CHEST Online Supplement

Decision Support Tools for Low-Dose CT Lung Cancer Screening

A Scoping Review of Information Content, Format, and Presentation Methods

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e-Table 1: Search terms, search strategy and number of articles retrieved by databases

	Search term	Number of papers retrieved			
		Pubmed	PsychInfo	Embase	CINAHL Plus
1	Lung neoplas* . ti,ab	1852	7	914	96
2	lung cancer . ti,ab	127444	2360	202274	39028
3	lung carcinoma . ti, ab	12382	74	17464	1561
4	lung adenocarcinoma . ti,ab	15095	31	22587	2999
5	lung malignancy . ti, ab	419	8	914	119
6	lung tumo?r . ti, ab	5001	26	7932	588
7	lung sarcoma . ti,ab	38	0	55	5
8	non-small cell lung cancer . ti, ab	53349	254	85767	16384
9	non small cell lung cancer . ti,ab				
10	lung AND squamous cell cancer . ti, ab	293	0	545	32
11	lung AND large cell carcinoma . ti, ab	709	2	1431	17
12	1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11	145437	2337	228860	42540
13	screen* . ti, ab	632078	78951	928450	170060
14	mass screen* . ti, ab	2663	75	2615	393
15	population screen* . ti, ab	2574	244	3980	745
16	screening program* . ti, ab	22249	1822	34799	8340
17	detect* . ti, ab	1693890	108518	2286663	218650
18	test* . ti, ab	2372656	507650	3496093	556064
19	early diagnosis . ti, ab	54661	2852	84386	12609
20	health check	2837	304	4233	1107
21	screening pilot	155	12	296	77
22	screening demonstration pilot	9	0	6	1
23	13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22	4092841	637445	5775220	831582
24	LDCT . ti, ab	961	26	1757	406
25	low dose CT . ti, ab	1973	15	4085	744
26	low-dose CT . ti, ab				
27	low dose computeri?ed tomog* . ti, ab	7	4	81	20
28	low-dose computeri?ed tomog* . ti, ab				
29	low dose computed tomog* . ti, ab	1364	35	1972	640
30	low-dose computed tomog* . ti, ab				
31	CT scan . ti, ab	37444	819	84882	9476
32	spiral CT . ti, ab (not included)	1859	6	2669	347
32a	chest CT . ti,ab	**6709**	**25**	**14779**	**2034**
33	24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32a (32 removed)	41837	881	100558	**12257**
34	inform* . ti, ab	1247731	446234	1764606	471882
35	decision* . ti, ab	331445	160169	472188	143391
36	provision* . ti, ab	81053	34830	110649	47112
37	decision making . ti, ab	129812	68584	175212	57854
38	decision-making . ti, ab				
39	decid*	64056	20891	107451	19843
40	educat*	461865	348422	657568	315203

41	34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40	1893216	852684	2731287	858553
42	(decision OR decision-making OR decision making OR information) AND (resource OR tool OR support tool OR aid OR intervention) . ti, ab	169039	51621	238928	99024
43	(video OR film OR campaign OR leaflet OR material OR pamphlet OR booklet OR brochure OR fl?er) AND (decision OR inform*) . ti, ab	56330	19501	132430	480538
44	42 OR 43	216895	68363	352421	145545
45	individual decision making . ti, ab	326	384	418	120
46	individual decision-making . ti, ab				
47	IDM . ti, ab	448	114	640	164
48	shared decision making . ti, ab	9307	2415	12254	5387
49	shared decision-making . ti, ab				
50	SDM . ti, ab	2775	685	3569	1052
51	decision intervention* . ti, ab	19	6	28	11
52	45 OR 46 OR 47 48 OR 49 OR 50 OR 51	11564	3147	15063	5971
53	questionnaire . ti, ab	353898	138574	542051	
54	survey . ti, ab	452361	193601	582022	
55	interview* . ti, ab	299344	252158	399434	
56	focus group . ti, ab	25448	17132	32350	
57	self-report* . ti, ab	149808	129484	201687	
58	self report . ti, ab				
59	randomi?ed controlled trial . ti, ab	105049	21227	134714	
60	randomi?ed trial . ti, ab	46100	6312	66239	
61	randomi?ed controlled study . ti, ab	10805	1456	15376	
62	randomi?ed study . ti, ab	20997	1357	33294	
63	RCT . ti, ab	24433	4486	39769	
64	intervention stud* . ti, ab	19013	6529	24347	
65	experiment* . ti, ab	1445892	253777	1678039	
66	think?aloud	1038	10	17	
67	53 OR 54 OR 55 OR 56 OR 57 OR 58 OR 59 OR 60 OR 61 OR 62 OR 63 OR 64 OR 65 OR 66	2603742	840798	3302998	
68	uptake . ti, ab	241582	13126	326974	33829
69	attend* . ti, ab	144471	72495	241129	71652
70	participa* . ti, ab	1148752	622146	1558695	524241
71	inten* . ti, ab	791449	197336	1085409	228758
72	opt out . ti, ab	1570	587	2474	1056
73	opt in . ti, ab	733	292	1104	2535
74	visit . ti, ab	87496	15642	166200	73883
75	choice . ti, ab	210816	71580	296380	71836
76	choose . ti, ab	33762	20883	48850	13892
77	chose . ti, ab	19470	9754	31988	6438
78	68 OR 69 70 OR 71 OR 72 OR 73 OR 74 OR 75 OR 76 OR 77	2414261	892232	3356611	106269

79	knowledge . ti, ab	613256	227781	787437	195919
80	comprehen* . ti, ab	339635	112471	451216	96972
81	understand* . ti, ab	1100906	437577	1379176	2655077
82	prefer* . ti, ab	356662	105220	461678	79367
83	deci* . ti, ab	425570	180509	616793	164561
84	engag* . ti, ab	176257	179433	229439	92875
85	attitud* . ti, ab	115884	119537	150570	71974
86	belief* . ti, ab	70366	93335	89073	43183
87	perception*. ti, ab	223265	206521	276425	112708
88	perceiv* . ti, ab	205875	190084	260627	113183
89	aware* . ti, ab	199144	97662	294705	97012
90	interest* . ti, ab	660977	188118	937879	115005
91	willing* . ti, ab	37540	26991	55796	18577
92	value . ti, ab	706957	133323	1044411	285513
93	certain . ti, ab	263384	69002	341655	48935
94	decisional conflict . ti, ab	1107	394	1566	675
95	79 OR 80 OR 81 OR 82 OR 83 OR 84 OR 85 OR 86 OR 87 OR 88 OR 89 OR 90 OR 91 OR 92 OR 93 OR 94	4224600	1480524	5640399	1268911
96	develop* . ti, ab	3430411	768967	4601156	
97	design* . ti, ab	1599852	365058	2037124	
98	create* . ti, ab	286692	106699	406503	
99	devise* . ti, ab	25991	5471	34341	
100	produce* . ti, ab	832838	126410	1022412	
101	96 OR 97 OR 98 OR 99 OR 100	5354178	1154249	7011059	

FINAL SEARCH STRING (106)

12 AND (23 OR 33) AND 44 AND (41 OR 52) AND (78 OR 95)

Lung cancer terms AND (screening/early detection OR LDCT/CT terms) AND decision resources/tools terms AND (decision-making terms OR individual and shared decision-making terms) AND (uptake/choice outcome terms OR knowledge/engagement/interest outcome terms)

EXCLUDED SEARCH TERMS
- Study design terms (67) were excluded as we were inclusive of all study designs.
- Similar resource 'design' terms (101) were excluded as these narrowed the search too much.

e-Table 2A: Data charting* and extraction framework for contextual information
(*derived from the Template for Intervention Description and Reporting (TIDIER) framework[19])

Heading	Sub-categories	Description
REFERENCES	Study author(s)	Study author(s)
	Study (title)	Title of the article or intervention
	Study (year)	Year the article was published
	DST name	Name of the decision support tool
	DST source	Study reference for decision support tool or details of where it is openly available
WHAT	Study design	Design of study (e.g., cross-sectional, quasi-experimental or observational)
WHY	Study aim/objectives	Rationale of the study in relation to the decision support tool being developed/used/tested
FOR WHOM	Study population description	Study inclusion criteria (including any specific lung cancer screening eligibility criteria used)
	Study sample size	Final number of participants included in the study
	Study sample characteristics	Age, gender, ethnicity, smoking status, socioeconomic factors
WHERE	Study country of origin	Country in which the study of the decision support tool took place
	Study setting	Setting where the study of the decision support tool took place (e.g., healthcare consultation)
WHAT	DST description	The nature of the decision support tool including its components
	DST objectives/ purpose	The purpose the decision support tool
	DST content	The topics of information included within the decision support tool (see e-Table 2B)
	DST decision-making context	Was the decision support tool designed to promote decision-making in the individual decision-making context or shared decision-making context?
	DST theoretical basis	Was a theoretical framework described by the study as being used to design or develop the decision support tool
	DST standards/ guidelines	Was the decision support tool developed according to standards or guidelines?
HOW	DST mode of delivery	What mode was used to deliver the resource (e.g., face-to-face, telephone, paper, video, internet)?
	DST presentation methods	What methods were used to present the information in the decision support tool (see e-Table 2C)
WHO	DST target population	Description of the target population for which the decision support tool is intended (including any specific lung cancer screening eligibility criteria used)
WHEN	When is the DST used in the study?	At what point is the decision aid/resource delivered? E.g. openly available, before or after consultation

e-Table 2B: Data charting* and extraction table for the topics of information content included within each decision support tool

(*categories derived from the Template for Intervention Description and Reporting (TIDIER) framework[19] and International Patient Decision Aids Standards instrument (IPDASi)[13]

Heading	Sub-categories	Description
Lung cancer screening eligibility	Eligibility criteria	Were the eligibility criteria for lung cancer screening described and what were these criteria?
	Eligibility calculator	Was guidance included for working out eligibility for lung cancer screening (e.g., smoking pack-year calculator to estimate smoking exposure/history)?
Lung cancer screening benefits[a]	Early diagnosis	Was the benefit of diagnosing lung cancer at an early stage described?
	Any other benefits mentioned	Were any additional benefits of lung cancer screening described?
Lung cancer screening harms/risks[a]	Radiation	Was the risk of the level of radiation exposure during screening described?
	Psychological harm	Was the risk of psychological distress described and in relation to which aspect of the screening pathway (e.g., screening process, waiting for results and potential further tests and procedures)? What type of psychological distress was described (e.g., stress, anxiety, worry)?
	False positive	Was the risk of a false positive result described (i.e., when cancer is suspected and individual undergoes unnecessary diagnostic work-up but no cancer is present)?
	False negative	Was the risk of a false negative result described (i.e., no abnormality found when in fact, cancer is present)?
	Overdiagnosis	Was the risk of over-diagnosis described (i.e., the detection of lung cancer that would not have caused any harm in a person's lifetime)?
	Harms from follow-up tests/ diagnostic procedures	Was the risk of harm from further testing after the screening described (including biopsies, surgery and potential complications)?
	Death even when lung cancer is detected	Was the risk of death even when lung cancer is detected through screening described?
Lung cancer information	Development	Was an explanation of how lung cancer develops given?
	Incidence or prevalence	Was therequency of lung cancer diagnosis within a population given?

	Survival in population	Was the number of people diagnosed with lung cancer who receive treatment and survive described?
	Survival from early stage	Was the number of people who survive lung cancer detected at an early stage described?
	Symptoms	Were the warning signs or symptoms of lung cancer described?
	Tobacco smoking as a risk factor	Was tobacco smoking described as a risk factor for lung cancer?
	Risk factors other than tobacco smoking	Were any other risk factors for lung cancer described?
	Questions/ tools for calculating individual risk	Was any tool provided forto calculate an individual's risk of developing lung cancer?
Screening procedure	Information about the LDCT scan	Was information provided about what a LDCT scan is and its use?
	Information about what having a LDCT scan is like (procedure)	Was information provided about what LDCT scans involve including what is expected of the patient, how the scan works and the length of time?
	Information on what happens after screening (including follow up)	Was information provided about how long it takes to receive the results of screening and the need for yearly follow up screenings?
Screening results[a]	Negative/ normal	Was an explanation of a negative/normal screening result given, including its implications and the next steps?
	Incidental/non-cancer finding	Was the possibility of finding other problems on the scan (not just lung cancer) that may need treatment explained?
	Indeterminate finding/ surveillance of low-risk pulmonary nodule	Was the possibility of needing further LDCT scans due to a low risk pulmonary nodule that requires surveillance explained?
	Abnormal (urgent referral/ suspected cancer)	Was the possibility of abnormal findings that require further testing explained, including the next steps?
	Lung cancer diagnosis	Was the possibility of needing diagnostic tests explained, including the types of test (e.g., biopsy)?
	Lung cancer treatment options	Were the different treatment options for lung cancer explained?
Smoking cessation	Benefits	Were the positive effects of quitting smoking described?
	Recommendation to stop smoking/ stay quit	Did the DST advice stopping smoking or staying quit?
	Information about how to stop smoking	Was information given about how to stop smoking and/or the type of support available?

	Contact information/ signposting for smoking cessation support/ services	Were contact details (e.g., phone number, email, or websites) given for how to access smoking cessation organisations?
Values clarification	Implicit or explicit	Does the decision support tool implicitly support or explicitly advise (including strategies) the weighing up of the benefits and harms of lung cancer screening based on personal value systems (what matters most to the individual)?
Guidance in deliberation/ communication		Is guidance given to assist the individual in thinking about the options available, communicating the information to others and coming to a decision?
Personal stories		Are personal stories of individuals' experiences of lung cancer screening and lung cancer diagnosis/treatment included?
Strategies to help understanding	Reading level	Was the reading level of the decision support tool stated?
	Different languages	Is the decision support tool available in languages other than English?
Decision prompts		Does the decision support tool prompt individuals to make a decision?
Shared decision-making prompt		Are factors included which aid the individual in having a conversation with their healthcare profession about lung cancer screening (e.g., list of questions/discussion points)?
Screening guidelines		Did the decision support tool include information about or adhere to national screening recommendations/guidelines?
Research evidence		Is the information provided described as being based on research evidence?
Other components		Any other aspect within the decision support tool that was previously not recorded or unique to a specific decision support tool

[a]The methods used to present this information (including their probability) were also extracted. Please see Supplementary Tables 2C for details of these categories

e-Table 2C: Data charting* and extraction table for the methods of information presentation (for lung cancer screening benefits, risks and types of result)

Heading	Sub-categories	Description
Methods used to quantify probability	Verbal	Verbal value labels (e.g., "higher than")
	Numerical	Numerical methods (i.e., percentages, natural frequencies, absolute numbers)
	Absolute/relative/ no probability	Whether or not quantified, and if so whether absolute risk or relative risk (i.e., in relation to another population) used
Method of information presentation	Verbal	Written text and/or audio (i.e., narration)
	Visual	Visual methods for presenting or comparing illustration proportions/quantity XX, including bar charts, icon arrays, table, cross-comparison grid, image/illustration

(*categories derived from and a systematic review of communicative aspects of decision aids for prostate cancer[20])

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e-Table 3: Summary of studies and decision support tool (DST) characteristics

Studies	Country	Design	Sample size	Purpose of DST	DST name/number	DST Description
Sakoda et al., 2019	USA	Quality improvement evaluation	680 patients	Used within a patient education class taught by a clinician specialists (e.g., pulmonologist) for patients who are interested in lung cancer screening (LCS) to attend before a personal face-to-face shared decision making (SDM) visit occurs.	1. Lung cancer screening: Is it right for me?	32 slide PowerPoint presentation
					2. Is Lung Cancer Screening Right for Me?	4-page patient leaflet
Carter-Harris et al., 2017	USA	Development Study protocol	10 participants	To prepare individuals for the SDM process about lung cancer screening.	3. LungTalk	Interactive narrated web program including audio, video, and animation segments (approx. 17 slides)
Mazzone et al., 2017 [1*]	USA	Quantitative survey	113 patients	To describe the benefits and harms of lung cancer screening during face-to-face counselling.	4. Making a value-based decision about lung cancer screening	6-min narrated video slide show
				To assist patients with the decision about participation in screening during a face-to-face counselling and SDM visits	5. Should I screen?	Web-based tool in a question-and-answer format
Lau et al., 2015 [1]	USA	Quasi-experimental design: a before-after study	60 participants	To assist patients in making informed decisions regarding LCS by helping individuals to accurately recognize their own lung cancer risk, and the harms		

Studies	Country	Design	Sample size	Purpose of DST	DST name/number	DST Description
Lau et al., 2014 [1]	USA	Qualitative focus group (alpha testing)	10 participants	and benefits of screening, while considering their personal values and preferences.		
Crothers et al.,2016 [1,2]*	USA	Mixed-methods approach	45 participants	To promote SDM and evaluate whether patient-centred communication using decision aids improves understanding of lung cancer screening benefits and harms.	5. Should I screen?	Web-based tool in a question-and-answer format
					6. Screening for lung Cancer	6-page print by the Veterans Affairs (VA) Health Administration
Greene et al.,2019 [2]	USA	Qualitative interview study	37 participants	Used by clinicians to help patients make informed decisions about whether to be screened by providing information about the harms and benefits of LCS and encourage patients to consider their personal preferences and values relevant to screening		
Lillie et al., 2017 [2]	USA	Observational survey study	588 patients	Used before a call with the LCS coordinator for a discussion about screening. DST used to identify which factors patients consider most important in making LCS decisions.		
	USA					

Studies	Country	Design	Sample size	Purpose of DST	DST name/number	DST Description
Tanner et al., 2019 [2*]		Prospective observational study	137 participants	To support patient-provider communication, understanding of the benefits and harms of LCS and understanding of cultural beliefs and values regarding screening.	7. Lung cancer screening program (Hollings Cancer Center)	2-page brochure
Dharod et al., 2019	USA	Single-arm pragmatic study	81 patients	To inform patients of the risks and benefits of LCS prior to in-person shared decision making with a medical provider. Provides a personalized risk assessment to help them make a screening decision and receive screening.	8. mPATH Lung	Web interactive (eligibility questionnaire + 2 min video + personal risk questionnaire)
Fagan et al.,2019 [3*]	USA, Delaware	Feasibility study	28 patients	Used to clarify preferences for LDCT screening and identify factors explaining preference before and during a telephone-delivered, primary care SDM intervention.	9. Is lung cancer screening right for me? A Decision-making Tool for You and Your Health Care Professional	2 page printed educational material
					10. EBSCO - Lung cancer screening: Yes or no? -	1 page table aid
Han et al., 2019 [4]	USA	Mixed-methods, pre-post intervention study	Quantitative N=60 patients Qualitative N=17 patients	Used to structure conversations about the potential benefits, harms, and uncertainties of LDCT screening during pre-screening SDM counselling by pulmonary physicians	11. Frequently asked questions about lung cancer screening	1 page, paper-based, encounter Decision aid (EDA)

Studies	Country	Design	Sample size	Purpose of DST	DST name/number	DST Description
Fukunaga et al., 2021 [4]		A pre-post pilot intervention study	23 Participants	Designed to guide a structured conversation between the patient and clinician during in-person SDM counselling. Explains the benefits and harms of LCS and elicits participants' values and preferences about screening.		
Hart et al.,2016 [5]	USA	Development and evaluation	12 healthcare providers	To help individuals considering screening to be aware of associated costs, potential risks, and benefits and to make decisions that adhere to their values.	12. Computed Tomography Lung Cancer screening. Is it right for me?	1 page DST
Manners et al., 2019 [6]	Australia	Quasi-experimental pre-post pamphlet exposure design.	55 participants	To improve the shared decision-making process for those approached to consider lung cancer screening.	13. It's your choice.	11-page educational pamphlet
Studies	**Country**	**Design**	**Sample size**	**Purpose of DST**	**DST name/number**	**DST Description**
Reuland et al., 2018 [7]	USA	Quantitative pre-post study	50 participants	To help patients understand the benefits of screening and screening-related harms including false positives and overdiagnosis	14. Should I start having yearly screening for lung cancer? -	6-minute video
Ruparel et al., 2019 [8,9]*	UK	RCT	229 participants	To provide information on LCS, its benefits and harms to individuals considering screening in addition to a discussion with a healthcare professional (HCP) to support the decision-making process.	15. Lung cancer screening - the facts	5.46-minute video
					16. Lung Health Check: Information on what's involved	12-page information leaflet

Studies	Country	Design	Sample size	Purpose of DST	DST name/number	DST Description
Sharma et al., 2018 [10]	USA, New York State -	RCT	431 participants	To educate about the benefits, risks, and associated costs, of LCS and to assess the impact on participants seeking information regarding lung cancer screening.	17. Lung cancer screening - Early detection saves lives -	2-page educational brochure
Sharma et al., 2019 [10]	USA, Buffalo	Qualitative research study	21 participants			
Volk et al., 2020 [11]	USA	RCT	516 participants	To help smokers' preparation for having a conversation with a health care clinician about LCS.	18. Lung cancer screening: Is it right for me? -	9.27-minute video
Volk et al., 2014 [12]	USA	An uncontrolled, before-after design	52 patients	Designed to be used in primary care settings by candidates for lung cancer screening to promote informed screening decisions.	19. Lung cancer screening: Is it right for me?	5-minute video
Lowenstein et al., 2018 [12]	USA	RCT: A patient-centered outcomes research study	10 advisory group members, 516 participants (for RCT)	To prepare patients to have a conversation with their primary care provider and not to sway patients to be for or against lung cancer screening.		
Hoffman et al., 2018 [12]	USA	Quantitative survey	30 participants	To increase knowledge and understanding of decision-making values, and screening intentions		
Studies	**Country**	**Design**	**Sample size**	**Purpose of DST**	**DST name/number**	**DST Description**
Roberts et al., 2021 [13]	USA	Semi-structured interview	10 participants	To facilitate SDM by providing objective information to providers and patients	20. the Risk-Based NLST Outcomes Tool (RNOT)	Interactive risk assessment web tool

Raz et al., 2020	USA	RCT	1281 patients	To provide information on lung cancer, LCS, eligibility, what to expect, and decision-making assistance for eligible patients receiving smoking cessation counselling	21. Lung Cancer Screening: Options	Online educational video
Elliot et al., 2021	USA	Clinic-randomized trial	34 healthcare clinics	Used to give patient-specific treatment suggestions to help both patient and clinician understand the patient's risk for cancers. SDM tool provided overview of screening benefits, risks, and structured decision making.	22. The CPW and SDM tool: 'Lung cancer screening: making a choice'	2-page SDM leaflet
*Uses two DSTs within study						

List of websites and reference for the studies and decision support tools in e-Table 3

References for openly available DSTs

5. Should I screen?: https://shouldiscreen.com/English/home

6. Screening for lung Cancer :
https://www.prevention.va.gov/docs/LungCancerScreeningHandout.pdf

9. Is lung cancer screening right for me?: https://effectivehealthcare.ahrq.gov/decision-aids/lung-cancer-screening/decisionmaking-tool.html

11. FREQUENTLY ASKED QUESTIONS ABOUT LUNG CANCER SCREENING - Fukunaga 2021.pdf

12. Tomography Lung Cancr screening. Is it right for me? - Hart.pdf

13. IT'S YOUR CHOICE: Manners -its your choice.pdf

14. Should I start having yearly screening for lung cancer? -
https://vimeo.com/192026567/7754172812

15. Lung cancer screening - the facts - https://www.youtube.com/watch?v=U3oirXkufno

16. Lung Health Check: Information on what's involved:
file:///C:/Users/mbasa/Downloads/AnnalsATS.201811-841OC_ruparel_data_supplement.pdf

17. Lung cancer screening - Early detection saves lives -
https://link.springer.com/article/10.1007/s13187-018-1362-4/figures/1

18. Lung cancer screening: Is it right for me? -
https://www.youtube.com/watch?v=wir3w1eUAJk&feature=youtu.be

19. Lung cancer screening: Is it right for me?:
https://www.youtube.com/watch?v=IczfHH4_Lfg

20. the Risk-Based NLST Outcomes Tool (RNOT):
https://analysistools.cancer.gov/lungCancerScreening/#!/

22.The Lung Cancer Risk Assessment Tool (LCRAT):
https://www.aats.org/aatsimis/AATSWeb/Resources/Lung_Cancer_Screening/AATSWeb/Association/About/Resources/Lung_Cancer_Risk_Assessment_Tool.aspx?hkey=29f118a8-d7a6-4bcd-a9b3-7e85484881b8

References for studies reporting the DSTs

1. Roberts MC, Seaman EL, Klein WM, Ferrer RA, Han PK, Katki HA, Land SR, Liotta RA, Nations JA, Peterson PG. Patient Perspectives on the Risk-Based NLST Outcomes Tool for Lung Cancer Screening. Journal of Cancer Education. 2021 Mar 9:1-8.

2. Elliott TE, O'Connor PJ, Asche SE, Saman DM, Dehmer SP, Ekstrom HL, Allen CI, Bianco JA, Chrenka EA, Freitag LA, Harry ML. Design and rationale of an intervention to improve cancer prevention using clinical decision support and shared decision making: A clinic-randomized trial. Contemporary Clinical Trials. 2021 Mar 1;102:106271.

3. Raz DJ, Ismail MH, Haupt EC, Sun V, Park S, Alem AC, Gould MK. Improving Utilization of Lung Cancer Screening Through Incorporating a Video-Based Educational Tool Into Smoking Cessation Counseling. Clinical Lung Cancer. 2021 Mar 1;22(2):83-91.

4. Fukunaga MI, Balwan A, Janis JA, Gutheil C, Yahwak J, Han PK. Pilot Study of an Encounter Decision Aid for Lung Cancer Screening. Journal of Cancer Education. 2021 Jan 7:1-5.

5. Sakoda LC, Meyer MA, Chawla N, Sanchez MA, Blatchins MA, Nayak S, San K, Zin GK, Minowada G. Effectiveness of a patient education class to enhance knowledge about lung cancer screening: a quality improvement evaluation. Journal of Cancer Education. 2019 May 9:1-8.

6. Carter-Harris, L., Comer, R. S., Goyal, A., Vode, E. C., Hanna, N., Ceppa, D., & Rawl, S. M. (2017). Development and usability testing of a computer-tailored decision support tool for lung cancer screening: study protocol. *JMIR research protocols*, 6(11), e225.

7. Crothers K, Kross EK, Reisch LM, Shahrir S, Slatore C, Zeliadt SB, Triplette M, Meza R, Elmore JG. Patients' attitudes regarding lung cancer screening and decision aids. A survey and focus group study. Annals of the American Thoracic Society. 2016 Nov;13(11):1992-2001.

8. Dharod A, Bellinger C, Foley K, Case LD, Miller D. The reach and feasibility of an interactive lung cancer screening decision aid delivered by patient portal. Applied clinical informatics. 2019 Jan;10(01):019-27.

9. Fagan HB, Fournakis NA, Jurkovitz C, Petrich AM, Zhang Z, Katurakes N, Myers RE. Telephone-based shared decision-making for lung cancer screening in primary care. Journal of Cancer Education. 2019 May 9:1-8.

10. Greene PA, Sayre G, Heffner JL, Klein DE, Krebs P, Au DH, Zeliadt SB. Challenges to educating smokers about lung cancer screening: A qualitative study of decision making experiences in primary care. Journal of Cancer Education. 2019 Dec;34(6):1142-9.

11. Han PK, Lary C, Black A, Gutheil C, Mandeville H, Yahwak J, Fukunaga M. Effects of personalized risk information on patients referred for lung cancer screening with low-dose CT. Medical Decision Making. 2019 Nov;39(8):950-61.

12. Hart K, Tofthagen C, Wang HL. Development and Evaluation of a Lung Cancer Screening Decision Aid. Clinical journal of oncology nursing. 2016 Oct 1;20(5).

13. Lau YK, Caverly TJ, Cao P, Cherng ST, West M, Gaber C, Arenberg D, Meza R. Evaluation of a personalized, web-based decision aid for lung cancer screening. American journal of preventive medicine. 2015 Dec 1;49(6):e125-9.

14. Lau YK, Caverly TJ, Cherng ST, Cao P, West M, Arenberg D, Meza R. Development and validation of a personalized, web-based decision aid for lung cancer screening using mixed methods: a study protocol. JMIR research protocols. 2014;3(4):e78.

15. Lillie SE, Fu SS, Fabbrini AE, Rice KL, Clothier B, Nelson DB, Doro EA, Moughrabieh MA, Partin MR. What factors do patients consider most important in making lung cancer screening decisions? Findings from a demonstration project conducted in the Veterans Health Administration. Lung Cancer. 2017 Feb 1;104:38-44.

16. Manners D, Pettigrew S, Lake FR, Piccolo F, McWilliams AM, Brims FJ. Development and evaluation of a consumer information resource, including Patient Decision Aid, for lung cancer screening: a quasi-experimental study. Translational behavioral medicine. 2020 Apr;10(2):404-12.

17. Mazzone PJ, Tenenbaum A, Seeley M, Petersen H, Lyon C, Han X, Wang XF. Impact of a lung cancer screening counseling and shared decision-making visit. Chest. 2017 Mar 1;151(3):572-8.

18. Reuland DS, Cubillos L, Brenner AT, Harris RP, Minish B, Pignone MP. A pre-post study testing a lung cancer screening decision aid in primary care. BMC medical informatics and decision making. 2018 Dec;18(1):1-9.

19. Ruparel M, Quaife SL, Ghimire B, Dickson JL, Bhowmik A, Navani N, Baldwin DR, Duffy S, Waller J, Janes SM. Impact of a lung cancer screening information film on informed decision-making: a randomized trial. Annals of the American Thoracic Society. 2019 Jun;16(6):744-51.

20. Sharma A, Bansal-Travers M, Celestino P, Fine J, Reid ME, Hyland A, O'Connor R. Using a smoking cessation quitline to promote lung cancer screening. American journal of health behavior. 2018 Nov 1;42(6):85-100.

21. Sharma A, O'Connor R, Celestino P, Killion S, Griswold-Krupski L, Bansal-Travers M. Focus groups and in-depth interviews to guide the development of lung cancer screening informational materials. Journal of Cancer Education. 2019 Aug;34(4):712-8.

22. Volk RJ, Lowenstein LM, Leal VB, Escoto KH, Cantor SB, Munden RF, Rabius VA, Bailey L, Cinciripini PM, Lin H, Housten AJ. Effect of a patient decision aid on lung cancer screening decision-making by persons who smoke: a randomized clinical trial. JAMA network open. 2020 Jan 3;3(1):e1920362-.

23. Tanner NT, Banas E, Yeager D, Dai L, Halbert CH, Silvestri GA. In-person and telephonic shared decision-making visits for people considering lung cancer screening: an assessment of decision quality. Chest. 2019 Jan 1;155(1):236-8.

24. Volk RJ, Linder SK, Leal VB, Rabius V, Cinciripini PM, Kamath GR, Munden RF, Bevers TB. Feasibility of a patient decision aid about lung cancer screening with low-dose computed tomography. Preventive medicine. 2014 May 1;62:60-3.

25. Lowenstein LM, Escoto KH, Leal VB, Bailey L, Bevers TB, Cantor SB, Cinciripini PM, Jacobs LE, Esparza A, Godoy MC, Housten AJ. Randomized trial of a patient-centered decision aid for promoting informed decisions about lung cancer screening: implementation of a PCORI study protocol and lessons learned. Contemporary clinical trials. 2018 Sep 1;72:26-34.

26. Hoffman AS, Hempstead AP, Housten AJ, Richards VF, Lowenstein LM, Leal VB, Volk RJ. Using a patient decision aid video to assess current and former smokers' values about the harms and benefits of lung cancer screening with low-dose computed tomography. MDM policy & practice. 2018 Apr;3(1):2381468318769886.

e-Table 4: Summary of the components within each decision support tool (DST)

		DST number (see e-Table 3 for corresponding DST name and information)																					TOTAL
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Screening eligibility	**Criteria**	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	20
	Pack year Calculator	X	X										X				X	X						5
Benefits	**Early diagnosis**	X	X	X	X	X			X		X	X	X	X		X	X	X	X	X		X		16
	Any other benefits mentioned	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	20
Harms	**Radiation**	X	X	X	X	X	X		X	X		X	X	X	X	X	X		X	X		X	X	18
	Psychological harm	X	X	X	X	X	X					X		X	X	X	X					X		12
	False positive	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	21
	False negative										X	X		X		X			X					5
	Overdiagnosis	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X			X	X	18
	Harms from follow-up tests	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X		X		18
	Death even when cancer detected	X	X						X	X	X				X									6
Lung cancer information	**Causes of LC**			X		X	X			X				X		X		X				X	X	9
	Incidence or prevalence	X		X	X		X	X	X				X	X		X	X	X	X	X			X	14

Category	Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Total
	Survival in population	X									X	X		X			X							5
	Survival from early stage				X		X			X		X	X										X	6
	Symptoms	X		X		X	X								X							X		6
	Tobacco smoking as a risk factor	X	X	X		X			X			X	X	X	X	X	X	X	X			X		14
	Risk factors other than tobacco smoking					X						X				X		X	X					5
	Tools for calculating individual risk					X			X											X				3
Screening procedure	**Information about LDCT scan**	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	20
	Information about what having a LDCT scan is like (procedure)	X		X		X	X	X	X		X		X	X		X	X	X	X	X		X	X	16
	Information on what happens after screening (including follow up)	X		X		X	X	X	X	X			X	X	X	X		X	X			X	X	15
	Information of where to get screened (i.e., facilities offering screening)					X		X	X					X										4

Category	Subcategory	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
LDCT Screening results = 16	Negative/ normal									X		X	X		X	X		X	X	7
	Incidental/non-cancer finding	X	X		X	X	X			X	X	X	X		X			X	X	12
	Indeterminate/ pulmonary dule (needs surveillance but low risk)				X		X			X	X	X	X					X	X	8
	Abnormal (urgent referral/ suspected cancer)	X		X	X		X			X	X	X	X		X	X		X		11
	Lung cancer diagnosis				X		X		X	X		X	X				X	X	X	9
	Lung cancer treatment options									X	X	X						X		4
Smoking cessation = 18	Benefits of smoking cessation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		16
	Recommendation to stop smoking					X				X	X		X		X	X		X	X	8
	Information about how to stop smoking		X			X							X					X	X	5
	Contact information/ signposting for smoking cessation services		X			X	X		X	X	X	X		X	X	X	X			11

Category	Subcategory	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Values clarification (implicit or explicit)		X	X	X		X	X	X		X		X	X	X			X	X		X	X	14
Guidance in deliberation		X	X	X		X	X		X				X							X	X	9
Personal stories														X			X					2
Strategies to help understanding	**Reading level**												X							X		2
	Different languages	X	X		X										X							4
Decision prompts		X	X			X	X	X		X										X	X	8
SDM prompt with HCP		X		X			X		X			X	X	X	X	X	X	X	X	X	X	14
National guidelines		X	X						X											X		4
Research evidence		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	20

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