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# RISKS & BENEFITS OF LUNG CANCER SCREENING

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# Disclosures

Speaker's name: Kelly Bunzeluk

Relationships with commercial interests:

- Grants/Research Support: Roche, COPAN
- Speakers Bureau/Honoraria: none
- Consulting Fees: none
- Other: none

# Mitigating Potential Bias

- COPAN provided in-kind cervical self-sampling kits for a research project
- Roche provided the analyzer for a cervical self-sampling project

This project is related to cervical cancer screening and does not affect decisions or opinions regarding lung cancer screening

# Learning Objectives

At the end of this presentation, healthcare providers will be able to:

1. Understand current guidelines for lung cancer screening, including who is eligible for screening.
2. Discuss the risks and benefits of lung cancer screening.
3. Describe the process for referring high-risk patients for screening.

# What is Screening?

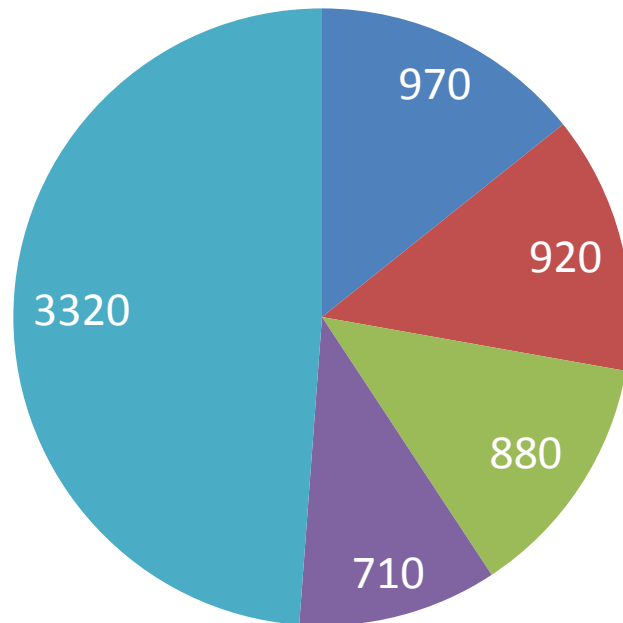
The **systematic** application of a test to identify individuals in the **population** at sufficient risk of a specific disorder to **benefit** from further investigation or direct preventive action among persons who have **not sought medical attention** on account of symptoms of that disorder.

Wald NJ (2001)

# Goals of Screening

## Reduce disease incidence

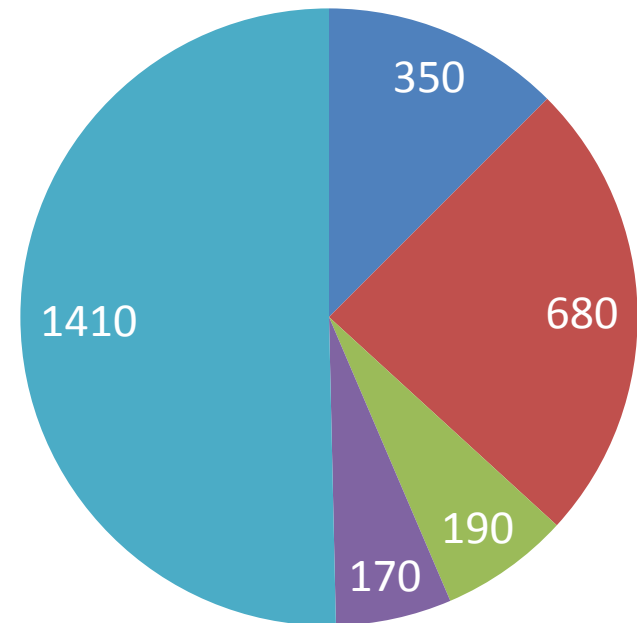
Estimated cancer incidence in MB



■ Colorectal ■ Lung ■ Breast ■ Prostate ■ Other cancers

## Reduce disease mortality

Estimated cancer mortality in MB



Canadian Cancer Statistics (2016)

# NLST (2011)

- Lung cancer deaths fell by 20% in current and/or former smokers aged 55-74 (with 30+ pack-years) who were screened annually for three consecutive years using low dose computed tomography (LDCT).
- All-cause mortality also fell by 7% among this group.
- Trial was stopped because of the significant additional benefit of LDCT compared to CXR

# Other Trials

- NELSON
  - Netherlands and Belgium
  - 8,000 LDCT patients compared to no screening
  - Have shown a mortality benefit with two annual screens, awaiting additional data
- PanCan
  - 5 sites in Canada screening with LDCT
  - Trial is finished, results not yet reported



# CTFPHC Recommendations (2016)

These recommendations apply to asymptomatic persons who meet the screening criteria. They **do not apply** to persons who have a history of lung cancer or are suspected of having lung cancer.

- For adults aged 55–74 years
- With at least a 30 pack-year smoking history who currently smoke or quit less than 15 years ago
- Recommendation: screen annually with LDCT up to 3 consecutive times.

*Weak recommendation*

# CTFPHC Recommendations

- For adults aged 18–54 and 75+, regardless of smoking history or other risk factors: do not screen for lung cancer with LDCT.

*Strong recommendation*










- For adults aged 18 years and older: do not screen for lung cancer with chest x-ray with or without sputum cytology.

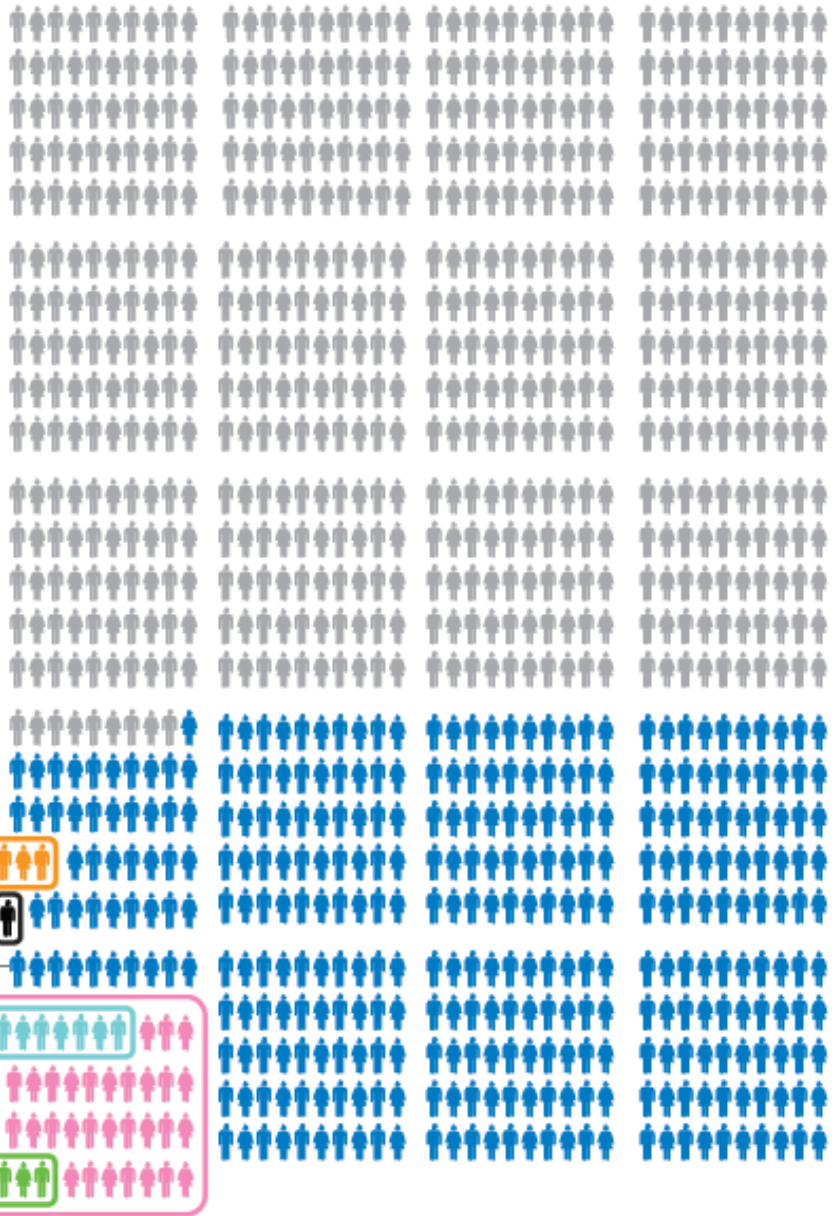
*Strong recommendation*

# Recommendation to Screen

- A weak recommendation is still a positive recommendation
  - Weak implies practitioners should weigh benefits and harms with their patients
- LDCT and subsequent management should be done in a facility with expertise in early diagnosis and treatment
- Over 6.5 years, 322 people would need to be screened to prevent one death
- Tobacco control and smoking cessation are critical

**Screening 1000 eligible people with low-dose CT (annually for 3 years)**

 <b>609</b>	will have a negative low-dose CT scan result	
 <b>40</b>	will be diagnosed with lung cancer	
 <b>351</b>	will have a positive scan result and find out after further testing that they do not have cancer (false positive)	<b>Harm</b> 
 <b>7</b>	of the 40 diagnosed lung cancers would not have caused illness or death (overdiagnosis)	
 <b>3</b>	will have major complications from invasive follow-up tests	
 <b>1</b>	will die from invasive follow-up testing	
 <b>3</b>	fewer people will die from lung cancer (vs. when screening with chest x-ray)	<b>Benefit</b> 



<http://canadiantaskforce.ca/guidelines/published-guidelines/lung-cancer/>

# Other Screening Guidelines

Guideline	Age	Pack Years	Frequency of Screening	Duration of Screening
U.S. Preventive Services Task Force (USPSTF)	55-80	30	Annual	Continuous, until age 80 or 15 years since smoking cessation
National Comprehensive Cancer Network (NCCN)	55-74 (≥ 50 if individual has additional risk factor)	30 (20 if the individual has additional risk factor)	Annual	2 years
Centers for Medicare & Medicaid Services (CMS)	55-77	30	Annual	Continuous, until age 77 or 15 years since smoking cessation
American Cancer Society	55-74	30	Annual	Continuous until age 74
Ontario pilot and Canadian research projects	Tammemagi risk prediction model of eligibility			

Characteristics to be entered	Enter Values	Centered or referent group	Coefficient	Contribution to estimate	ORs
Age in years	65	62	0.0778868	0.2336604	1.08
Education (enter the number identifying the highest level obtained) 1 = Less than high school grad; 2 = High school grad; 3 = Post high school training; 4 = Some college; 5 = College grad; 6 = Postgraduate/professional.	6	4	-0.0812744	-0.1625488	0.92
Body Mass Index (BMI, weight in kilograms/height in meters^2)	27	27	-0.0274194	0	0.97
COPD, emphysema or chronic bronchitis (0=No; 1=Yes)	0		0.3553063	0	1.43
Personal history of cancer (0=No; 1=Yes)	0		0.4589971	0	1.58
Family history of lung cancer (0=No; 1=Yes)	0		0.587185	0	1.80
Race/ethnicity (select only one from this category)					
White (referent group) (0=No; 1=Yes)	1		0	0	
Black (non-Hispanic) (0=No; 1=Yes)	0		0.3944778	0	1.48
Hispanic (0=No; 1=Yes)	0		-0.7434744	0	0.48
Asian (0=No; 1=Yes)	0		-0.466585	0	0.63
Native Hawaiian/Pacific Islander (0=No; 1=Yes)	0		0	0	
American Indian/Alaskan Native (0=No; 1=Yes)	0		1.027152	0	2.79
Smoking status, 0 = Former-smoker 1 = Current-smoker	1		0.2597431	0.2597431	1.30
Average number of cigarettes smoked per day**	30	-0.068820828	-1.822606	0.125433254	nonlinear
Duration smoked (years)	25	27	0.0317321	-0.0634642	1.03
Years ago quit smoking. Enter zero for current smokers.	0	10	-0.0308572	0.308572	0.97
Model constant			-4.532506	-4.532506	
<b>Probability of lung cancer in 6 years =</b>			<b>0.02123</b>		

<https://brocku.ca/lung-cancer-risk-calculator>

\* Reference: Tammemagi et al. *Selection Criteria for Lung-Cancer Screening*. *NEJM*. 2013;368(8):728-36.

# Patient Referrals – Questions to Ask

1. Is my patient eligible for lung cancer screening?
2. Have I counselled my patient on smoking cessation?
3. Have I discussed the risks and benefits of lung cancer screening with my patient?
4. Is my patient agreeable/suitable for follow-up tests and the whole screening protocol?

# Referral for Lung Screening CT

<b>REQUEST FOR CONSULTATION FORM</b>	<input type="checkbox"/> <b>Outpatient</b> <input type="checkbox"/> First Available Site Fax to: DI Central Intake 204-926-3650 or <input type="checkbox"/> Preferred Site(s) _____ (see reverse)	<b>PATIENT INFORMATION</b> PHIN _____ Sex <input type="checkbox"/> Male <input type="checkbox"/> Female Other Insurance No. _____ WCB # _____ Address _____ City _____ Province _____ Postal Code _____ Phone Home ( ) _____ Work ( ) _____ Cell ( ) _____ Emergency Contact/Next of Kin _____ Maiden Name _____	
	<input type="checkbox"/> ER <input type="checkbox"/> Inpatient _____ (Site and Unit) Date Exam Needed: _____ ACP #: _____	<b>HISTORY AND EXAMINATION REQUESTED</b> (See WRHA website for additional information and forms for Breast U/S; PET; Mammography, Bone Density) Modality Requested (select one) <input type="checkbox"/> X-Ray <input type="checkbox"/> Ultrasound <input type="checkbox"/> CT <input type="checkbox"/> Nuclear Medicine <input type="checkbox"/> MRI	
	Examination Requested <b>Specify LDCT for screening</b> <input type="checkbox"/> Elective <input type="checkbox"/> Urgent *Note: For <i>emergent</i> outpatient exams, Radiologist must be contacted directly	<b>METHOD OF TRANSPORT</b> <input type="checkbox"/> Wheelchair <input type="checkbox"/> Stretcher <input type="checkbox"/> Ambulatory <input type="checkbox"/> Portable <input type="checkbox"/> Gerichair <input type="checkbox"/> Bed <input type="checkbox"/> Will Require Lift	
	History and Provisional Diagnosis. Patient on Infection Control Precautions? Specify <b>Indicate patient age, smoking status (current or former smoker), and smoking history (# pack years)</b>	Previous Relevant Exams      Date      Location 1. _____ 2. _____ 3. _____	
	<b>MUST COMPLETE FOR ALL EXAMS</b> Patient Weight _____ Patient Height _____ Is patient pregnant? <input type="checkbox"/> Yes <input type="checkbox"/> No	<b>FOR CONTRAST ENHANCED EXAMS</b> If contrast media is required, no solid food 4 hours prior to study. Normal fluid intake. If the patient is diabetic, please adjust medication accordingly. "Allergy" to X-Ray dye <input type="checkbox"/> Yes <input type="checkbox"/> No	

<http://www.wrha.mb.ca/prog/diagnostic/forms.php>  
 Submit to CI or facility of choice



# Take home messages

1. It is preferable to conduct lung screening in the context of an organized program.
2. In the absence of an organized program, lung cancer screening should only be done on high-risk individuals
  - Asymptomatic, 55-74 years, 30+ pack year, current or <15y former smoker OR
  - Asymptomatic, 50+ years and Tammemagi risk score >1.5%

# Take home messages

3. Referrals for LDCT should only be made after informed decision-making with patients, including a discussion about the benefits and harms of screening
  - Requisition should specify screening CT (low dose), patient age, current smoking status (or date quit), and smoking history (# of pack years)
4. Counsel and/or enroll patient in smoking cessation (regardless of screening decision)



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SCREENING PROGRAMS

# CT Result

- Most thoracic radiologists are assessing nodules based on Lung-RADS
  - Normal CT or benign: recall for screen in 1y
  - Indeterminate nodule (probably benign): rescreen in 6 months
  - Suspicious nodule or mass: follow-up required, including further imaging and/or chest medicine and/or thoracic surgery consult

Lung-RADS info: <https://www.acr.org/Quality-Safety/Resources/LungRADS>

# Follow-Up

- PCP will be responsible for ensuring follow-up, including
  - Referrals to subsequent annual screens (CTFPHC recommends 3 annual screens)
  - Follow-up of incidental findings

# CCMB Activities

- Advisory and Working Groups established to explore feasibility of programmatic lung cancer screening in Manitoba
- Activities
  - Environmental scan of current situation/capacity
  - Propose models for programmatic screening
  - Develop resources for PCPs and radiologists
  - Assess cost and cost-effectiveness