Pan-Canadian Early Lung Cancer Detection Project

Canadian Early Lung Cancer Study Group

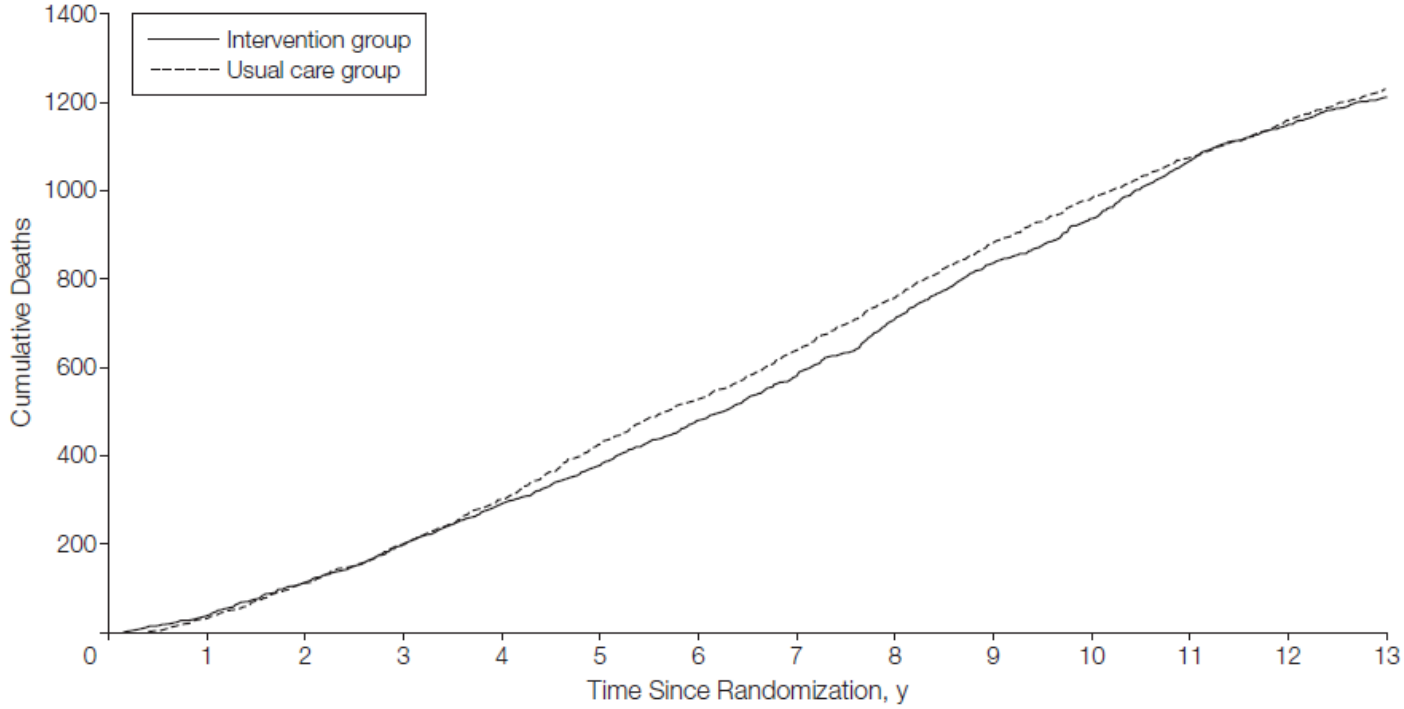
The Terry Fox Research Institute
L'Institut de recherche Terry Fox

CANADIAN PARTNERSHIP AGAINST CANCER
PARTENARIAT CANADIEN CONTRE LE CANCER

DISCLOSURE

- I have no conflict of interest to declare

CXR Screening Does Not Reduce Lung Cancer Mortality



Intervention group													
Cumulative deaths	36	113	196	292	378	480	582	711	838	937	1070	1150	1213
Cumulative person-years	77 268	154 053	230 270	305 833	380 691	454 773	527 937	600 004	670 274	735 098	789 540	832 441	864 227
Usual care group													
Cumulative deaths	30	111	198	301	426	527	639	761	884	987	1076	1162	1230
Cumulative person-years	77 286	154 116	230 348	305 902	380 725	454 719	527 804	599 790	669 955	734 523	788 854	831 678	863 330

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PLCO Study. JAMA 2011;306:doi:10.1001

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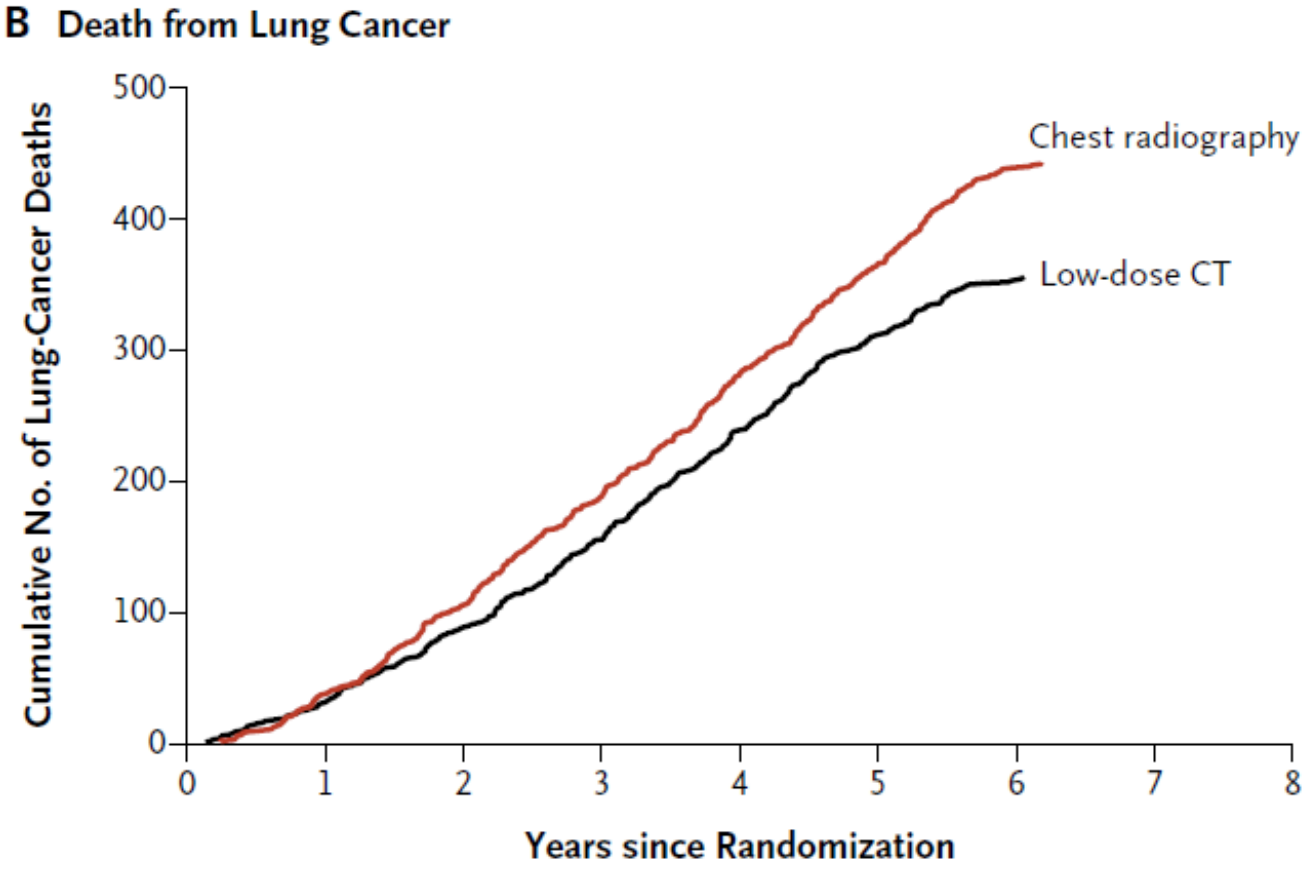
20% Reduction In Lung Cancer Mortality With LDCT Screening



NLST. NEJM 2011; 365:395-409

BACKGROUND (2007)

- If randomized trials (NLST, NELSON) show a mortality reduction benefit, how do we develop a screening strategy that can become an affordable program within the Canadian health care system

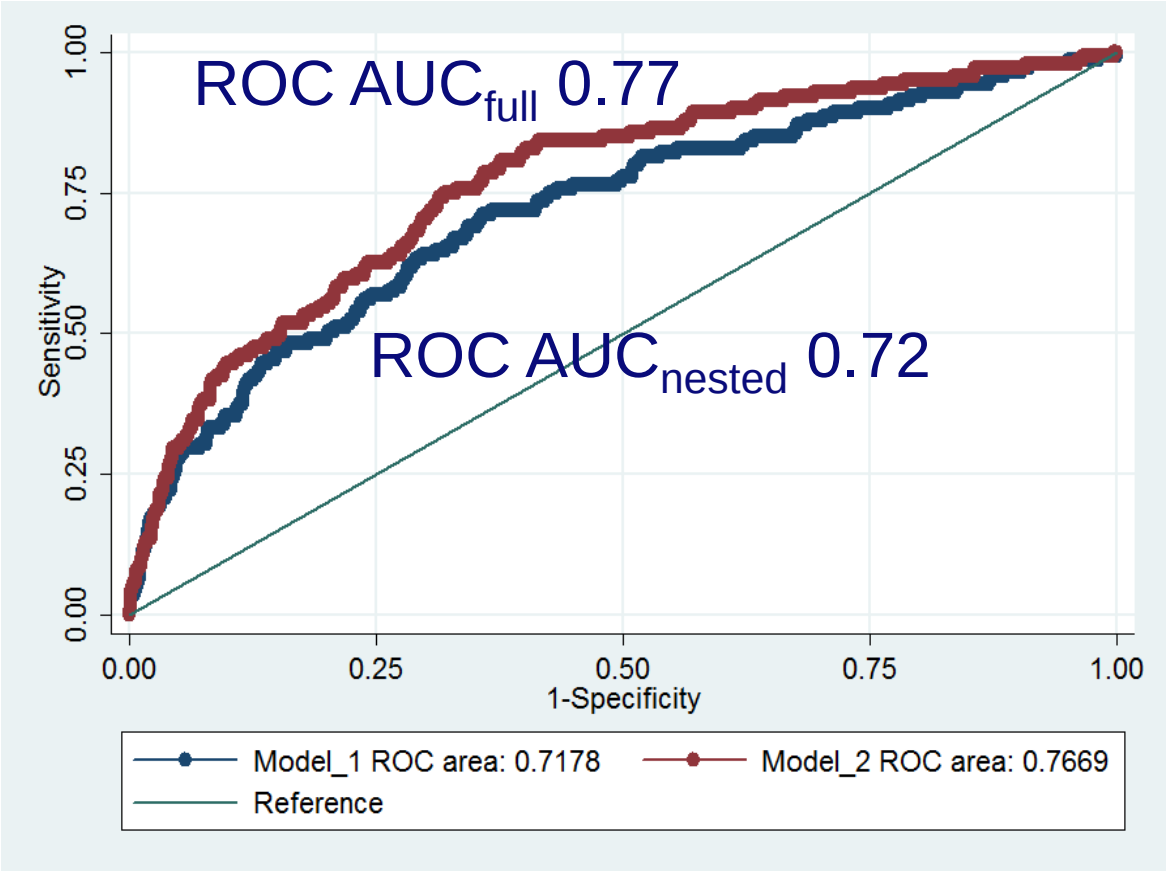
OBJECTIVES

- Validate a low cost lung cancer risk assessment tool to select population cohorts for early detection with LDCT
- Determine the incremental value of spirometry, blood biomarkers and autofluorescence bronchoscopy as part of the screening strategy
- Impact of screening on quality of life and smoking behaviour
- Cost implication of program implementation

Lung Cancer Risk Prediction Tool

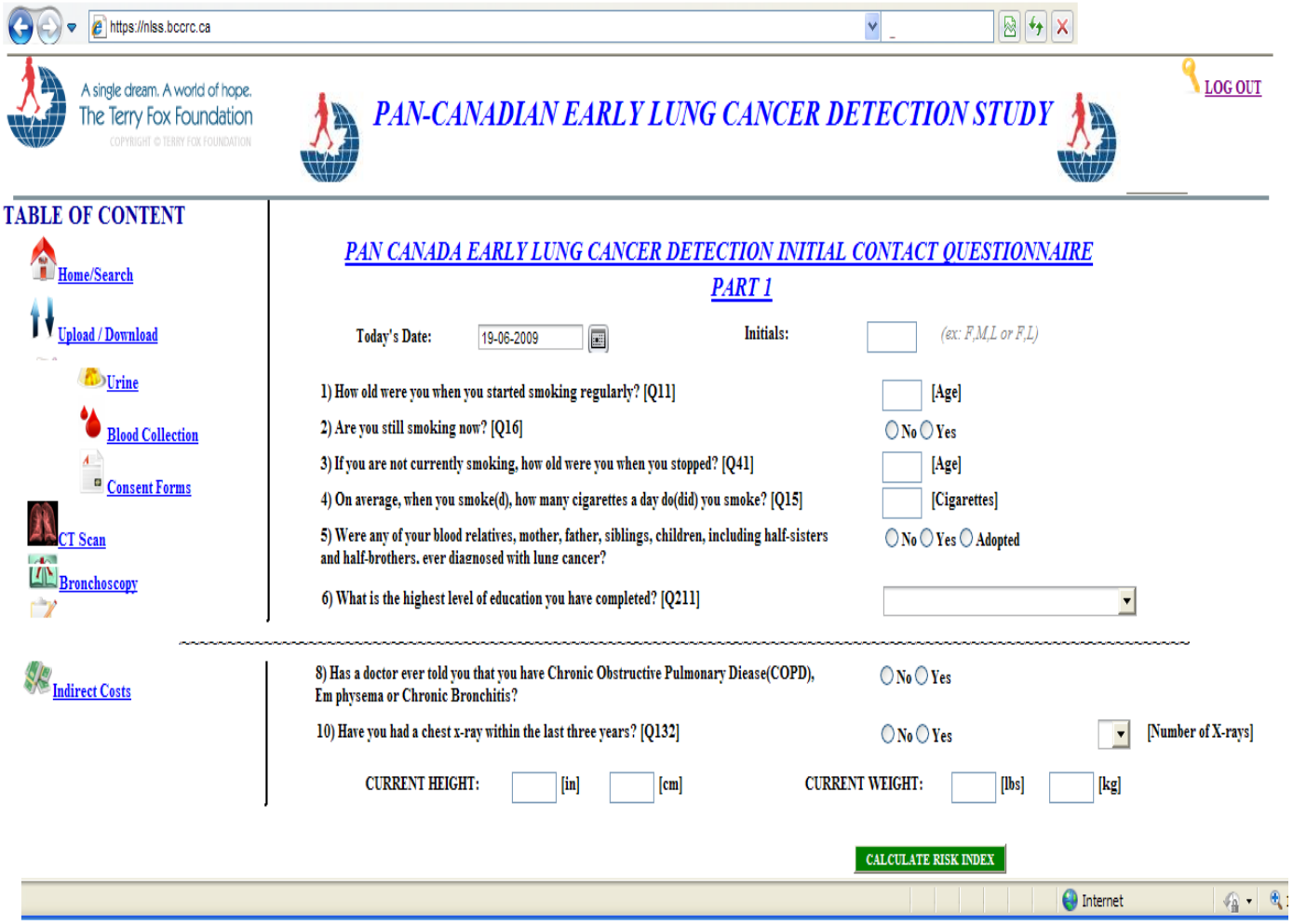
- Based on PLCO data (Tammemägi et al. J Natl Cancer Inst 2011;103:1–11)
- Risk variables: age, smoking history, family history of lung cancer, education level (socio-economic status), history of COPD (self-reported), chest X-ray in last 3 years and body mass index

Incremental Value Of Pulmonary Function In Lung Cancer Risk Prediction



(Cancer Prev Res; 4(4); 1–11. 2011)

Web-based Screening Questionnaire



The Pan-Canada Lung Cancer Study Group

Co-Directors: Stephen Lam (BCCA) & Ming Tsao (PMH)

- British Columbia Cancer Agency-VCH (Annette McWilliams, John Mayo, Richard Finley, John Yee, Ken Evans, Paola Nasute)
- University of Calgary (Alain Tremblay, Paul Burrowes, Paul MacEachern)
- University Hospital Network-Princess Margaret Hospital (Heidi Roberts, Geoff Liu, Frances Shepherd, Kam Soghrati, Kazuhiro Yasufuku, John Thenganat, Charlie Chan, Natasha Leighl)
- Juravinski Cancer Center (John Goffin, Serge Puksa, Lori Stewart, Allan McLellan, Bill Evans)
- Ottawa Hospital Regional Cancer Centre (Garth Nicholas, Glen Goss, Jean M Seely, Kayvan Amjadi)
- University of Laval (Simon Martel, Francis Laberge, Michel Gingras, Christian Couture))
- Dalhousie University (Michael Johnston, Daria Manos)
- Memorial University (Rick Bhatia)

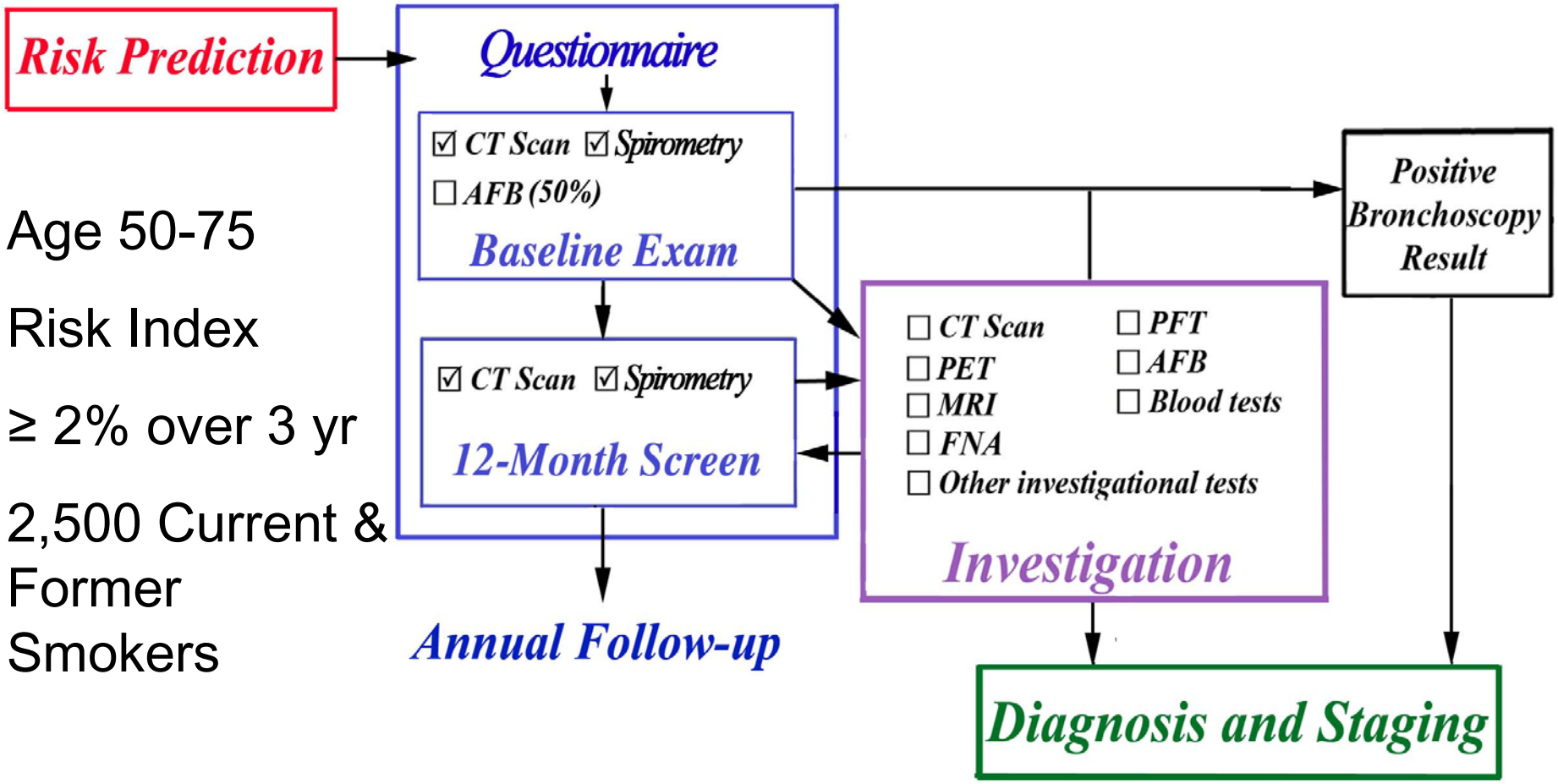
Study Protocol

Age 50-75

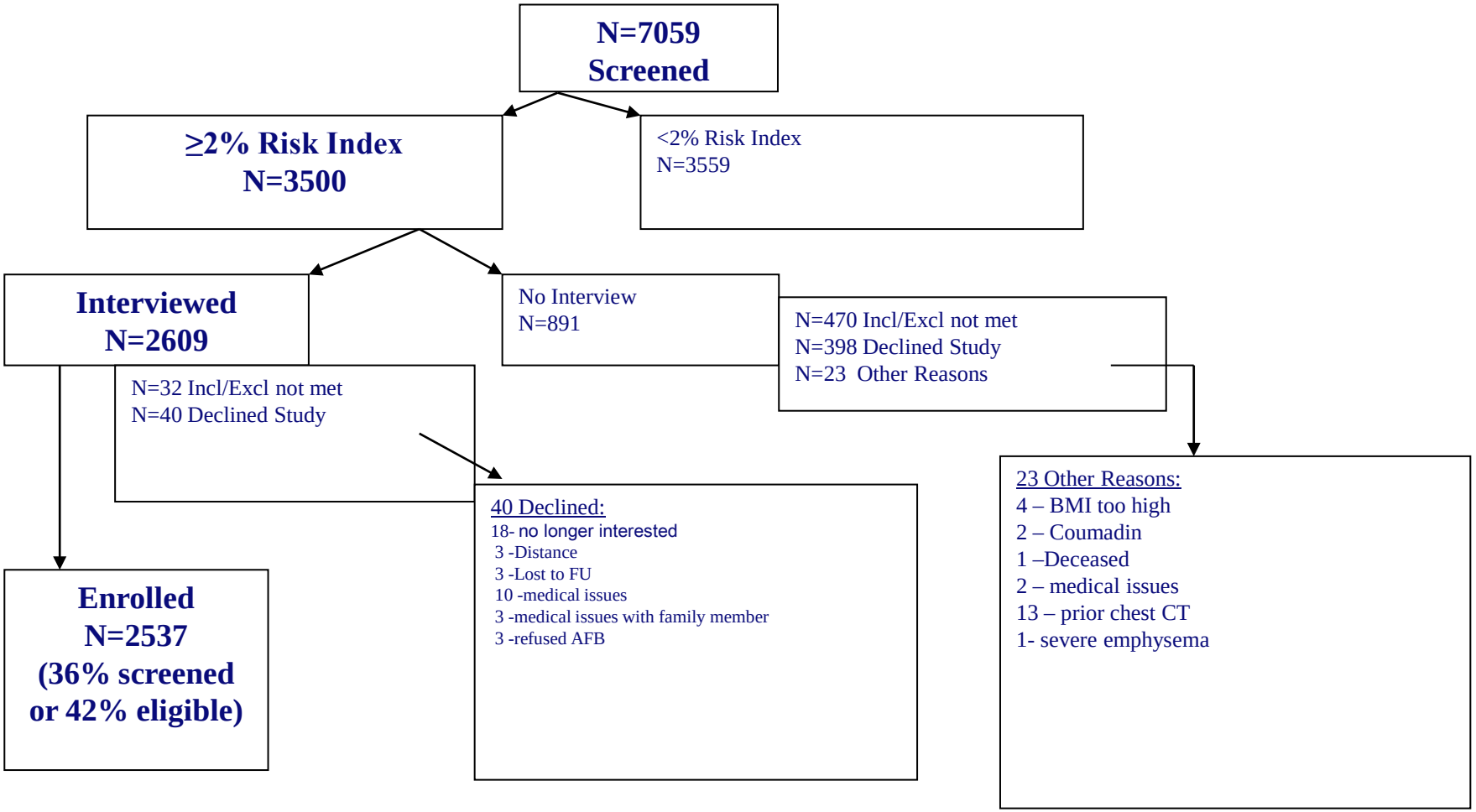
Risk Index

≥ 2% over 3 yr

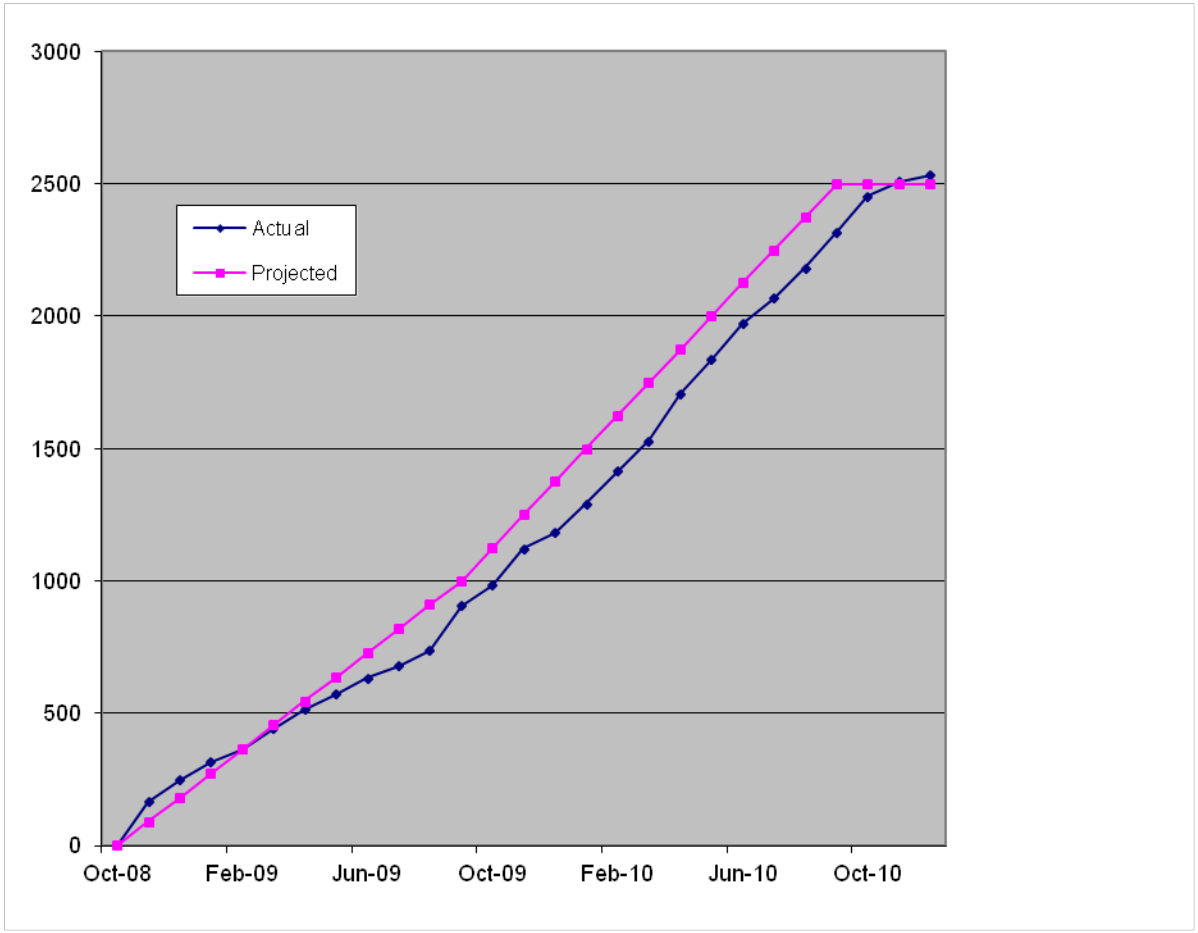
2,500 Current & Former Smokers



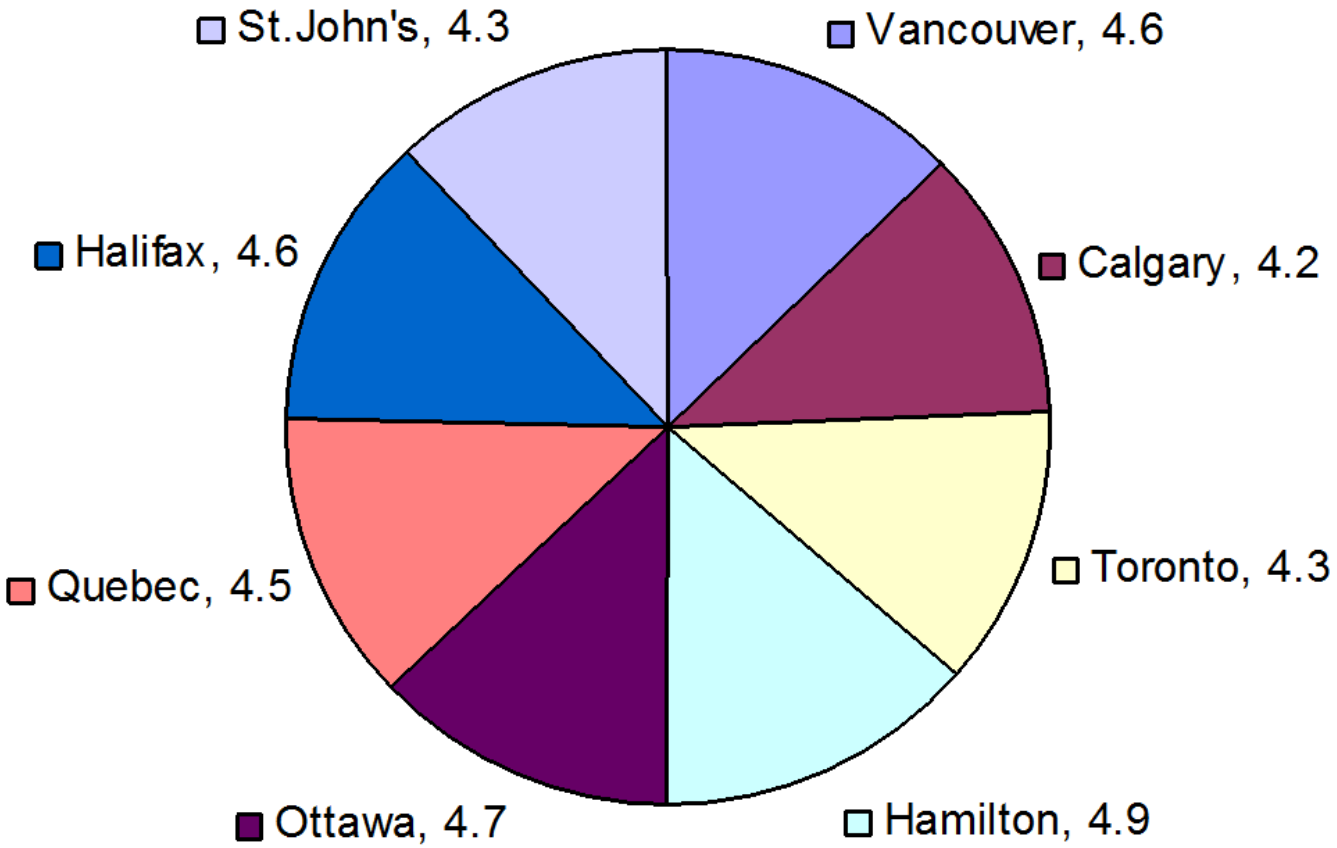
Number Screened For Study Entry



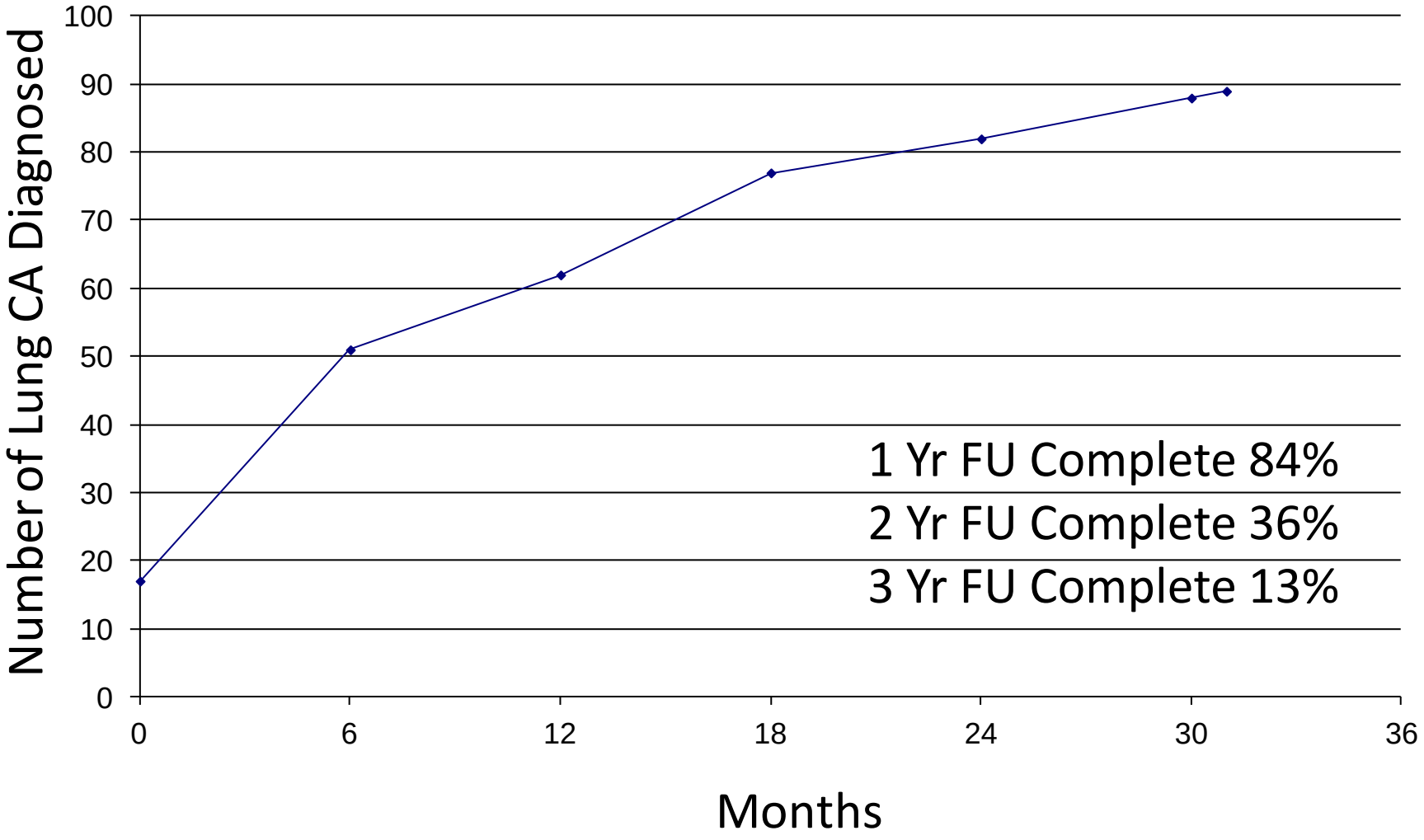
Study Accrual (9/2008 -12/2010)



Average Lung Risk Index 4.5



89 Lung Cancers (3.5%) Diagnosed With A Median Follow-up of 18 Months



Baseline Characteristics of Study Participants

	No Cancer N=2448	Cancer N=89	Total N=2537
M : F	56% : 44%	46% : 54%	55% : 45%
Age (yrs)	62 (50-75)	64 (50-75)	62 (50-75)
Pack Years	50 ± 23	52 ± 25	50 ± 23
Current Smokers (%)*	62	65	62
COPD (%)	12%	13%	12%

*Former smoker defined as smoking cessation for ≥1 year

Prevalence Of Lung Cancer In Screening Trials Using Age & Smoking

	NLST	NELSON	Danish	ITALUNG
N=	26,312	7,557	2,052	1,406
Population	Age 55-74; ≥30 pack-yrs	Age 50-75; >15 cig/day >25 yr or >10 cig/day ≥ 30 yr	Age 50-75; ≥20 pack-yrs	Age 55-69; ≥20 pack-yrs
Prevalence + (Incidence)	1.02% (CT – 1060 CXR - 941)	0.97% (CT - 134 after 2 + yrs)	0.8% (CT – 69 UC- 24)	1.4% (2.7% after 3+ yrs)

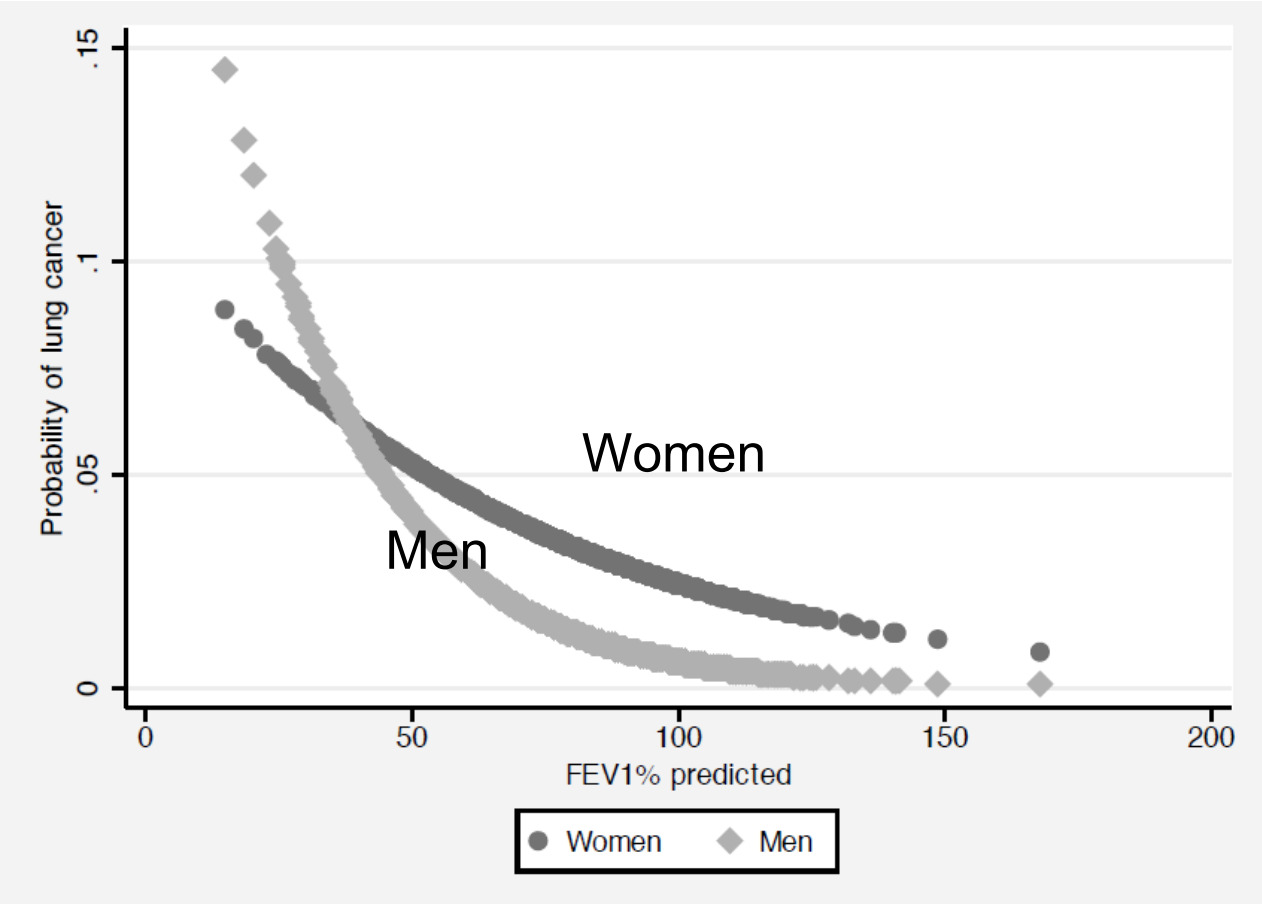
Pan-Canadian Study 3.5% after median follow-up of 18 months

Staging and Histology

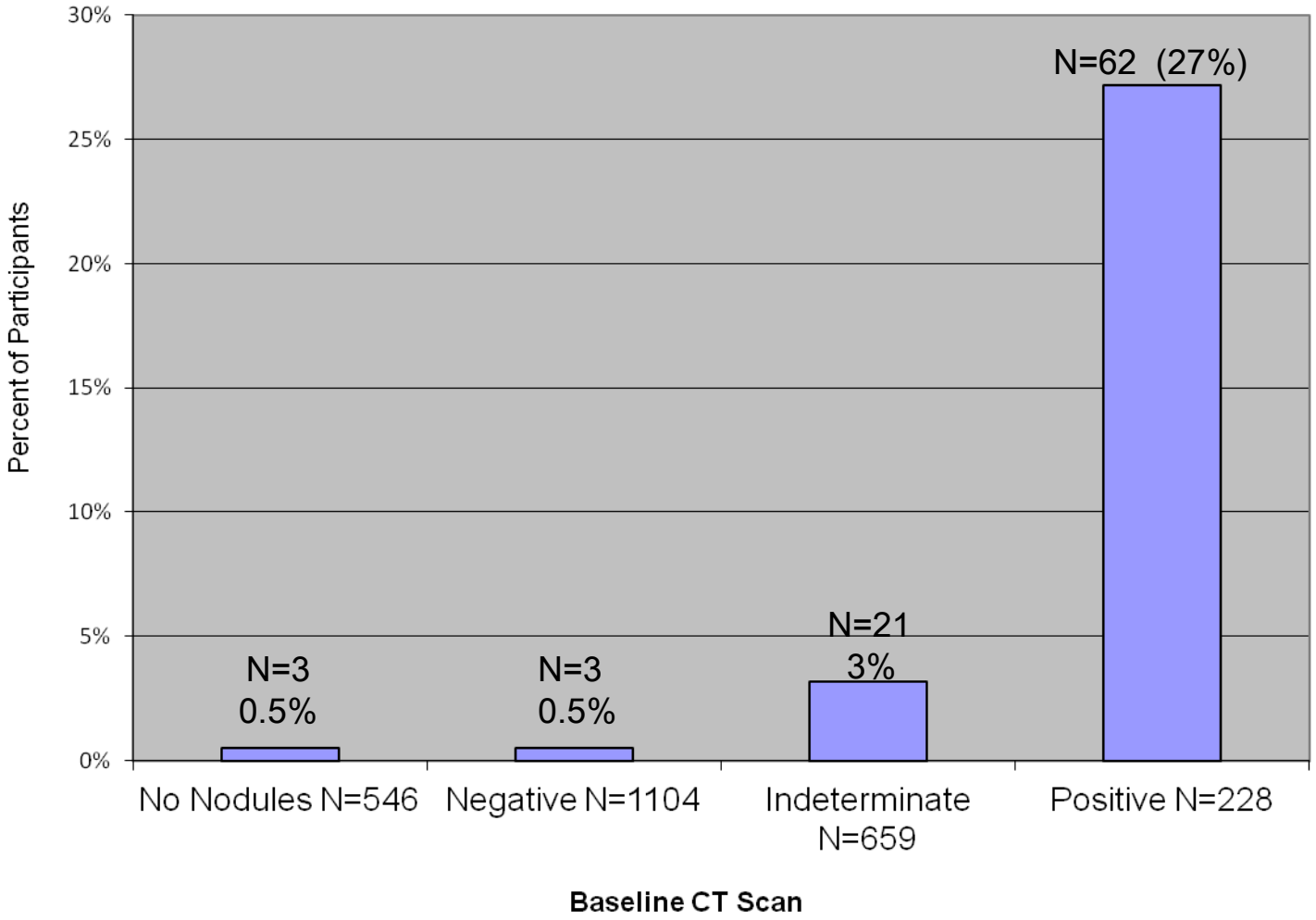
IA	48	(54%)
IB	14	(16%)
IIA	4	(4%)
IIB	1	(1%)
IIIA	6	(7%)
IIIB	6	(7%)
IV	4	(5%)
Limited	3	(3%)
Extensive	1	(1%)
Pending	2	(2%)
Total	89	

Adeno CA	61	(69%)
Squamous	14	(16%)
BAC	3	(3%)
Small Cell	5	(6%)
NSCLC	2	(2%)
Other	4	(4%)
Total	89	

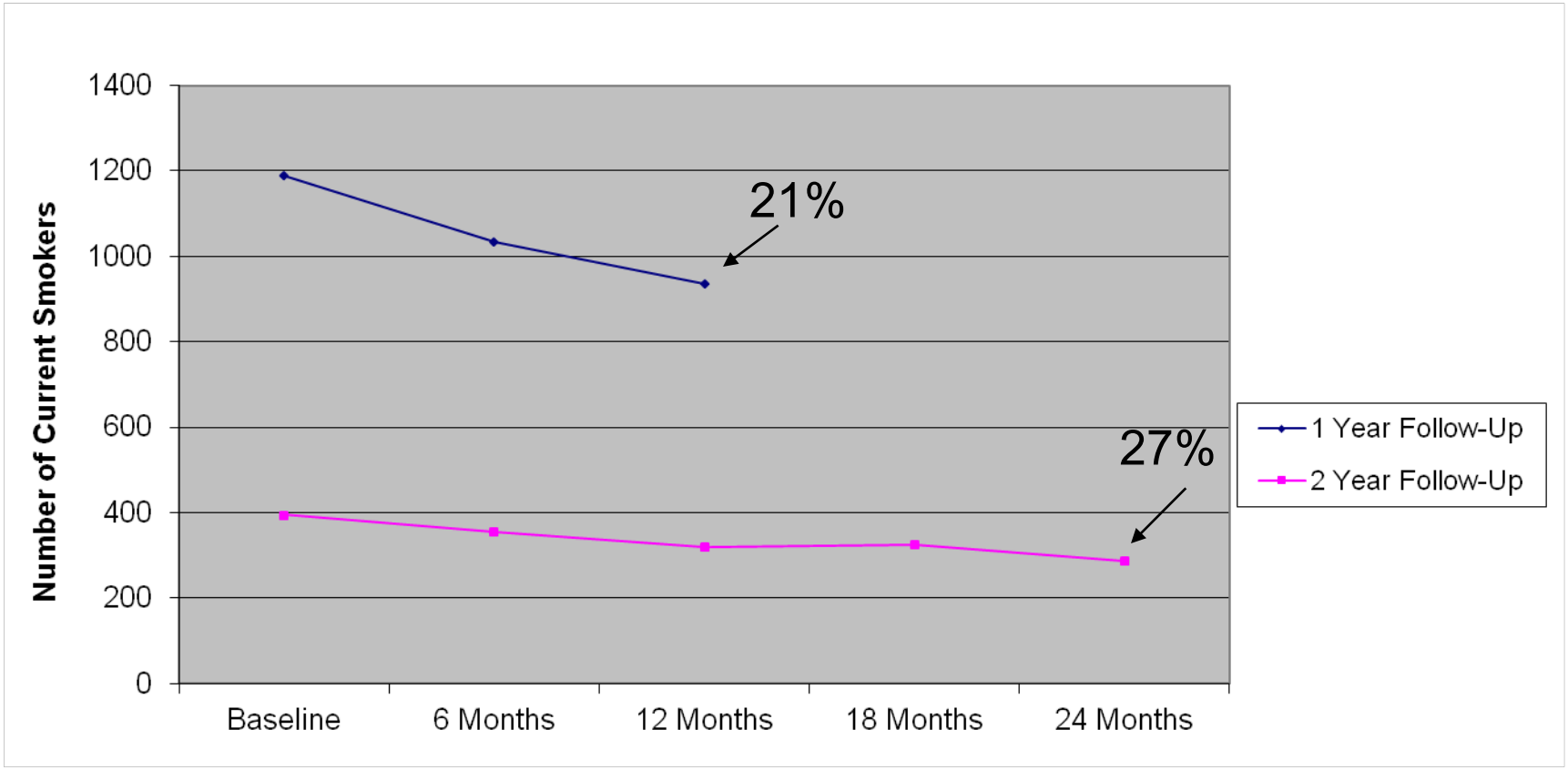
Relationship Between FEV_1% & Lung Cancer Risk By Sex



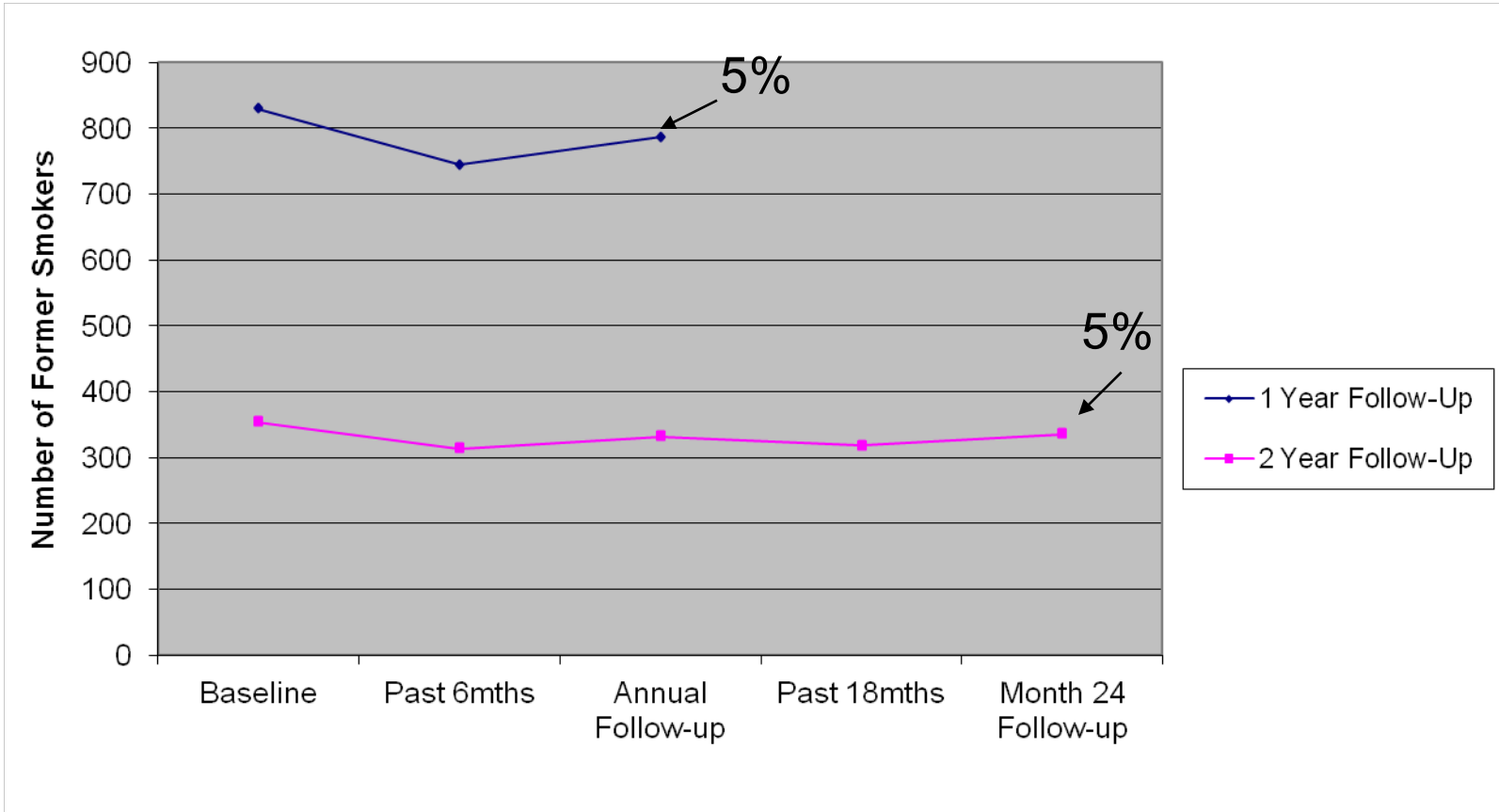
Percent Confirmed Lung Cancer According To LDCT Result



Smoking Cessation Rate Among Current Smokers



Former Smokers Who Resumed Smoking



Summary

- Developed accurate low cost web-based lung cancer risk assessment tool to identify high risk cohorts for LDCT screening
- Spirometry can improve accuracy of risk assessment tool & may account for gender differences in lung cancer risk
- Over 20% of current heavy smokers quit smoking as a result of the screening study

Significance

- Our study provides the framework for a practical, low-cost approach to define the optimal screening population that can be adopted in a public health care setting

Acknowledgement

- Terry Fox Research Institute
- The Canadian Partnership Against Cancer
- National Cancer Institute (USA)
- Study coordinators: Sukhinder Atkar-Khattra, Sharon Gee, Rommy Koetzler, Maureen McGregor, Elaine Moore, Sharon Kelly, Carolle St.Pierre, Diana Sonnichsen, Erin Pennell
- 7,059 Participants in the study

The Pan-Canada Lung Cancer Study Group

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