysterectomy if fertility is not an issue, patient is < 40 years, and health will not be adversely affected by surgery • follow standard screening recommendations for other cancers
Cardiovascular screening/treatment	• aggressively screen for and treat known, modifiable cardiovascular risk factors • screen and treat hypertension and hyperlipidemia as with non-transgender patients • consider daily aspirin therapy for patients at high risk of CAD *If patient is planning to start masculinizing hormone therapy within 1-3 years:* • before initiating hormones aim to control cardiovascular risk factors; consider stress testing if patient is at very high risk for cardiovascular disease or has cardiovascular symptoms • try to bring systolic BP to ≤ 130 mm Hg and diastolic BP to ≤ 90 mm Hg • try to bring LDL cholesterol to ≤ 3.5 mmol/L
Diabetes screening/treatment	• screen and treat as with non-transgender patients • diabetes screening is indicated if patient history suggests PCOS
HIV and Hepatitis B/C screening/ prevention	• if ongoing risk of sexual/blood-borne transmission, consider HIV & Hepatitis B/C screening every 6-12 months; otherwise consider HIV & Hepatitis B/C screening at least once during lifetime • treat STIs according to recommended guidelines for non-transgender patients • offer Hepatitis B vaccination if patient is not already immune
Mental health screening/treatment	• screen for depression • refer, if needed, to trans-competent mental health provider
Osteoporosis screening/prevention	• follow screening recommendations for natal females
Sexual health	• if sexually active, test yearly for gonorrhea, chlamydia, and syphillis; if patient reports ongoing risk factors for STI transmission, screen every 6 months • treat STIs according to recommended guidelines for non-transgender patients *If planning to take testosterone in future:* • advise that testosterone is not an adequate contraceptive • discuss impact of masculinizing agents on fertility and possibility of permanent sterility • discuss typical impact on libido
Substance use screening/treatment	• screen (by history) for past and present use of tobacco, alcohol, and other drugs • refer, if needed, to trans-competent chemical dependency program

FTM, past (but not current) hormone use, no oophorectomy	
Health history (new patient)	**General health history** • review general health history, including medications and menstrual/gynecologic/obstetric history • review family history, with particular attention to breast cancer, cervical/ovarian/uterine cancer, clotting disorders, cardiovascular disease, diabetes, hypertension, mental illness • assess psychosocial supports/stresses (e.g., family, work environment) • sexual history: sexual orientation, risks related to STIs, sexual function • assess whether vaccinations are up-to-date (including Hepatitis B) **Trans-specific health history** • When was testosterone taken, how long for, and at what doses? Are there any complications or concerns regarding past use? • Has the patient undergone any masculinizing surgical procedures (chest reconstruction, partial hysterectomy)? Are there any complications or concerns regarding past surgeries? • Does the patient plan to pursue hormone therapy or masculinizing surgeries in the future? • Are there any additional masculinizing interventions sought by the patient?
Routine physical exam	• annual chest wall/axillary exam • Pap smear: follow recommended guidelines for natal females; may be deferred if no history of genital sexual activity; inform pathologist of prior testosterone use • pelvic exam: every 1-3 years in patients over age 40 or with a family history of ovarian cancer, or yearly if patient history suggests PCOS
Lab results	• use F or M reference values depending on test and length of time/recency of hormone use
Cancer screening	• breast: annual chest wall/axillary exam; screening mammography as for natal females (not needed following chest reconstruction, but should be considered if only a reduction performed) • cervical: follow Pap guidelines for natal females; may defer if no history of genital sexual activity; inform pathologist of prior testosterone use (cervical atrophy can mimic dysplasia) • ovarian: pelvic exam every 1-3 years if over age 40 or family history of ovarian cancer, or yearly if patient history suggests PCOS • uterine: follow standard guidelines for natal females if dysfunctional or postmenopausal bleeding • consider total hysterectomy if fertility is not an issue, patient is < 40 years, and health will not be adversely affected by surgery • follow standard screening recommendations for other cancers
Cardiovascular screening/treatment	• aggressively screen for and treat known cardiovascular risk factors • screen and treat hypertension and hyperlipidemia as with non-transgender patients • consider daily aspirin therapy for patients at high risk of CAD *If patient is planning to start restart hormone therapy within 1-3 years:* • before initiating hormones aim to control cardiovascular risk factors; consider stress testing if patient is at very high risk for cardiovascular disease or has cardiovascular symptoms • try to bring BP to ≤ 130/90 mm Hg, LDL cholesterol to ≤ 3.5 mmol/L
Diabetes screening/treatment	• screen and treat as with non-transgender patients • diabetes screening is indicated if patient history suggests PCOS
HIV and Hepatitis B/C screening/ prevention	• if ongoing risk of sexual/blood-borne transmission, consider HIV & Hepatitis B/C screening every 6-12 months; otherwise consider HIV & Hepatitis B/C screening at least once during lifetime • treat STIs according to recommended guidelines for non-transgender patients • offer Hepatitis B vaccination if patient is not already immune
Mental health screening/treatment	• screen for depression • refer, if needed, to trans-competent mental health provider
Osteoporosis screening/ prevention	• if previously on testosterone for < 5-10 years: follow screening guidelines for natal females • if previously on testosterone for > 5-10 years: consider bone density screening if age 50+ and earlier if additional risk factors for osteoporosis; recommend supplemental calcium (1200 mg daily) and Vitamin D (600 units daily) to help maintain bone density
Sexual health	• if sexually active, test yearly for gonorrhea, chlamydia, and syphillis; if patient reports ongoing risk factors for STI transmission, screen every 6 months • treat STIs according to recommended guidelines for non-transgender patients • if planning to take testosterone in future, discuss impact of masculinizing agents on fertility and possibility of permanent sterility
Substance use screening/treatment	• screen (by history) for past and present use of tobacco, alcohol, and other drugs • refer, if needed, to trans-competent chemical dependency program

FTM, current hormone use, no oophorectomy	
Health history (new patient)	**General health history** • review general health history, including medications and menstrual/gynecologic/obstetric history • review family history, with particular attention to breast cancer, cervical/ovarian/uterine cancer, clotting disorders, cardiovascular disease, diabetes, hypertension, mental illness • assess psychosocial supports/stresses (e.g., family, work environment) • sexual history: sexual orientation, risks related to STIs, sexual function • assess whether vaccinations are up-to-date (including Hepatitis B) **Trans-specific health history** • How long has the patient been taking testosterone, and what is the current dose? Are there any complications or concerns regarding past or current testosterone use? • Has the patient undergone any masculinizing surgical procedures (e.g., chest surgery)? Are there any complications or concerns regarding past surgeries? • Does the patient plan to pursue hormone therapy or masculinizing surgeries in the future? • Are there any additional masculinizing interventions sought by the patient?
Routine physical exam	• annual chest wall/axillary exam • Pap smear: follow recommended guidelines for natal females; may be deferred if no history of genital sexual activity; inform pathologist of testosterone use • pelvic exam: every 1-3 years in patients over age 40 or with a family history of ovarian cancer, or yearly if patient history suggests PCOS
Lab results	• use F or M reference values depending on test and length of time/recency of hormone use
Cancer screening	• breast: annual chest wall/axillary exam; screening mammography as for natal females (not needed following chest reconstruction, but should be considered if only a reduction performed) • cervical: follow Pap guidelines for natal females; may defer if no history of genital sexual activity; inform pathologist of testosterone use (cervical atrophy can mimic dysplasia) • ovarian: pelvic exam every 1-3 years if over age 40 or family history of ovarian cancer, or yearly if patient history suggests PCOS • uterine: evaluate unexplained uterine bleeding as for postmenopausal natal females • consider total hysterectomy if fertility is not an issue, patient is < 40 years, and health will not be adversely affected by surgery • follow standard screening recommendations for other cancers
Cardiovascular screening/treatment	• aggressively screen for and treat known cardiovascular risk factors • CAD: closely monitor for cardiac events or symptoms, tightly control CAD and risk factors, consider daily aspirin therapy for high-risk patients • hypertension: monitor blood pressure every 1-3 months, treat hypertension to goal of systolic pressure ≤ 130 mm Hg and diastolic pressure ≤ 90 mm Hg – esp. in patients with PCOS • lipids: annual fasting lipid profile, treat high cholesterol to LDL goal of ≤ 3.5 mmol/L (or ≤ 2.5 mmol/L if high risk), avoid supraphysiologic testosterone levels if hyperlipidemia (use daily topical or weekly IM testosterone rather than bi-weekly IM injection)
Diabetes screening/treatment	• screen and treat as with non-transgender patients • diabetes screening is indicated if patient history suggests PCOS
HIV and Hepatitis B/C screening/ prevention	• if ongoing risk of sexual/blood-borne transmission, consider HIV & Hepatitis B/C screening every 6-12 months; otherwise consider HIV & Hepatitis B/C screening at least once during lifetime • treat STIs according to recommended guidelines for non-transgender patients • offer Hepatitis B vaccination if patient is not already immune
Mental health screening/treatment	• screen for depression • refer, if needed, to trans-competent mental health provider
Osteoporosis screening/ prevention	• if taking testosterone for < 5-10 years, follow screening recommendations for natal females • if taking testosterone for > 5-10 years, consider bone density screening if age 50+ and earlier if additional risk factors for osteoporosis; recommend supplemental calcium (1200 mg daily) and Vitamin D (600 units daily) to help maintain bone density
Sexual health	• if sexually active, test yearly for gonorrhea, chlamydia, and syphillis; if patient reports ongoing risk factors for STI transmission, screen every 6 months • treat STIs according to recommended guidelines for non-transgender patients • advise that testosterone is not a fail-safe contraceptive
Substance use screening/treatment	• screen (by history) for past and present use of tobacco, alcohol, and other drugs • refer, if needed, to trans-competent chemical dependency program
Note: If primary care provider is hormone prescriber, add exams and labs as in *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines*[1]	

FTM, post-oophorectomy (or total hysterectomy)	
Health history (new patient)	**General health history** • review general health history, including medications and menstrual/gynecologic/obstetric history • review family history, with particular attention to breast cancer, cervical/ovarian/uterine cancer, clotting disorders, cardiovascular disease, diabetes, hypertension, mental illness • assess psychosocial supports/stresses (e.g., family, work environment) • sexual history: sexual orientation, risks related to STIs, sexual function • assess whether vaccinations are up-to-date (including Hepatitis B) **Trans-specific health history** • Has the patient ever taken testosterone? Is the patient currently taking testosterone? Are there any complications or concerns regarding past or current testosterone use? • Has the patient undergone any other masculinizing surgical procedures? Are there any complications or concerns regarding past surgeries? • Are there any additional masculinizing interventions sought by the patient?
Routine physical exam	• annual chest wall/axillary exam • Pap smear/pelvic exam: see cancer section below
Lab results	• use M reference values
Cancer screening	• breast: annual chest wall/axillary exam; screening mammography as for natal females (not needed following chest reconstruction, but should be considered if only a reduction performed) **Following total hysterectomy** • cervical: if no prior history of high-grade cervical dysplasia and/or cervical cancer, no Pap needed; if prior history of high-grade cervical dysplasia or cervical cancer, do annual Pap smear of vaginal cuff until 3 normal tests are documented, then continue Pap every 2-3 years • follow standard screening recommendations for other cancers **If ovaries were removed but uterus/cervix remain intact** • cervical: follow Pap guidelines for natal females; may defer if no history of genital sexual activity; inform pathologist of current/prior testosterone use (cervical atrophy can mimic dysplasia) • uterine: evaluate vaginal bleeding as for postmenopausal natal females; consider hysterectomy if fertility is not an issue, patient is < 40 years, and health will not be adversely affected by surgery • follow standard screening recommendations for other cancers
Cardiovascular screening/ treatment	• aggressively screen for and treat known cardiovascular risk factors • CAD: closely monitor for cardiac events or symptoms, tightly control CAD and risk factors, consider daily aspirin therapy for high-risk patients • hypertension: monitor blood pressure every 1-3 months, treat hypertension to goal of systolic pressure ≤ 130 mm Hg and diastolic pressure ≤ 90 mm Hg – esp. in patients with PCOS • lipids: annual fasting lipid profile, treat high cholesterol to LDL goal of ≤ 3.5 mmol/L (or ≤ 2.5 mmol/L if high risk), avoid supraphysiologic testosterone levels if hyperlipidemia (use daily topical or weekly IM testosterone rather than bi-weekly IM injection)
Diabetes	• screen and treat as with non-transgender patients
HIV and Hepatitis B/C screening/ prevention	• if ongoing risk of sexual/blood-borne transmission, consider HIV & Hepatitis B/C screening every 6-12 months; otherwise consider HIV & Hepatitis B/C screening at least once during lifetime • treat STIs according to recommended guidelines for non-transgender patients • offer Hepatitis B vaccination if patient is not already immune
Mental health screening	• screen for depression • refer, if needed, to trans-competent mental health provider
Osteoporosis screening/ prevention	• continue testosterone to reduce risk of bone density loss; if contraindications, consider bisphosphonate • consider bone density screening at age 60+ if taking testosterone for < 5-10 years; if taking testosterone for > 5-10 years consider at age 50+, earlier if additional risk factors for osteoporosis • recommend supplemental calcium (1200 mg daily) and Vitamin D (600 units daily)
Sexual health	• if sexually active, test yearly for gonorrhea, chlamydia, and syphillis; if patient reports ongoing risk factors for STI transmission, screen every 6 months • treat STIs according to recommended guidelines for non-transgender patients
Substance use	• screen (by history) for past and present use of tobacco, alcohol, and other drugs • refer, if needed, to trans-competent chemical dependency program
Note: If primary care provider is hormone prescriber, add exams and labs as in *Endocrine Therapy for Transgender Adults in British Columbia: Suggested Guidelines*[1]	