Lung Cancer Screening/ Tobacco Control Best of WCLC 2020 Virtual San Francisco

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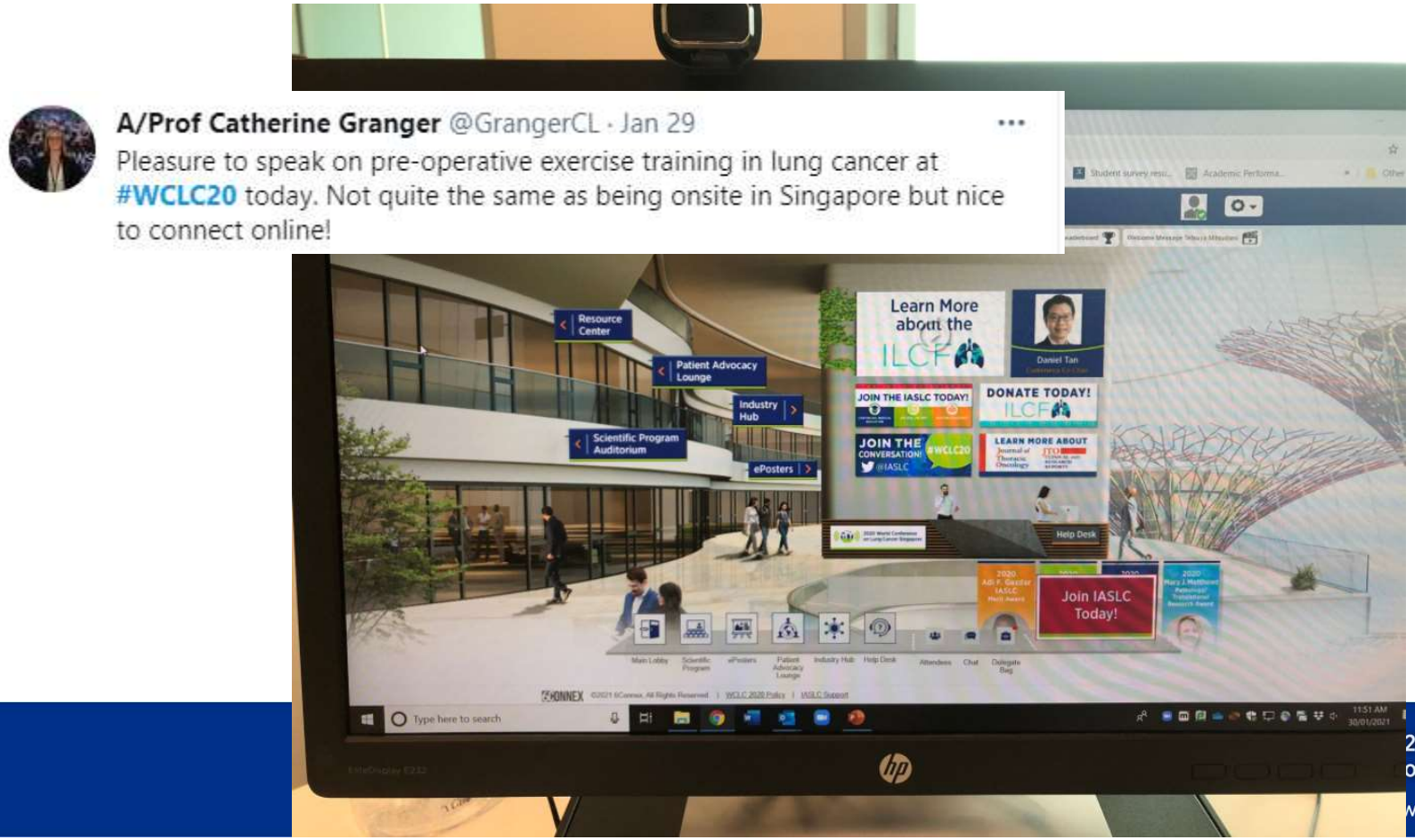
IASLC 2020 World Conference on Lung Cancer Singapore
JANUARY 28-31, 2021 | WORLDWIDE VIRTUAL EVENT

DISCLOSURES

Commercial Interest	Relationship(s)
None	None

Singapore in your Office



2020 World Conference on Lung Cancer Singapore

WORLDWIDE VIRTUAL EVENT

Charu Aggarwal, MD, MPH
@CharuAggarwalMD

In case anyone was missing the fact that we are NOT physically in in Singapore right now, #WCLC20 just took it to another level by sharing recipes for food and drinks in my "delegate bag"
😭😭😭
@IASLC #LCSM
@GlopesMd @JPatelMD @NarjustDumaMD

Presidential Symposium

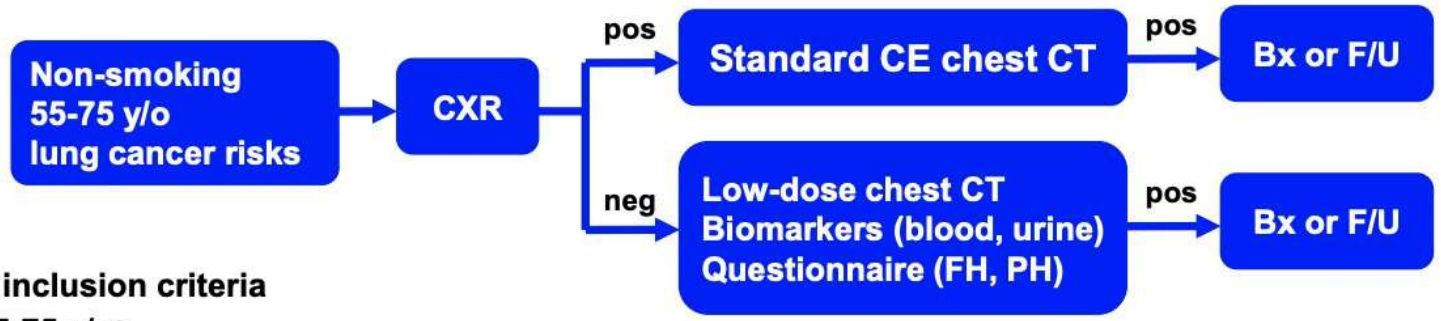
National Lung Cancer Screening Program in Taiwan: The TALENT Study

Pan-Chyr Yang MD, PhD
On Behalf of TALENT Study Group

National Taiwan University
Institute of Biomedical Sciences
Center of Genomics, Academia Sinica

Taiwan Lung Cancer Screening in Never Smoker Trial (TALENT)

From Feb 2015 to July 2019, 17 medical centres participated



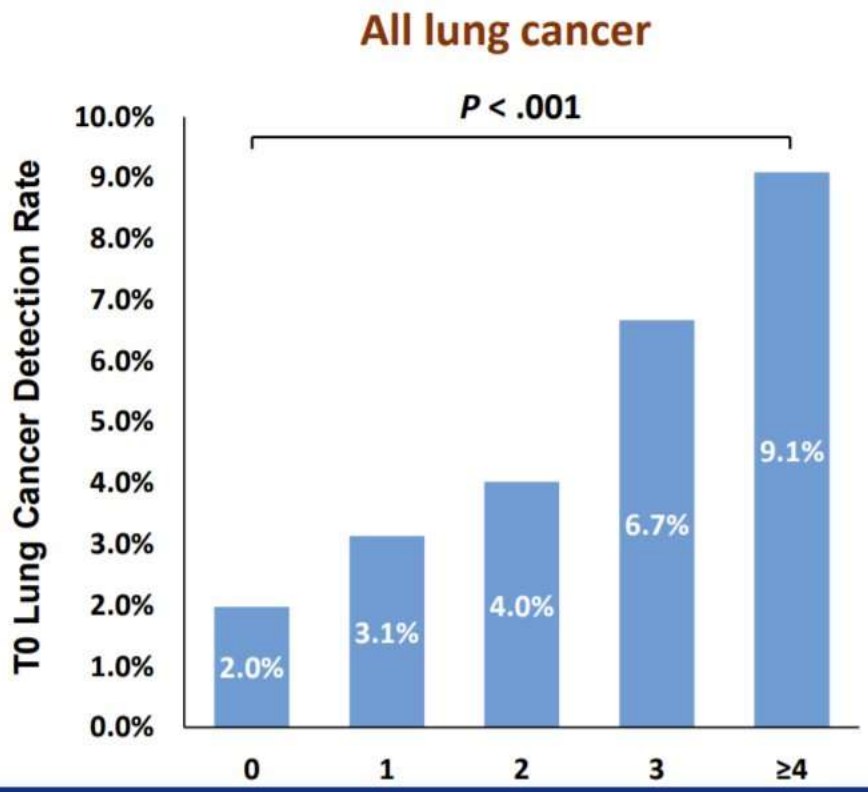
- Key inclusion criteria
  - 55-75 y/o[a]
  - Never smoking or SI < 10 PY and had quit > 15 yrs
  - Having one of the following risks
    - family history of lung cancer (≤ 3-degree)
    - environmental tobacco smoking history
    - chronic lung disease (TB, COPD)
    - cooking index[b] ≥ 110
    - cooking without using ventilation
  - Negative CXR

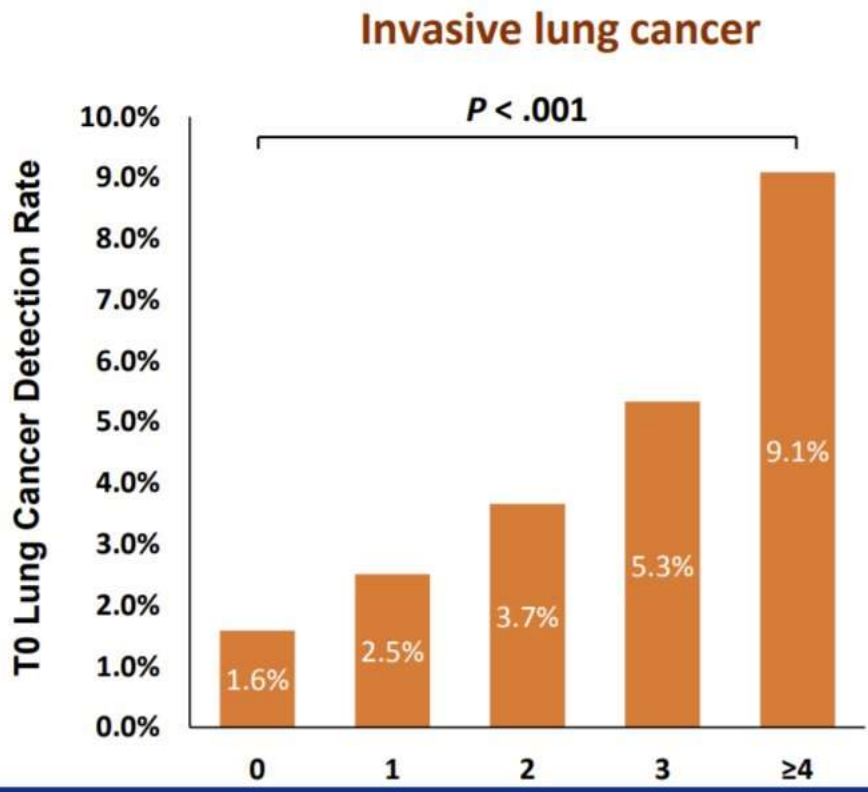
- Data cutoff: September 30, 2020
- 13,207 subjects screened, 12,011 enrolled
- 6009 (50%) with family history

[a] Subjects with lung cancer FH: >50 yrs or > the age at diagnosis of the youngest lung cancer case in the family
[b] 2/7 x days with cooking by pan-frying, stir-frying, or deep-frying in 1 week (maximum=21) x Yrs with cooking

Taiwan LDCT Lung Cancer TALENT Study Group, 2020

No. of 1st Degree Lung Cancer Family History and Risk of Lung Cancer





Taiwan LDCT Lung Cancer TALENT Study Group, 2020

TALENT T0 Lung Cancer Detection Rate

- T0 lung cancer detection rate: 313/12,011= **2.6%,** NLST: 1.1%, NELSON: 0.9%
- Invasive lung cancer: 255/12,011= **2.1%**. Multiple primary lung cancer: **17.9%**
- LDCT positive: 17.4% (GGO > 5mm, S/PS > 6mm) #. Invasive procedures: 3.4%
- Lung cancer confirmed: **96.5% stage 0-1**. LDCT features: GGO 47%, S 19%, PS 34%
- Prevalence of lung cancer w/ or w/o family history: **3.2% vs 2.0%** (p< 0.001)

Histologic Diagnosis	(n)
Adenocarcinoma in situ (AIS)	58
Minimally invasive adenocarcinoma (MIA)	71
Invasive adenocarcinoma (INAD)	183
Adenosquamous carcinoma	1
Total	313

Stage 0	58
Stage IA	218
Stage IB	26
Stage IIA	0
Stage IIB	3
Stage IIIA	2
Stage IIIB	1
Stage IV	5

 # GGO: Ground glass opacity; S: Solid; PS: Part solid
Taiwan LDCT Lung Cancer TALENT Study Group, 2020

TALENT vs Other LDCT Lung Cancer Screening Studies

	TALENT			NLST[1]	NELSON[2]	UKLS-pilot[3]	I-ELCAP[4]
	w/ FH	w/o FH	ALL	LDCT arm	LDCT arm	LDCT arm	ALL
Population	Never or light ex- smoker[5]			Smoker	Smoker	Smoker[6]	Mixed[7]
Patient number	6009	6002	12011	26309	7557	1994	31567
LDCT positive rate	17.7%	17.1%	17.4%	27.3%	20.8%[8]	13.3%	26.9%
T0 LC detection rate	3.2%	2.0%	2.6%	1.1%	0.9%	1.7%	1.1%
Sensitivity	91.7%	92.5%	92.0%	93.8%	94.6%	97.6%	98.8%
Specificity	84.7%	84.4%	84.6%	73.4%	98.3%	74.6%	87.9%
PPV	16.6%	10.8%	13.8%	3.8%	35.7%	7.6%	9.7%
NPV	99.7%	99.8%	99.7%	99.9%	99.9%	99.9%	100.0%
Stage 0-I (%)	96.4%	96.7%	96.5%	54.8%	63.9%	66.7%	85%[9]

[1] NEJM 2013, [2] NEJM 2020, [3] Thorax 2016, [4] NEJM 2006,
[5] 6.7% are light ex-smokers, [6] 99.9% are smokers, [7] 82.8% are smokers,
[8] by the first scans, [9] including baseline and annual scans
Taiwan LDCT Lung Cancer TALENT Study Group, 2020

National Lung Cancer Screening Program in Taiwan: The TALENT Study

Pan-Chyr Yang
MD

Conclusion and Take Home Message

- Lung cancer in never smoker is a global rising threat, the pathogenic mechanism and method of screening may be different.
- TALENT T0 lung cancer detection rate: **2.6%**, higher than NLST **(1.1%)** and NELSON **(0.9%).**
- Lung cancer detected in TALENT T0: **96.5% stage 0-1**.
- Multiple primary lung cancer: 17.9%.
- 1st degree family hx of lung cancer may increase the risk of lung cancer.
- LDCT lung cancer screening for never-smokers with high-risk may be feasible.

Dr. Estela Rodriguez
@Latinamd

Replying to @Latinamd

#WCLC20 Although results of TALENT may be influenced by molecular profile of this Asian population, the other risk factors identified such as family history and environmental factors are important to understand given rising trend of lung cancer in never smokers worldwide #lcsm

Discussant:

Results of TALENT Study

Ugo Pastorino

Istituto Nazionale Tumori, Milan, Italy

LC epidemiology in Taiwan

- Population: 23.6 million, density: 652 / Km^2
- 371,000 LC pts reviewed, 1995-2015
- smoking prevalence: M 30% vs. F 5%
- similar (high) increase of ADC incidence in M / F
- > 50% of LC in never smokers
- proportion of stage III-IV LC: NSm 70% vs. Sm 81%

Tseng et al., J Thorac Oncol. 2019; 14:784-97

DIFFERENT LC BIOLOGY IN TAIWAN NEVER SMOKERS

Taiwan non-smoker cohort	TCGA smoking-dominant cohort
103 patients, 80% stages IA-IB, 89% ADC **83% non-smokers, 58% female**, median age 63y	**230** patients , 54% stage I **37% non-smokers, 56% female**

Distinct genomic landscape with different driver alteration frequencies

85% EGFR, 33% **TP53**, 20% **RBM10**, **7% KRAS (men smokers only)**	**14% EGFR**, 46% **TP53**, 8% **RBM10**, **33% KRAS**, 17% **KEAP1**, 17% **STK11**,

Different endogenous (genetic susceptibility?) and exogenous mutational processes contribute to Taiwan pts in age, gender and EGFR mutation dependent manner

Chen et al., Cell 2020

Gansmo et al., Carcinogenesis, 2018

TAKE HOME MESSAGE

- TALENT study provides new evidence on LC risks
- LDCT screening eligibility could be re-defined in Asia
- more research needed on LC biology in non-smokers

Oral Presentations
Lung Cancer Screening

Yeon Wook Kim
MD

Low-Dose Chest Computed Tomographic Screening and Invasive Diagnosis of Pulmonary Nodules for Lung Cancer in Never-Smokers

Yeon Wook Kim

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IASLC 2020 World Conference on Lung Cancer Singapore

Low-Dose Chest Computed Tomographic Screening and Invasive Diagnosis of Pulmonary Nodules for Lung Cancer in Never-Smokers

Yeon Wook Kim
MD

Introduction

- Although lung cancer screening using LDCT is widely used in clinical practice, data are limited on the incidence and results of invasive diagnostic procedures for screen-detected nodules in never-smokers, especially in Asian countries with prevalent ground glass opacity nodules.

- The aim of this study was to determine the prevalence of nodules considered for invasive biopsy, and evaluate the final diagnosis and complications related to procedures in never-smokers who undergo LDCT screening.

Low-Dose Chest Computed Tomographic Screening and Invasive Diagnosis of Pulmonary Nodules for Lung Cancer in Never-Smokers

Yeon Wook Kim
MD

Methods

- A retrospective cohort study
- Eligibility
  - Period: from Jan 2009 to Dec 2018
  - Asymptomatic adults that underwent lung cancer screening with LDCT at SNUBH

- Data collection
  - Smoking status
  - Characteristics of participants, detected lung nodules
  - Diagnostic results of patients with lung nodules considered for biopsy

- Analysis
  - Rate of invasive diagnostic procedure and the related complications for detected nodules in never-smoker and ever-smoker groups, and the detection rate of lung cancer

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Low-Dose Chest Computed Tomographic Screening and Invasive Diagnosis of Pulmonary Nodules for Lung Cancer in Never-Smokers

Yeon Wook Kim
MD

Results

- A total of 37,436 (17,968 never-smokers and 19,468 ever-smokers) were analysed

Table 1. Characteristics of participants who underwent LDCT screening

	Total (n = 37,436)	Never-smoker (n=17,968)	Ever-smoker (n=19,468)	p value
Age at baseline screening, mean ± SD	49.5 ± 11.2	50.5 ± 11.6	48.6 ± 10.8	<0.001
Sex, male, n (%)	23,827 (63.6)	5,644 (31.4)	18,183 (93.4)	<0.001
BMI, mean ± SD	24.0 ± 3.2	23.3 ± 3.2	24.7 ± 3.1	<0.001
Total months of follow up, mean ± SD	34.8 ± 35.5	34.0 ± 34.4	35.6 ± 36.4	<0.001
Lung-RADS category at baseline LDCT screening, n (%)				0.281
1 or S	32,558 (87.0)	15,691 (87.3)	16,867 (86.6)	
2	3,871 (10.3)	1,792 (10.0)	2,079 (10.7)	
3	522 (1.4)	253 (1.4)	269 (1.4)	
4A	324 (0.9)	155 (0.9)	169 (0.9)	
4B or 4X	161 (0.4)	77 (0.4)	84 (0.4)	
Subjects with positive lung nodule, n (%)	6,066 (16.2)	2,908 (16.2)	3,158 (16.2)	0.922
Nodule detected at baseline screening, n (%)	4,878 (13.0)	2,277 (12.7)	2,601 (13.4)	0.048
Nodule detected during follow up, n (%)	1,188 (3.2)	631 (3.5)	557 (2.9)	<0.001
Received invasive biopsy, n (%)	333 (0.89)	139 (0.77)	194 (1.00)	0.022
Diagnosed as lung cancer, n (%)	207 (0.56)	84 (0.47)	123 (0.63)	0.032
Diagnosed as metastatic carcinoma or lymphoma, n (%)	7 (0.02)	5 (0.03)	2 (0.01)	0.215
Diagnosed as benign (false-positive), n (%)	119 (0.32)	50 (0.28)	69 (0.35)	0.191

Table 2. Characteristics of participants with positive nodules detected by LDCT screening

	Total (n=6,066)	Never-smoker (n=2,908)	Ever-smoker (n=3,158)	p value
Age at baseline screening, mean ± SD	52.5 ± 11.6	53.7 ± 11.8	51.4 ± 11.3	<0.001
Sex, male, n (%)	3,759 (62.0)	852 (29.3)	2,907 (92.1)	<0.001
Nodule detected at baseline screening, n (%)	4,878 (80.4)	2,277 (78.3)	2,601 (82.4)	<0.001
Nodule detected during follow up, n (%)	1,188(19.6)	631 (21.7)	557 (17.6)	<0.001
Subjects with multiple nodules, n (%)	1,736 (28.6)	835 (28.7)	901 (28.5)	0.875
Nodule type, n (%)				<0.001
Solid	3,296 (54.3)	1,401 (48.2)	1,895 (60.0)	
Part-solid	694 (11.4)	318 (10.9)	376 (11.9)	
Pure GGN	2,023 (33.3)	1,172 (40.3)	851 (26.9)	
Cavitary	53 (0.9)	17 (0.6)	36 (1.1)	
Size of nodule at first detection, mm, mean ± SD	7.0 ± 5.2	7.1 ± 4.6	6.9 ± 5.6	0.241
Diagnostic evaluation for detected nodule, n (%)				
Invasive biopsy	333 (5.5)	139 (4.8)	194 (6.1)	0.020
Bronchoscopy without biopsy	65 (1.1)	35 (1.2)	30 (0.9)	0.338
FDG-PET	190 (3.1)	69 (2.4)	121 (3.8)	0.001
Pathologic diagnosis				
Lung cancer, n (%)	207 (3.4)	84 (2.9)	123 (3.9)	0.031
Metastatic carcinoma or lymphoma, n (%)	7 (0.1)	5 (0.2)	2 (0.1)	0.213
Benign disease (false-positive), n (%)	119 (2.0)	50 (1.7)	69 (2.2)	0.192

TAKE HOME MESSAGE

- Lung cancer screening with LDCT in never smokers in Korea led to detection of lung nodules & invasive biopsy.
- Lung Cancer detection rates were lower in never vs ever smokers, but there was no difference in false positives and complications.
- Further evidence that there should be a screening strategy for never-smokers or light smokers, at leas in this specific population.

Oral Presentations
Tobacco Recovery

Reporting of Tobacco Use and Impact on Outcomes in Cancer Cooperative Group Clinical Trials: A Systematic Scoping Review

Lawson Eng, J Brual, A Nagee, S Mok, R Fazelzad, M Chaiton, D Saunders, N Mittmann, R Truscott, G Liu, PA Bradbury, WK Evans, J Papadakos, ME Giuliani

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January 31, 2021

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Introduction

- Continued smoking after a cancer diagnosis leads to poorer outcomes
- Less is known about how tobacco use may impact specific treatment modalities
- Clinical trials can provide an opportunity to evaluate the unintended consequences of tobacco on treatment outcomes
  - Many trials do not routinely collect tobacco use leading to challenges adjusting for the prognostic effects of tobacco and its impact on treatment outcomes
- A prior review of NCI-Cooperative Group trial protocols by Peters *et al* identified that 30% collected any tobacco use at enrollment, primarily in head and neck or lung cancers
- Less is known about other cancer cooperative groups and what is reported in clinical trial publications

Methods

Systematic Scoping Review

- Databases: Medline, EPub Ahead of Print and In-Process & Other Non-Indexed Citations, Embase Classic + Embase, and Cochrane Central Register of Controlled Trials (Host: OvidSP platform) as of October 2019
- English articles published between January 2017 to October 2019
- Inclusion Criteria: ≥ 100 patients, at least 1 cancer cooperative group, all trial design phases, reported at least 1 of: i) OS ii) PFS/TTP/DFS/TTR iii) RR, or iv) QofL as one of the main outcomes and evaluated either systemic therapy or radiation therapy
- Exclusion Criteria: Trials solely evaluating surgical interventions, diagnostic tests or supportive care measures, secondary analysis of previously published trials (i.e., genetic analysis), protocol only publications

Results – Studies Collecting Tobacco Use

- 19 out of 91 (21%) studies reported collecting tobacco use

Variable	Category	Number of studies (n=19) (%)
Format For Baseline Smoking Status	Ever / Never*	7 (37%)
	Current / Ex-Smoker / Never	10 (53%)
	Unknown	2 (11%)
Smoking Intensity Collected at Baseline	Pack Years	4 (21%)
	Not Captured	15 (79%)
Smoking Information Presented in Tables	Presented in Main Tables	17 (89%)
	Not Presented	2 (11%)
Reported Verification of Smoking Status	Yes	0 (0%)
	No	19 (100%)
Reported Follow-up Smoking Status Collected	Yes	2 (11%)
	No	17 (89%)
Smoking Status Used in Analysis	Yes	7 (37%)
	Analyzed but not displayed	2 (26%)
	No	9 (47%)
Second-Hand Smoke Exposure Reported	Yes	0 (0%)
	No	19 (100%)

- None had a formal definition of smoking status in the methods

*Studies solely reporting pack years were included as ever/never

Results – Studies Analyzing Tobacco

Site	Author Initiation Year	Cooperative Groups	Phase	Countries Sample Size	Smoking Info Collected	Impact of Smoking on Outcomes
Lung	Atagi et al 2003	JCOG	III	Japan 200	Ever vs Never	Smokers had improved OS with CRT vs RT Never smokers showed no difference between CRT vs RT Smoking did not impact grade 2+ heart or lung toxicities
Lung	Baggstrom et al 2008	CALGB	III	USA 210	Never Smoker, Ex-Smoker, Current Smoker	Smoking status did not impact OS or PFS between arms
HNC	Chera et al 2014	NCI	II	USA 114	Never, ≤10 PkYrs, >10 Pkyrs	Pack-years not significantly associated with time to recurrence
Breast	Ganz et al 2000	NSABP NRG	III	USA 441	Yes vs No*	Smoking did not impact DASI score at follow-up. *Smoking collected during baseline PRO assessment in late follow-up
HNC	Gillison et al 2011	RTOG	III	USA, Canada 987	0, 0 to 10, > 10 Pack Years	Patients with > 10 pack years had better 5 year OS with Cisplatin compared to Cetuximab Patients with ≤ 10 pack years did not show a significant difference in 5 year OS
Lung	Isla et al 2011	SLCG	II	Spain 140	Never Smoker, Ex-Smoker, Current Smoker	Possibly included in model selection, but not selected.
Pancreas	Neoptolemos et al 2008	ESPAC	III	England, Wales, Scotland, France, Germany, Sweden 732	Never Smoker, Ex-Smoker, Current Smoker	Included in model selection, but not selected. Subgroup analysis showed smoking did not impact difference between treatment arms
Lung	Ramailingam et al 2010	ECOG-ACRIN	III	USA 1516	Never Smoker, Ex-Smoker, Current Smoker	Smoking entered in multivariable modelling but not included in final model
Lung	Wakelee et al 2007	ECOG-ACRIN CCTG ICORG	III	USA, Canada, Ireland, Peru, South Africa 1501	Ever vs Never	Smoking status did not impact overall survival or DFS between chemotherapy + Bevacizumab vs chemo alone

PMID: 29887243, 28161554, 31411949, 29072977, 30449625, 31446990, 28129987, 31361535, 29129443

TAKE HOME MESSAGE

- Less than 25% of cancer cooperative group clinical trial publications report tobacco use and even less collect dose intensity and follow-up tobacco use information
  - Majority in head and neck and lung cancer trials
- Only half of studies collecting tobacco use reported any analysis of its impact on trial outcomes
- There is significant heterogeneity in the reporting of tobacco use and lack of definition and verification of smoking status
- Routine standardized assessment, collection and reporting of tobacco use at baseline and follow-up in clinical trials should be implemented to enable investigators to evaluate the clinical impact of tobacco use on new cancer therapies

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