

Meaningful Use Criteria to Identify Patients Eligible for Lung Cancer Screening: One Center's Experience

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Disclosures

- Financial: None
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Background

- Lung cancer accounts for nearly 30% of all cancer deaths
- Lung Cancer Screening (LCS) with Low Dose Radiation CT (LDCT) saves lives in high risk patients
- USPSTF recommended
- Few at risk patients are getting screened
 - 2013: Median patients screened per year per LCS program= 10*
- Comprehensive Tobacco history not universally recorded by providers

* Conway, L. *2013 Lung Cancer Screening Quick Poll*. Oncology Roundtable, 2013



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Meaningful Use

- Incentive payments from CMS to physicians to encourage meaningful use of electronic health records (EHR)
- Stage 1 (2011-2017):
 - Core and menu set objectives including tobacco use and frequency data
 - Tobacco cessation intervention
- Stage 2 (2014-2020):
 - Higher proportion of tobacco use data reported
 - More detail on tobacco use



Purpose

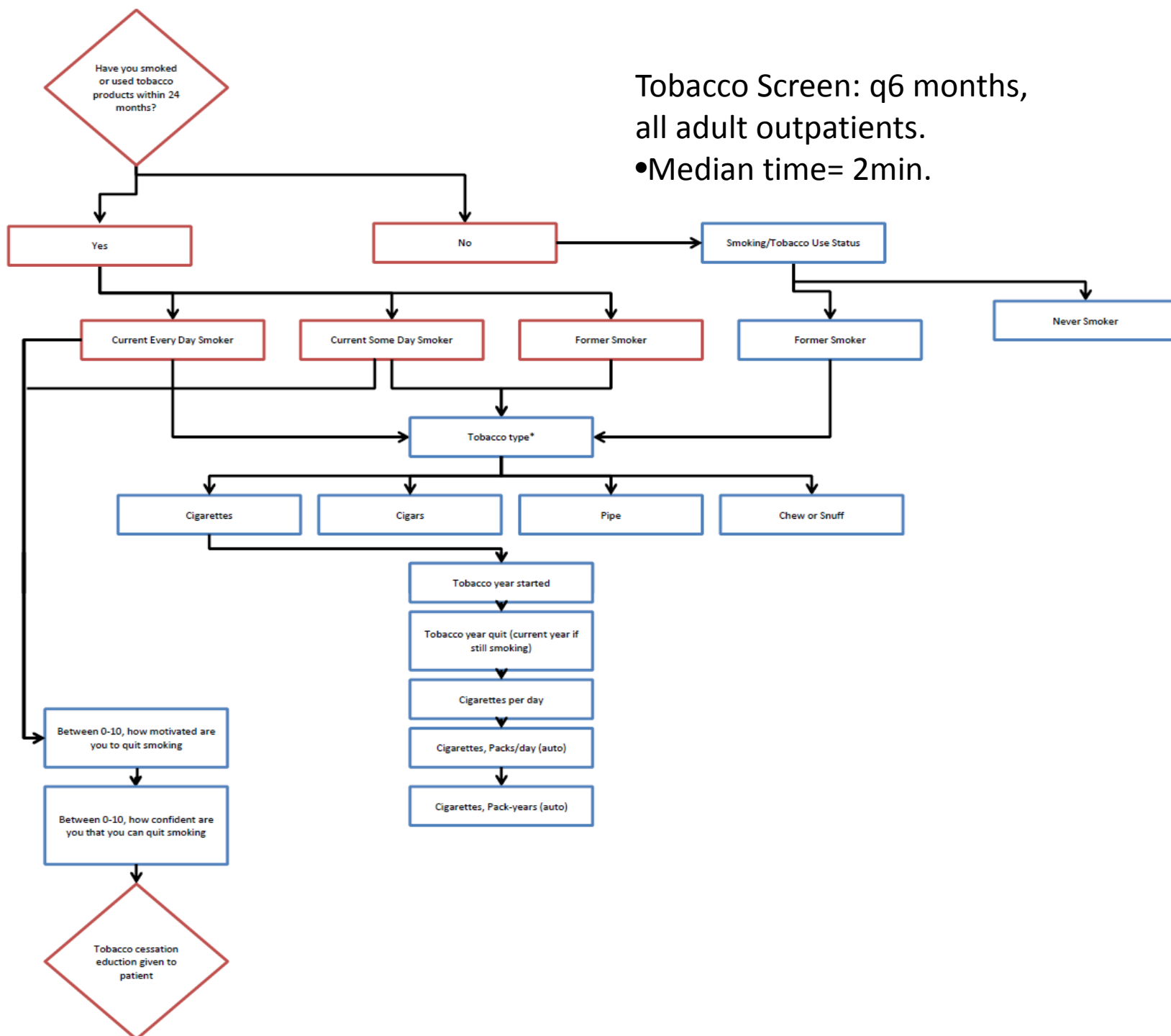
- Can we build upon meaningful use tobacco questions to document a detailed tobacco history and identify patients eligible for LCS?



Our Program

- Tobacco Exposure Program
 - Integrated LCS and Tobacco Cessation
- Nurse Practitioner Run
- NCCN LCS Eligibility Criteria
 - We did not use an upper age limit or exclude patients from LCS because of severe COPD or comorbidities
- NCCN-based nodule management
- Minimal external advertisement
- Cancer Center
- No Primary Care Affiliation





Tobacco Screen: q6 months,
all adult outpatients.

•Median time= 2min.

Methods

- IT department generated reports
 - Age ≥ 50 years, ≥ 20 py smoking (NCCN criteria)
- Searched EHR to exclude patients undergoing active treatment for cancer, CT chest within 1 year in system.
- Contacted patients, verified eligibility, out-of-pocket expense



Results

- First 3 months (before tobacco screen):
 - 4 patients enrolled
- Next 7 months (after tobacco screen):
 - 110 patients enrolled
 - 58 (53%) identified by Tobacco Screen
 - 32 (29%) self-referred
 - 20 (18%) physician referrals



Results

- Age
 - Median age 65
 - Maximum age 89
 - 5 patients ≥ 80 years old
- All patients >80 years old were independent and in good health



Results

- “Positive” scan in 32% (n=34)
 - High prevalence granulomatous disease
- Repeat LDCT in 3 months if nodule <15mm per protocol
- Transthoracic needle biopsy in 3 patients (2.6%)
- 3/3 had stage I NSCLC

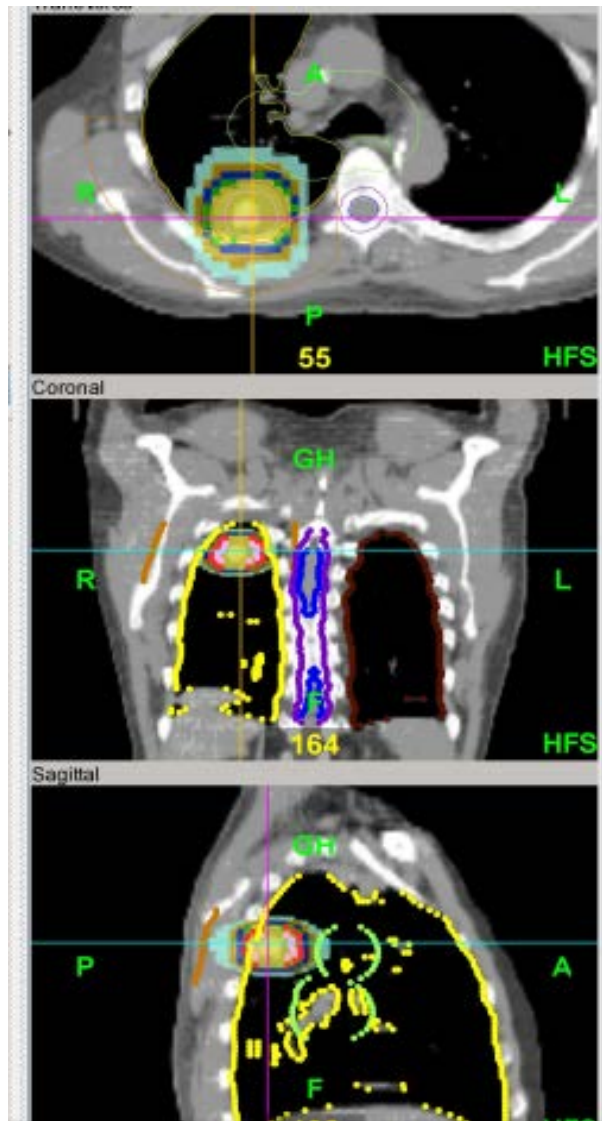


Results: patients with lung cancer

- All 3 patients underwent endobronchial ultrasound (EBUS) for mediastinal staging
- All 3 patients treated with stereotactic body radiation therapy (SBRT)
 - 2 patients had severe COPD, on home oxygen
 - 1 patient refused surgery



Stereotactic Body Radiotherapy (SBRT)



- Focused, high dose radiation with pin-point accuracy.
- Standard of care for patients at high risk for surgical resection
- Not mentioned in USPSTF report on screening
- High risk patients can and should receive curative treatment for stage I NSCLC



Efficacy of SBRT well described

Dose fractionation regimens and crude local control

	Patient (#)	Median FU (months)	Tumor size (cm)	Prescribed dose/# fractions	Prescription	BED _{iso} (Gy _{iso})	BED _{periphery} (Gy _{iso})	Crude local control (%)
<i>Median follow-up ≥30 months</i>								
Baumann et al. [29]	138	33	≤9 Median 3.7	45 Gy/3 30 Gy/3 40 Gy/4	100% isodose at PTV periphery; 140–150% at the isocenter	219.4 112.5 150	112.5 60 80	88
Baumann et al. [30]	57	35	≤5 Median 2.5	45 Gy/3	67% isodose line at PTV periphery	219.4	112.5	93
Fakiris et al. [31]	70	50.2	≤7	T1: 60 Gy/3 T2: 66 Gy/3	80% isodose includes ≥95% PTV	262.5 309.4	180 211.2	94.3
Kopeck et al. [32]	89	44	n/a	45 Gy/3 67.5 Gy/3	Isocenter	112.5 219.4	60.5 113.4	94.4
Koto et al. [33]	31	32	≤5	45 Gy/3 60 Gy/8	Isocenter	112.5 105	95.2 90.5	71
Nagata et al. [34]	45	30	≤4	48 Gy/4	Isocenter	105.6	n/a	98
Nyman et al. [35]	45	43	≤6	45 Gy/3	100% isodose at PTV periphery; 140% at the isocenter	195.3	112.5	80
Onishi et al. [36]	257	38	≤5.8 Median 2.8	30–84 Gy/1–14	Isocenter	57.6–180	n/a	86
Salazar et al. [37]	102	38	<5	40 Gy/4	70% isodose at PTV periphery	124.0	80	82 (Stage I)
Takeda et al. [38]	63	39	n/a	50 Gy/5	80% isodose at PTV periphery	140.6	100	95.2
Uematsu et al. [39]	131	90	n/a	50–60 Gy/5–10	80% isodose at PTV periphery	7101.6– 200.2	775–140.6	96.2
Chen et al. [40]	65	47	n/a	48–64 Gy/6–15	95% isodose at PTV periphery	80.1–123.6	75.0–115.2	87.7
<i>Median follow-up <30 months</i>								
Chang et al. [41]	Stage I: 13/ 27	17	<4	40 Gy/4 50 Gy/4	75–90% isodose at PTV periphery	~105.6 150.0	~80 112.5	57 100
Collins et al. [42]	20	25	≤3.5 Median 2.2	42–60 Gy/3	PTV periphery	n/a	100.8–180	100
Fritz et al. [43]	40	40	≤10	30 Gy/1	Isocenter	120	81.6	92.5
Fukumoto et al. [44]	22	24	≤5.85 Median 2.67	48 Gy/8 60 Gy/8	Isocenter	76.8 105	56.8 76.8	95.5
Hata et al. [45]	21	25	≤4.2 Median 2.5	50 Gy/10 60 Gy/10	≥90% isodose at CTV periphery	86.3 110	75.0 96.0	95.2
Hof et al. [46]	42	15	≤5	19–30 Gy/1	Isocenter	55.1–120	38.3–81.6	85.7
Hoyer et al. [47]	40	29	≤6	45 Gy/3	Isocenter	112.5	60.5	92.5
Lagerwaard et al. [48]	206	12	≤6	60 Gy/3 60 Gy/5 60 Gy/8 (central tumors)	80% isodose at PTV periphery	262.5 187.5 145.3	180 132 105	97
Le et al. [49]	Stage I: 20/ 32	18	≤6.2 Median 3.9	15–30 Gy/1	100% dose includes ≥95% PTV	64.1–215.6	37.5–120	75
McGarry et al. [50]	47	15.2	≤7	MTD 66 Gy/3	80% isodose includes ≥95% PTV	309.4	211.2	78.7
Ng et al. [51]	20	21	n/a	48–60 Gy/3–4	85–90% isodose includes ≥95% PTV	129.6–187.9	105.6–151.2	90
Onishi et al. [53]	35	13	≤6	60 Gy/10	80–85% isodose at PTV periphery	125.3	96.0	94
Pennathur et al. [54]	21	24	n/a	20 Gy/1 60 Gy/3	80% isodose at PTV periphery	87.5 262.5	60 180	58
Song et al. [55]	32	26.5	<5	60 Gy/3 40 Gy/4 48 Gy/4	85% isodose includes ≥95% PTV	236.7 102.9 136.8	180 80 105.6	87.5
Xia et al. [56]	43	27	<10	50 Gy/10	50% isodose includes ≥95% PTV	200.0	75.0	95.2
Yoon et al. [57]	Stage I: 21/ 91	14	≤4.6 Median 2.3	30 Gy/3 40 Gy/4 48 Gy/4	90% isodose at CTV periphery	70.3 93.7 124.2	60 80 105.6	85.7 (Stage I)
Zimmermann et al. [58]	68	17	n/a	37.5 Gy/3 35 Gy/5	60% isodose at PTV periphery	193.4 126.8	84.4 59.5	94



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Conclusions

- Augmenting meaningful use tobacco questions is feasible
 - Increased participation in our LCS program
 - Facilitated enrollment in tobacco cessation
 - Useful for future research
- Limitations
 - Resource consuming
 - Need to improve methods of enrolling patients identified as eligible



Discussion

- Severe COPD, co-morbidities, or advanced age are **NOT contraindications** to LCS
- Detected Stage I lung cancers can be treated with SBRT effectively
- Elderly and high-risk patients historically have excellent outcomes with minimally invasive lung resection for stage I lung cancer



Future Plans and Needs

- Automated alerts in EMR to primary providers to encourage enrollment of high risk patients
- Primary care physicians need incentive and education on Lung Cancer Screening
 - Few are referring patients for screening
- Public needs education on the benefits of Lung Cancer Screening
 - Screening and tobacco cessation efforts should be joint public health efforts

