

Cancer Screening Guidelines

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Disclosures

- Novartis – Advisory Board
- Takeda – Speaking Stipend
- Atlantic Canada Oncology Group – Speaking Stipend

- No off-label medication recommendations anticipated.
- Will discuss future, not yet available testing.

Objectives

- To review the screening guidelines for various cancers
 - Breast cancer
 - Lung cancer
 - Gastrointestinal cancers (colorectal, esophageal, HCC)
 - Genitourinary cancers (bladder, prostate, testicular)
 - Gynecological cancers (ovarian, cervical)

Cancer Screening Guidelines

Breast Cancer

Screening as per 2018 CTFPHC Guidelines

- Average risk patients:
 - General population, **women aged 50-74 years**, no “high risk” risk factors
 - <15% lifetime risk
 - Screen with **mammogram q2-3 years**, no other screening modalities
- High risk patients:
 - Any 1 risk factor:
 - Known hereditary gene mutation (eg BRCA)
 - 1st degree relative with known hereditary gene mutation
 - Personal or family history of ≥ 2 cases of breast/ovarian cancer in a relative; bilateral breast cancer; breast cancer onset at <35 years old; invasive serous ovarian cancer; breast/ovarian cancer in Ashkenazi Jewish female; male breast cancer
 - Prior radiation to chest wall when <30 years old and at least 8 years ago
 - >25% lifetime risk
 - Screen with **mammogram and MRI breasts q1 year in women aged 30-69 years**

Should we screen younger?

- NS breast screening program: “Women in Nova Scotia, aged 40-49, are recommended to have annual screening mammography.”
 - Quote the Canadian Association of Radiologists (CAR), National Standards and Guidelines for Breast Screening.
- Alberta recently (2022) changed Average risk patients recommendation:
 - General population, women aged **45**-74 years, no “high risk” risk factors:
 - Screen with mammogram q2 years
- Canadian Task Force on Preventive Health Care
 - Weak recommendation against routine screening age 40-49 average risk

CanadianTaskForce.Ca Handout

With screening:

294 women will have a false positive test result

43 women will have an unnecessary biopsy

7 women will be diagnosed with breast cancer. Among these 7 women:

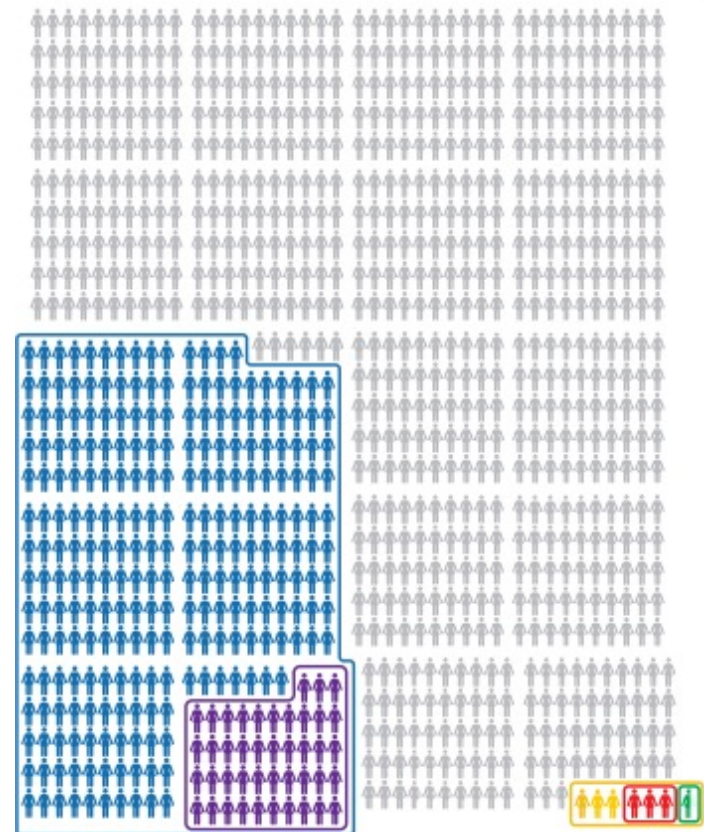
3 will be treated for a breast cancer that would have never caused a problem

Less than 1 breast cancer death will be prevented

1724 women in this age group would need to be screened to prevent one death

For women aged 40–49, we conditionally recommend not screening those who are not at increased risk with mammography

Screening 1000 women not at increased risk aged 40–49 over 7 years



Lung Cancer

Screening as per 2016 CTFPHC Guidelines

- Patients meet criteria for screening if:
 1. **Age 55-74 years, and**
 2. **≥ 30 pack year** smoking history, *and*
 3. **Current smoker or former smoking who quit within the past 15 years**

***Overall health status** should also be considered since reasonable life expectancy and suitability for treatment are required to benefit from screening
- Screen with **low dose CT scan q1year x 3 consecutive years**
 - * Recommend AGAINST using sputum cytology or CXR for screening

NS Lung Cancer Screening Program Launch!!

- Announced 27 hours ago!

Colorectal Cancer

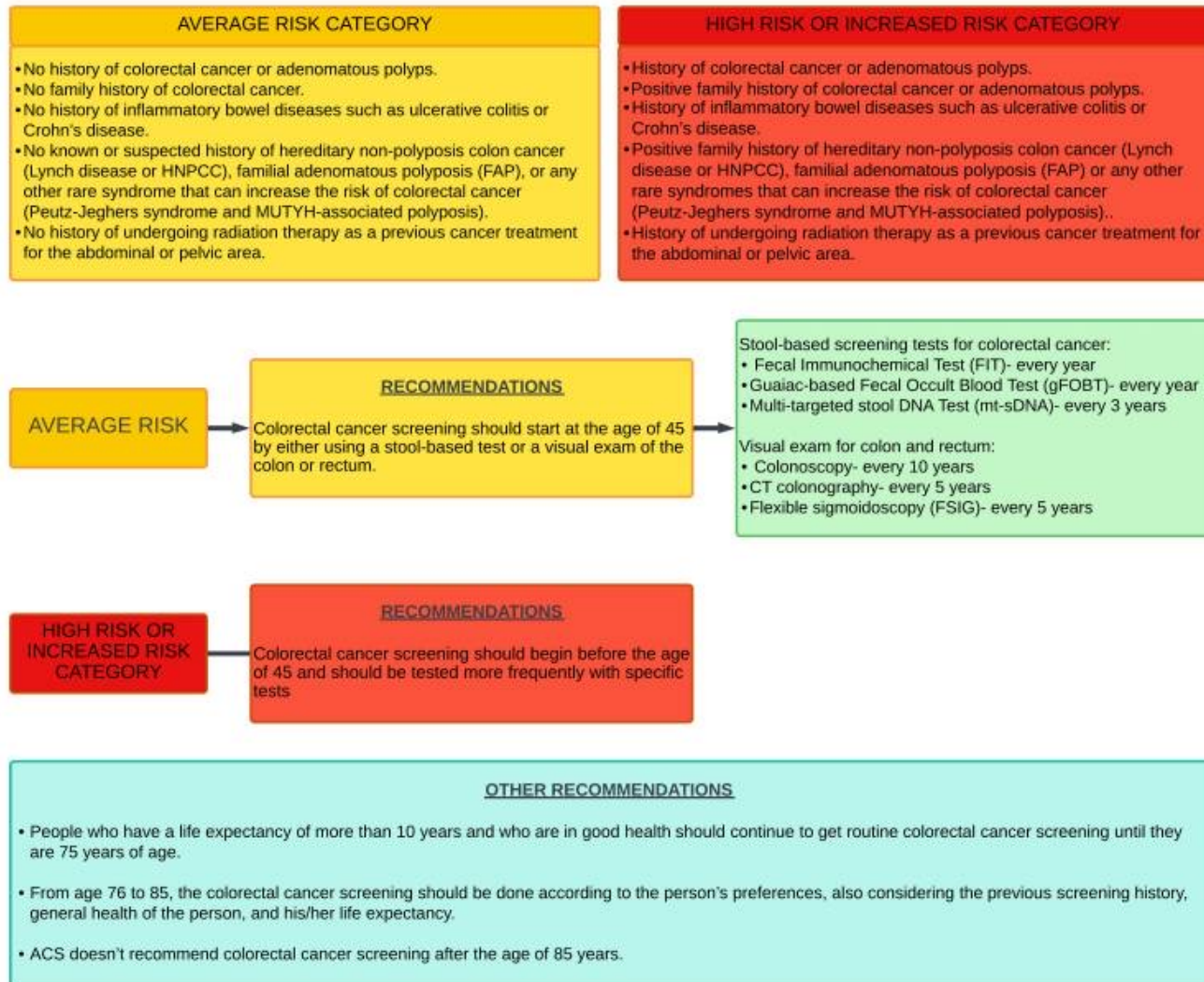
Screening as per 2016 CTFPHC Guidelines

- Average risk patients:
 - General population, **aged 50-74 years**, no risk factors
 - Screen with **FIT/FOBT q2 years** OR **flexible sigmoidoscopy q10 years**
- Increased risk patients:
 - ≥ 1 1st degree relative with CRC or advanced adenoma
 - Screen with **colonoscopy q5-10 years** starting at **age 40-50 years** or **10 years before age of relative's diagnosis**
- High risk patients:
 - Family history of Lynch syndrome/HNPCC
 - Screen with colonoscopy q1-2 years starting at age 20 years or 10 years before age of relative's diagnosis
 - Family history of FAP
 - Screen with sigmoidoscopy q1year starting at age 10 years
 - Personal history of IBD
 - Screen with colonoscopy q1-3 years starting 8 years after diagnosis for pancolitis or 10-12 years after diagnosis for left-sided colitis

Should we screen younger?

- American Cancer Society (ACS) 2018 recommendation: **45+** years with an **average** risk of CRC undergo routine screening
- Supported by U.S. Preventive Services Task Force (paraphrased quotes):
- People under the age of 50 account for 10.5% of newly diagnosed colorectal cancer cases.
- The number of cases between age 40 and 49 years has grown by ~15% in recent years.
- By lowering the age to 45, the Task Force predicts that 22 to 27 life-years may be gained and deaths from colorectal cancer will be reduced.

Colorectal Cancer Screening Guidelines According to American Cancer Society (ACS)



CEA tumour marker post CRC curative therapy

- Standard screening: CEA Q3 months x 5 years, CT Q1 year x 3 years, colonoscopy per GenSx
- Returns to baseline risk after 5 years
- False-positive elevations in: smokers, gastrointestinal disease (eg, inflammatory bowel disease, pancreatitis, liver disease, diverticulitis, hepatitis, peptic ulcers, biliary obstruction, cirrhosis), lung disease (eg, chronic obstructive pulmonary disease, lung infection, pleural effusions), and hypothyroidism.
- CEA <5 normal. Does not entirely rule out recurrence.
- CEA 5-10 borderline
- CEA 10-35 probably cancer?
- CEA >35 essentially diagnostic of cancer (but rare to see this high)
- If elevated, repeat in ~4 weeks. Imaging if symptomatic or remains elevated.

Esophageal Cancer

Screening as per 2020 CTFPHC Guidelines

- Recommend AGAINST screening for esophageal adenocarcinoma or precursor conditions (eg Barrett esophagus, dysplasia) in **patients aged ≥ 18 years with no symptoms or chronic GERD without alarm symptoms**
- Guidelines DO NOT apply to patients with:
 - Alarm symptoms (eg dysphagia, odynophagia, recurrent vomiting, unexplained weight loss, anemia, loss of appetite, GI bleeding)
 - Barrett esophagus with or without dysplasia

Hepatocellular Carcinoma

Screening as per 2018 AASLD Guidelines

- High risk populations:
 - All patients with **cirrhosis** regardless of etiology or patient age
 - **Hepatitis B carriers** (sAg+) and:
 - Asian males aged ≥ 40 years, Asian females ≥ 50 years
 - African or African American ≥ 20 years
 - FHx of HCC in a 1st degree relative; start screening at age 40 years
 - HIV co-infection; start screening at age 40 years
 - Hepatitis D co-infection
- Screen with **ultrasound q6months**
 - *Recommend AGAINST serum AFP monitoring for screening
 - *Recommend AGAINST screening patients with Childs-Pugh C cirrhosis, unless awaiting liver transplant

Bladder Cancer

Screening as per 2021 CUA Guidelines

- Recommend AGAINST screening with urine cytology or cystoscopy in asymptomatic patients

Prostate Cancer

Screening as per 2014 CTFPHC Guidelines

- Recommend AGAINST screening with PSA
 - Old recommendation at this point...

- Canadian Urological Association 2022 update disagrees...

Canadian Urological Association 2022 update

Table 1

Most recent results from three randomized, controlled trials investigating PSA screening

	PLCO (2017 update) ¹⁵	ERSPC (2014 update) ¹⁶	Goteborg (2014 update) ¹⁷
n	76 683	162 243	20 000
Age	55–74	55–69	50–64
Site	10 US centers	8 European countries	1 city (Goteborg, Sweden)
Intervention	PSA annually × 6 years annual DRE × 4 years	PSA q4 years (in most centers) Some centers offered DRE	PSA q2 years
Current median followup	15 years	13 years	18 years
Definition of positive test	PSA >4 ng/ml Abnormal DRE	PSA>3 ng/ml (most centers)	PSA >2.5 ng/ml (from 2005 on) PSA >2.9 ng/ml (from 1999–2004) PSA>3.4 ng/ml (from 1995–98)
Prostate cancer deaths	Control: 244 Screened: 255	Control: 545 Screened: 355	Control: 122 Screened: 79
Rate ratio for CSS (95% CI)	1.04 (0.87–1.24)	0.79 (0.69–0.91) 21% relative risk reduction in favor of screening	0.58 (0.46–0.72) 42% relative risk reduction in favor of screening
NNS	N/A	1:781	1:139
NND	N/A	1:27	1:13

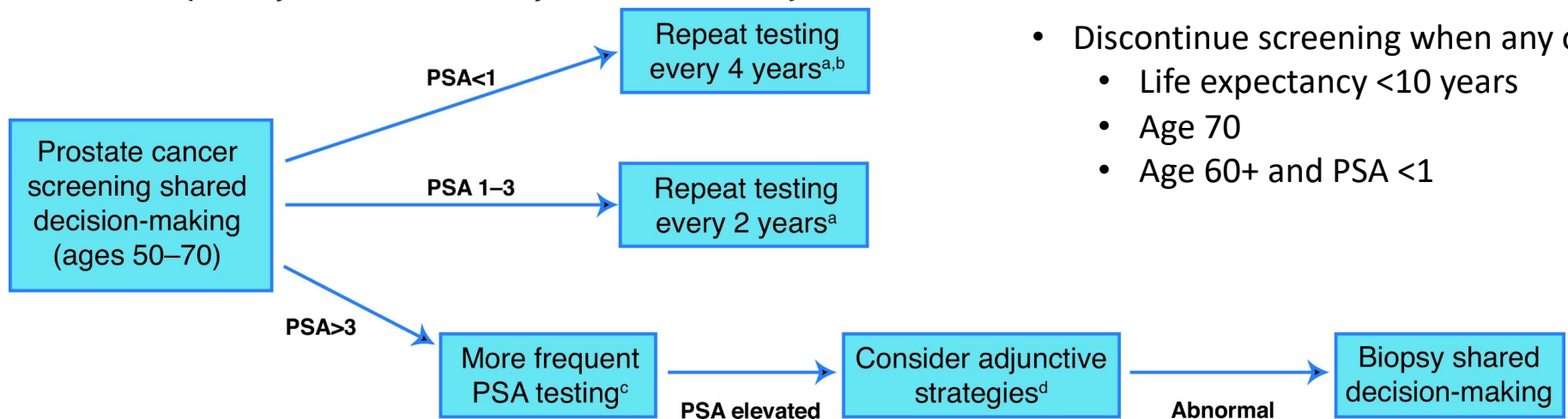
CSS: Prostate cancer-specific survival; DRE: digital rectal exam; ERSPC: European Randomized Study of Screening for Prostate Cancer; NNS: number needed to screen; NND: number needed to diagnose; PLCO: Prostate, Lung, Colon, and Ovarian screening trial

Over-diagnosis and over-treatment

- 2/3 of men diagnosed with prostate cancer by screening will be identified as having clinically insignificant prostate cancer, which, if never detected, would be unlikely to lead to increased morbidity or mortality

CUA 2022 recommendations

- Offer PSA screening to men with a life expectancy greater than 10 years
 - Shared decision-making on whether to pursue PSA screening
 - *(Level of evidence: 1; Grade of recommendation: B)*
- If undertaken, start PSA testing at age 50 in most men and at age 45 in men at an increased risk of prostate cancer
 - *(Level of evidence: 3; Grade of recommendation: C).*



- Discontinue screening when any of:
 - Life expectancy < 10 years
 - Age 70
 - Age 60+ and PSA < 1

Testicular Cancer

Screening as per 2011 USPSTF Guidelines

- Recommend AGAINST screening in asymptomatic men

Ovarian Cancer

Screening as per 2016 CTFPHC Guidelines

- Recommend AGAINST screening in asymptomatic women

Cervical Cancer

Screening as per 2013 CTFPHC Guidelines

- Screen **sexually active people with a cervix aged 25-69 years** with **cervical cytology q3years**
 - Screening guidelines **DO** apply to HPV-vaccinated women and women who have sex with women
 - Age 20-24 is a **weak** recommendation against screening, moderate quality evidence
- **Stop** screening at **age ≥ 70 years** AND **≥ 3 negative tests** in the past 10 years
- Guidelines DO NOT apply to:
 - Never sexually active
 - Previous abnormal Pap test
 - Immunocompromised (eg HIV, organ transplant recipient, chemotherapy, chronic glucocorticoid use)
 - Alarm symptoms (eg abnormal vaginal bleeding)
 - Limited life expectancy

Updated guidelines expected later this year...

HPV testing?

- American Cancer Society (ACS) recommends that individuals with a cervix, age 25-65 years:
- Undergo primary human papillomavirus (HPV) testing every 5 years through age 65 years (**preferred**)
- OR cotesting (HPV testing in combination with cytology) every 5 years
- OR cytology alone every 3 years (**acceptable**)
- (strong recommendation).

- (American College of Obstetrics and Gynecology has a different opinion)

The Future – Liquid Biopsies?

- Blood or urine test to detect genetic material suggestive of solid tumour cancers.
 - E.g. Circulating tumour cells (CTC), cell-free DNA (cfDNA), circulating tumour DNA/RNA (ctDNA/ctRNA), ect.
 - May be able to identify specific driver mutations
- cfDNA/ctDNA half life less than 3 hours – allows estimation of burden of disease
 - But high inter-patient variability. Best used to track disease state within a single patient
- CELLSEARCH[®] CTC – only approved Health Canada test currently, only for people with diagnosed CRC, breast, and prostate cancer.
 - (Not used in practice)
- Not ready yet for screening in Canada, but coming someday!
 - E.g. Epi proColon – FDA approved blood test screening for colon cancer in average-risk patients older than 50 years

Consolidation Questions

Q1. A 62M wants to discuss colon cancer screening. He has no concerning symptoms. His grandfather was diagnosed with colon cancer in his 80s, which is why this is on his mind. He has well controlled hypertension, dyslipidemia, and atherosclerotic heart disease. He is a non-smoker. What are your recommendations for colon cancer screening?

- Colonoscopy q5 years
- CT colonography q10 years
- Flexible sigmoidoscopy q5 years
- FIT test q2 years

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- Colonoscopy q5 years
- CT colonography q10 years
- Flexible sigmoidoscopy q5 years
- **FIT test q2 years**

Q2. A 40F has a known BRCA1 mutation after pursuing genetic testing after her mother was diagnosed with triple negative breast cancer. Given her age and risk factors, she should be counselled about breast cancer screening. What is the most sensitive testing modality?

- Mammogram with tomosynthesis
- Breast ultrasound
- Breast MRI
- Breast thermography

Q2. A 40F has a known BRCA1 mutation after pursuing genetic testing after her mother was diagnosed with triple negative breast cancer. Given her age and risk factors, she should be counselled about breast cancer screening. What is the most sensitive testing modality?

- Mammogram with tomosynthesis
- Breast ultrasound
- **Breast MRI**
- Breast thermography

Q3. A 55M has hereditary hemochromatosis and type II diabetes mellitus. Both conditions are well controlled. How would you screen him for hepatocellular carcinoma?

- No screening required
- AFP q6 months
- Liver ultrasound q6 months
- AFP + liver ultrasound q6 months

Q3. A 55M has hereditary hemochromatosis and type II diabetes mellitus. Both conditions are well controlled. How would you screen him for hepatocellular carcinoma?

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- Liver ultrasound q6 months
- AFP + liver ultrasound q6 months

Q4. What is an accepted indication for CEA testing?

- Surveillance for colon cancer recurrence
- Work up of microcytic anemia
- Colon cancer treatment decision making
- Screening for colon cancer in high risk patients

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Q5. A 73M smoker with severe COPD (FEV1 23%) wants to know if there is any test to screen him for lung cancer. Chronic respiratory symptoms are stable, with no recent worsening or hemoptysis. He remains dyspneic with minimal exertion including dressing and bathing. What is your recommendation for lung cancer screening?

- Sputum testing q1 year
- Chest x-ray q1 year
- Low-dose CT scan q1 year
- Nothing

Q5. A 73M smoker with severe COPD (FEV1 23%) wants to know if there is any test to screen him for lung cancer. Chronic respiratory symptoms are stable, with no recent worsening or hemoptysis. He remains dyspneic with minimal exertion including dressing and bathing. What is your recommendation for lung cancer screening?

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- Chest x-ray q1 year
- Low-dose CT scan q1 year
- **Nothing**

Q6. What is the utility of CA-125?

- Confirmation of ovarian cancer diagnosis
- Ovarian cancer treatment decision making
- Monitoring response to ovarian cancer treatment
- Work-up of intra-abdominal masses

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- Ovarian cancer treatment decision making
- **Monitoring response to ovarian cancer treatment**
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Q7. A 65M has HIV and chronic hepatitis B. He is on appropriate anti-retroviral treatment. He is a non-smoker. There is no history of liver disease. He has no concerning symptoms. There is no family history of malignancy. Which of the following screening tests would you recommend for him?

- FIT, CT lung, AFP, liver ultrasound, PSA
- Sigmoidoscopy, CT lung, AFP, liver ultrasound
- Sigmoidoscopy, liver ultrasound
- FIT, AFP, PSA

Q7. A 65M has HIV and chronic hepatitis B. He is on appropriate anti-retroviral treatment. He is a non-smoker. There is no history of liver disease. He has no concerning symptoms. There is no family history of malignancy. Which of the following screening tests would you recommend for him?

- FIT, CT lung, AFP, liver ultrasound, PSA
- Sigmoidoscopy, CT lung, AFP, liver ultrasound
- **Sigmoidoscopy, liver ultrasound**
- FIT, AFP, PSA

Q8. You are seeing a G0P0 55F in clinic who has not seen a doctor in 30+ years. She is a smoker. She otherwise has no past medical history. She has no family history of malignancy. What cancer screening investigations should you counsel her on?

- Pap, FIT, mammogram, CT chest
- Pap, colonoscopy, mammogram, breast MRI
- Pap, colonoscopy, mammogram, CT chest
- Pap, FIT, mammogram

Q8. You are seeing a G0P0 55F in clinic who has not seen a doctor in 30+ years. She is a smoker. She otherwise has no past medical history. She has no family history of malignancy. What cancer screening investigations should you counsel her on?

- **Pap, FIT, mammogram, CT chest**
- Pap, colonoscopy, mammogram, breast MRI
- Pap, colonoscopy, mammogram, CT chest
- Pap, FIT, mammogram

Questions?

Feel free to email me with questions: GraydonH.Lucas@nshealth.ca

EZ-NS Cancer Care Updates

- New MedOnc starting late March in Sydney!
 - Brings us up to 4/5 positions filled
- Sydney expanding into more Oncology RCTs
 - Independently and as a second location for Halifax trials.
- Cancer diagnostic pathways are under development, many launching within the next few months.
- “Oncology Transformation Project”
 - Transitioning to ARIA EMR later this year.
- Announced two weeks ago: 10-year, \$175 million CAD multi-disciplinary oncology partnership (MDOP) “designed to deliver value across the Nova Scotia Health system by accelerating the patient journey from screening to survivorship.”
 - Lung screening program launching (sometime soon)