表1. 年齢別受診者数(2003年度

1-1. 間接X線検査

(年齢)	男性	女性	合計
～19	243	465	708
20～	5336	4473	9809
30～	5710	2788	8498
40～	3576	2190	5766
50～	3318	1660	4978
60～	763	244	1007
70～	47	32	79
80～	2	4	6
合 計	18995	11856	30851

1-2. 直接X線検査

(年齢)	男性	女性	合計
～19	12	22	34
20～	710	498	1208
30～	2188	1198	3386
40～	3365	2225	5590
50～	3059	1727	4786
60～	1211	394	1605
70～	126	41	167
80～	11	2	13
合 計	10682	6107	16789

1-3. 間接・直接X線検査すべて

(年齢)	男性	女性	合計
～19	255	487	742
20～	6046	4971	11017
30～	7898	3986	11884
40～	6941	4415	11356
50～	6377	3387	9764
60～	1974	638	2612
70～	173	73	246
80～	13	6	19
合 計	29677	17963	47640

表2. 年齢性別有所見者数（率）

2-1. 間接X線検査

（年齢）	男性		女性		合計	
～19	16	(6.6)	39	(8.4)	55	(7.8)
20～	467	(8.8)	284	(6.3)	751	(7.7)
30～	855	(15.0)	295	(10.6)	1150	(13.5)
40～	903	(25.3)	401	(18.3)	1304	(22.6)
50～	1219	(36.7)	467	(28.1)	1686	(33.9)
60～	371	(48.6)	105	(43.0)	476	(47.3)
70～	27	(57.4)	23	(71.9)	50	(63.3)
80～	1	(50.0)	4	(100)	5	(83.3)
合 計	3859	(20.3)	1618	(13.6)	5477	(17.8)

（%）

2-2. 直接X線検査

（年齢）	男性		女性		合計	
～19	0	(0)	1	(4.5)	1	(2.9)
20～	70	(9.9)	22	(4.4)	92	(7.6)
30～	379	(17.3)	126	(10.5)	505	(14.9)
40～	809	(24.0)	378	(17.0)	1187	(21.2)
50～	1138	(37.2)	520	(30.1)	1658	(34.6)
60～	651	(53.8)	190	(48.2)	841	(52.4)
70～	82	(65.1)	36	(87.8)	118	(70.7)
80～	11	(100)	2	(100)	13	(100)
合 計	3140	(29.4)	1275	(20.9)	4415	(26.3)

（%）

2-3. 間接・直接X線検査すべて

（年齢）	男性		女性		合計	
～19	16	(6.3)	40	(8.2)	56	(7.5)
20～	537	(8.9)	306	(6.2)	843	(7.7)
30～	1234	(15.6)	421	(10.6)	1655	(13.9)
40～	1712	(24.7)	779	(17.6)	2491	(21.9)
50～	2357	(37.0)	987	(29.1)	3344	(34.2)
60～	1022	(51.8)	295	(46.2)	1317	(50.4)
70～	109	(63.0)	59	(80.8)	168	(68.3)
80～	12	(92.3)	6	(100)	18	(94.7)
合 計	6999	(23.6)	2893	(16.1)	9892	(20.8)

（%）

表3. 年齢性別要精検者数（率）

3-1. 間接X線検査

（年齢）	男性		女性		合計	
～19	1	(0.4)	5	(1.1)	6	(0.8)
20～	31	(0.6)	17	(0.4)	48	(0.5)
30～	48	(0.8)	23	(0.8)	71	(0.8)
40～	73	(2.0)	50	(2.3)	123	(2.1)
50～	110	(3.3)	53	(3.2)	163	(3.3)
60～	36	(4.7)	13	(5.3)	49	(4.9)
70～	5	(10.6)	1	(3.1)	6	(7.6)
80～	0	(0)	0	(0)	0	(0)
合 計	304	(1.6)	162	(1.4)	466	(1.5)

(%)

3-2. 直接X線検査

（年齢）	男性		女性		合計	
～19	0	(0)	0	(0.0)	0	(0.0)
20～	3	(0.4)	0	(0.0)	3	(0.2)
30～	20	(0.9)	5	(0.4)	25	(0.7)
40～	43	(1.3)	26	(1.2)	69	(1.2)
50～	95	(3.1)	35	(2.0)	130	(2.7)
60～	59	(4.9)	10	(2.5)	69	(4.3)
70～	9	(7.1)	2	(4.9)	11	(6.6)
80～	4	(36.4)	0	(0)	4	(30.8)
合 計	233	(2.2)	78	(1.3)	311	(1.9)

(%)

3-3. 間接・直接X線検査すべて

（年齢）	男性		女性		合計	
～19	1	(0.4)	5	(1.0)	6	(0.8)
20～	34	(0.6)	17	(0.3)	51	(0.5)
30～	68	(0.9)	28	(0.7)	96	(0.8)
40～	116	(1.7)	76	(1.7)	192	(1.7)
50～	205	(3.2)	88	(2.6)	293	(3.0)
60～	95	(4.8)	23	(3.6)	118	(4.5)
70～	14	(8.1)	3	(4.1)	17	(6.9)
80～	4	(30.8)	0	(0)	4	(21.1)
合 計	537	(1.8)	240	(1.3)	777	(1.6)

(%)

表4．年齢性別精検受診者数（率）

4-1．間接X線検査

（年齢）	男性		女性		合計	
～19	1	(100)	4	(80.0)	5	(83.3)
20～	24	(77.4)	17	(100)	41	(85.4)
30～	36	(75.0)	19	(82.6)	55	(77.5)
40～	52	(71.2)	43	(86.0)	95	(77.2)
50～	86	(78.2)	43	(81.1)	129	(79.1)
60～	28	(77.8)	12	(92.3)	40	(81.6)
70～	3	(60.0)	1	(100)	4	(66.7)
80～	0	( )	0	( )	0	( )
合　計	230	(75.7)	139	(85.8)	369	(79.2)

(%)

4-2．直接X線検査

（年齢）	男性		女性		合計	
～19	0	( )	0	( )	0	( )
20～	1	(33.3)	0	( )	1	(33.3)
30～	14	(70.0)	5	(100)	19	(76.0)
40～	25	(58.1)	23	(88.5)	48	(69.6)
50～	60	(63.2)	30	(85.7)	90	(69.2)
60～	47	(79.7)	10	(100)	57	(82.6)
70～	8	(88.9)	1	(50.0)	9	(81.8)
80～	4	(100)	0	( )	4	(100)
合　計	159	(68.2)	69	(88.5)	228	(73.3)

(%)

4-3．間接・直接X線検査すべて

（年齢）	男性		女性		合計	
～19	1	(100)	4	(80.0)	5	(83.3)
20～	25	(73.5)	17	(100)	42	(82.4)
30～	50	(73.5)	24	(85.7)	74	(77.1)
40～	77	(66.4)	66	(86.8)	143	(74.5)
50～	146	(71.2)	73	(83.0)	219	(74.7)
60～	75	(78.9)	22	(95.7)	97	(82.2)
70～	11	(78.6)	2	(66.7)	13	(76.5)
80～	4	(100)	0	( )	4	(100)
合　計	389	(72.4)	208	(86.7)	597	(76.8)

(%)

表5. 精密検査結果

精密検査結果		性		
		男	女	男女総数
分類	診断名	人数	人数	
肺野	肺結核		1	1
	肺結核疑	1	1	2
	肺結核(陳旧性)	2	2	4
	非結核性抗酸菌症	1		1
	非結核性抗酸菌症疑		1	1
	肺炎	2	4	6
	肺炎疑	1		1
	炎症性変化	14	8	22
	気管支拡張症	3	5	8
	中葉症候群		1	1
	中葉舌区症候群疑		2	2
	肺クリプトコッカス症	1	1	2
	スリガラス様陰影		1	1
	気管支炎		1	1
	石灰化影	2		2
	線状影	2		2
	陳旧性陰影	13	3	16
	陳旧性陰影疑	2		2
	硬化性陰影	1		1
	硬化性陰影疑	1	1	2
	肺気腫	8		8
	肺気腫疑	1		1
	肺嚢胞	6		6
	サルコイドーシス	1	1	2
	間質性肺疾患疑		1	1
	肺癌(原発性)	3		3
	肺癌(転移性)	2	1	3
	肺癌疑	2	1	3
	肺過誤腫		1	1
	硬化性血管腫疑	1		1
	肺腫瘍		1	1
	肺腫瘍疑	1		1
	アスベストーシス疑	1		1
	結節影	22	9	31
	結節影疑	1		1
	胸部異常陰影		1	1
	胸部異常陰影疑	1		1
肺野病変 合計		96	48	144
心臓・大血管	大動脈解離	1		1
	大動脈病変(異常)	2	1	3
	高血圧性心臓病	1		1
	高血圧性心臓病疑	1		1
	冠動脈石灰化	1		1
	心肥大	2		2
心臓・大血管病変 合計		8	1	9
縦隔・横隔膜	縦隔腫瘍	1	2	3
	縦隔腫瘍疑		1	1
縦隔・横隔膜病変 合計		1	3	4
胸膜	気胸	1	2	3
	胸膜炎(陳旧性)	2	3	5
	胸膜炎疑(陳旧性)	1		1
	胸膜肥厚	5	1	6
	肋膜炎(陳旧性)	1		1
	肋膜腫瘤疑	1		1
胸膜病変 合計		11	6	17
その他	術後の変化(肺癌)	1		1
	食道の拡張(アカラシア)		1	1
	脊椎の加齢性変形	1		1
	陳旧性陰影	1		1
	ブルセラ症		1	1
	気管内異物	1		1
	paricardial cyst	1		1
	デュピュイトラン拘縮	1		1
その他の病変 合計		6	2	8
総計		122	60	182

表6．年齢性別発見肺癌数（率）

6-1．間接X線検査

（年齢）	男性		女性		合計	
～19		（　）		（　）	0	（　）
20～		（　）		（　）	0	（　）
30～		（　）		（　）	0	（　）
40～		（　）	1	（ 0.05 ）	1	（ 0.02 ）
50～		（　）		（　）	0	（　）
60～		（　）		（　）	0	（　）
70～		（　）		（　）	0	（　）
80～		（　）		（　）	0	（　）
合　計	0	（　0 ）	1	（ 0.008 ）	1	（ 0.003 ）

（％）

6-2．直接X線検査

（年齢）	男性		女性		合計	
～19		（　）		（　）	0	（　）
20～		（　）		（　）	0	（　）
30～		（　）		（　）	0	（　）
40～		（　）		（　）	0	（　）
50～	3	（ 0.10 ）		（　）	3	（ 0.06 ）
60～	2	（ 0.17 ）		（　）	2	（ 0.12 ）
70～		（　）		（　）	0	（　）
80～		（　）		（　）	0	（　）
合　計	5	（ 0.05 ）	0	（　0 ）	5	（ 0.03 ）

（％）

6-3．間接・直接X線検査すべて

（年齢）	男性		女性		合計	
～19		（　）		（　）	0	（　）
20～		（　）		（　）	0	（　）
30～		（　）		（　）	0	（　）
40～		（　）	1	（ 0.02 ）	1	（ 0.009 ）
50～	3	（ 0.05 ）		（　）	3	（ 0.03 ）
60～	2	（ 0.10 ）		（　）	2	（ 0.08 ）
70～		（　）		（　）	0	（　）
80～		（　）		（　）	0	（　）
合　計	5	（ 0.02 ）	1	（ 0.006 ）	6	（ 0.013 ）

（％）

Lung Cancer Screening

Recommendation Statement

U.S. Preventive Services Task Force

This statement summarizes the current U.S. Preventive Services Task Force (USPSTF) recommendation on screening for lung cancer and the supporting scientific evidence, and updates the 1996 recommendations contained in the *Guide to Clinical Preventive Services, Second Edition: Periodic Updates.*[1] In 1996, the USPSTF recommended against screening for lung cancer (a "D" recommendation). The Task Force now uses an explicit process in which the balance of benefits and harms is determined exclusively by the quality and magnitude of the evidence. As a result, current letter grades are based on different criteria than those in 1996. Explanations of the ratings and of the strength of overall evidence are given in Appendix A and in Appendix B, respectively. The complete information on which this statement is based, including evidence tables and references, is available in the summary of the evidence[2] and in the Systematic Evidence Review[3] on this topic, available through the USPSTF Web site (www.preventiveservices.ahrq.gov) and through the National Guideline Clearinghouse™ (www.guideline.gov). The summary of the evidence and the recommendation statement are also available through the Agency for Healthcare Research and Quality (AHRQ) Publications Clearinghouse in print through subscription to the *Guide to Clinical Preventive Services, Third Edition: Periodic Updates.* To order, contact the Clearinghouse at 1-800-358-9295, or e-mail ahrqpubs@ahrq.gov.

Recommendations made by the USPSTF are independent of the U.S. Government. They should not be construed as an official position of AHRQ or the U.S. Department of Health and Human Services.

This was first published in *Ann Intern Med.* 2004;140:738–739.

Summary of Recommendation

The U.S. Preventive Services Task Force (USPSTF) concludes that the evidence is insufficient to recommend for or against screening asymptomatic persons for lung cancer with either low dose computerized tomography (LDCT), chest x-ray (CXR), sputum cytology, or a combination of these tests. I recommendation.

The USPSTF found fair evidence that screening with LDCT, CXR, or sputum cytology can detect lung cancer at an earlier stage than lung cancer would be detected in an unscreened population; however, the USPSTF found poor evidence that any screening strategy for lung cancer decreases mortality. Because of the invasive nature of diagnostic testing and the possibility of a high number of false-positive tests in certain populations, there is potential for significant harms from screening. Therefore, the USPSTF could not determine the balance between the benefits and harms of screening for lung cancer.

Clinical Considerations

* The benefit of screening for lung cancer has not been established in any group, including asymptomatic high-risk populations such as older smokers. The balance of harms and benefits becomes increasingly unfavorable for persons at lower risk, such as nonsmokers.

* The sensitivity of LDCT for detecting lung cancer is 4 times greater than the sensitivity of CXR. However, LDCT is also associated with a greater number of false-positive results, more radiation exposure, and increased costs compared with CXR.

Corresponding Author: Ned Calonge, MD, MPH, Chair, U.S. Preventive Services Task Force, c/o Program Director, USPSTF, Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850, e-mail: uspstf@ahrq.gov.

- Because of the high rate of false-positive results, many patients will undergo invasive diagnostic procedures as a result of lung cancer screening. Although the morbidity and mortality rates from these procedures in asymptomatic individuals are not available, mortality rates due to complications from surgical interventions in symptomatic patients reportedly range from 1.3% to 11.6%; morbidity rates range from 8.8% to 44%, with higher rates associated with larger resections.

- Other potential harms of screening are potential anxiety and concern as a result of false-positive tests, as well as possible false reassurance because of false-negative results. However, these harms have not been adequately studied.

Discussion

Lung cancer is the second leading cancer in the United States and the leading cause of cancer-related death among men and women. In 2003, approximately 157,200 lung cancer-associated deaths were predicted in the United States.[4] Incidence of lung cancer increases with age.[5] Although cigarette smoking is the major risk factor for lung cancer,[6] other risk factors include family history, chronic obstructive pulmonary disease, idiopathic pulmonary fibrosis, environmental radon exposure, passive smoking, asbestos exposure, and certain occupational exposures.[3] For a given amount of tobacco exposure, some studies suggest that women are at higher risk for developing lung cancer than men.[7] Women tend to develop adenocarcinoma of the lung disproportionately to men,[8] and adenocarcinoma tends to occur peripherally, making it more readily visible on radiography. Lung cancer has a poor prognosis; even with advances in therapy, average 5-year survival rates are less than 15% for all those with lung cancer.[4] Five-year survival ranges from 70% for patients with Stage I disease to less than 5% for those with Stage IV disease.[9]

The USPSTF examined the evidence for the accuracy of screening tests for lung cancer (CXR, with or without sputum cytology, and LDCT) in the general population as well as in the high-risk population. The sensitivity and specificity of CXR for diagnosing lung cancer are 26% and 93%, respectively, with a positive predictive value of an abnormal CXR of 10% (estimates based on LDCT as the gold standard).[10] The false-positive rate of LDCT (defined as number of patients with abnormal LDCT requiring further evaluation who do not have cancer) ranges from 5% to 41%.[3] Most abnormalities found on LDCT are resolved on high-resolution CT. This wide range of false-positive results is likely to be because of underlying differences, such as prevalence of pulmonary fungal infections, in the populations studied. Most of the patients (63% to 90%) with abnormalities found on high-resolution CTs are subsequently found to have cancer.[3]

Two fair-quality randomized controlled trials (RCTs) screened high-risk males using annual CXR with or without sputum cytology every 4 months and have shown no lung cancer mortality benefit from adding cytology to annual CXR.[11,12] Two fair quality RCTs among high-risk men comparing intensive screening with less intensive screening (CXR plus sputum cytology every 4 months versus CXR plus sputum cytology every year,[13] or CXR every 6 months versus CXR every 3 years) also showed no lung cancer mortality benefit from more frequent screening.[14] Five fair-quality case-control studies from Japan show lung cancer mortality benefit with CXR screening among high-risk men (with smoking exposure) and low- to high-risk women (with and without direct smoking exposure).[15-19] Interpretation of these studies is limited by lack of control for occupational exposures and family history, and possible bias from the screening of healthy persons.[3] Another limitation of the lung cancer screening-specific RCTs was the use of prevalence screening at the beginning of the studies. Consequently, there were no completely unscreened control groups.

Six recent cohort studies of LDCT have shown that LDCT is significantly more sensitive than CXR for identifying lung cancer and also identifies a significantly higher proportion of small (early-stage, resectable) lung cancers than CXR.[20-26] However, the effectiveness of LDCT in decreasing lung cancer mortality cannot be evaluated from these studies because of the absence of randomization and the

lack of an unscreened control group for which mortality was an outcome.

An important concern in lung cancer screening is over-diagnosis (and potential over-treatment). Data from the Mayo Lung Project showed increased rates of early tumors in the CXR/sputum cytology-screened group compared with the control group, without a change in numbers of advanced tumors or subsequent mortality rates, suggesting diagnosis of a pool of indolent tumors.[27] The false-positive rate with LDCT ranges from 5% to 41% in prevalence screening and 3% to 12% in incidence screening, with most abnormalities resolved on high-resolution computerized tomography. Harms include cost and risk associated with further evaluation and the potential anxiety and concern of false-positive test results. In addition, the rate of false-negative CXRs is estimated to be as high as 75%, which can lead to false reassurance LDCT, which also has been shown to have false-negative results (eg, nodules identified retrospectively).[21] More studies are needed to quantify the harms of over- and under-diagnosis.

Overall, mortality rates from invasive procedures in symptomatic patients range from 1.3% to 11.6%, with lower mortality among patients undergoing smaller resections.[23] Comorbidity and the volume of surgery have also been shown to affect surgical risks. The morbidity reported among several series of thoracotomy ranges between 8.8% and 44%, depending on the extent of the resection, the number of procedures performed by the center, and the comorbidities of the patient.[23]

Although no RCT of screening for lung cancer with mortality outcomes in the general population has yet been completed, at least 3 such RCTs are currently in progress.[3] In addition, new technologies are being studied for potential use in lung cancer screening, including immunogenetic-based tests, molecular analysis of sputum, automated image sputum cytology, and fluorescence bronchoscopy. In the absence of results from an RCT screening of the general population with mortality outcomes, the USPSTF concludes there is insufficient evidence to recommend for or against screening for lung cancer.

Recommendations of Others

Lung cancer screening recommendations from the American Cancer Society can be accessed at www.cancer.org/docroot/PUB/content/PUB_3_8X_American_Cancer_Society_Guidelines_for_the_Early_Detection_of_Cancer_update_2001.asp. The policy of the American Academy of Family Physicians can be accessed at www.aafp.org/x24974.xml. Recommendations from the Canadian Task Force on Preventive Health Care can be accessed at www.ctfphc.org. Relevant guidelines from other organizations on lung cancer screening can be accessed at the National Guideline Clearinghouse at www.guideline.gov.

References

1. U.S. Preventive Services Task Force. *Guide to Clinical Preventive Services.* 2nd ed. Washington, DC: Office of Disease Prevention and Health Promotion; 1996.

2. Humphrey LL, Johnson M, Teutsch S. Lung Cancer Screening with Sputum Cytologic Examination, Chest Radiography, and Computed Tomography: An Update of the U.S. Preventive Services Task Force. *Ann Intern Med.* 2004;140:740-753.

3. Humphrey LL, Johnson M, Teutsch S. *Lung Cancer Screening: An Update for the U.S. Preventive Services Task Force.* Systematic Evidence Review No. 31 (Prepared by the Oregon Health & Science University Evidence-based Practice Center under Contract No. 290-97-0018). Rockville, MD: Agency for Healthcare Research and Quality. May 2004. (Available on the AHRQ Web site at: www.ahrq.gov/clinic/serfiles.htm.)

4. American Cancer Society. Cancer facts and figures, 2003: A Presentation from the American Cancer Society. Available at: http://www.cancer.org/docroot/PRO/content/PRO_1_1_Cancer_Statistics_2002_slides.zip.asp?sitearea=PRO.

5. National Cancer Institute. SEER Cancer Statistics Review 1975-2000. 2003.

6. Strauss GM. Bronchiogenic carcinoma. *Textbook of pulmonary diseases, 6th ed.* Philadelphia, PA: Lippincott-Raven Publishers; 1998.

7. Osann KE, Anton-Culver H, Kurosaki T, Taylor T. Sex differences in lung-cancer risk associated with cigarette smoking. *Int J Cancer.* 1993;54(1):44–48.

8. Nesbitt JC, Lee JL, Komaki R, Roth JA. Cancer of the lung. In: Holland JF, Bast RC Jr, Morton DL, Frei E III, Kufe DW, Weichselbaum RR, eds. *Cancer Med.* Baltimore: William & Wilkins; 1997.

9. Mountain CF. Revisions in the International System for Staging Lung Cancer. *Chest.* 1997; 111(6):1710–1717.

10. Henschke CI, McCauley DI, Yankelevitz DF, et al. Early Lung Cancer Action Project: overall design and findings from baseline screening. *Lancet.* 1999;354(9173):99–105.

11. Martini N. Results of the Memorial Sloan-Kettering study in screening for early lung cancer. *Chest.* 1986;89(4 Suppl):S325.

12. Levin ML, Tockman MS, Frost JK, Ball WC Jr. Lung cancer mortality in males screened by chest X-ray and cytologic sputum examination: a preliminary report. *Recent Results Cancer Res.* 1982;82:138–146.

13. Marcus PM, Bergstralh EJ, Fagerstrom RM, et al. Lung cancer mortality in the Mayo Lung Project: impact of extended follow-up. *J Natl Cancer Inst.* 2000;92(16):1308–1316.

14. Brett GZ. The value of lung cancer detection by six-monthly chest radiographs. *Thorax.* 1968;23(4):414–420.

15. Sobue T, Suzuki T, Matsuda M, Kuroishi T, Ikeda S, Naruke T. Survival for clinical stage I lung cancer not surgically treated. Comparison between screen-detected and symptom-detected cases. The Japanese Lung Cancer Screening Research Group. *Cancer.* 1992;69(3):685–692.

16. Okamoto N, Suzuki T, Hasegawa H, et al. Evaluation of a clinic-based screening program for lung cancer with a case-control design in Kanagawa, Japan. *Lung Cancer.* 1999;25(2):77–85.

17. Sagawa M, Tsubono Y, Saito Y, et al. A case-control study for evaluating the efficacy of mass screening program for lung cancer in Miyagi Prefecture, Japan. *Cancer.* 2001;92(3):588–594.

18. Tsukada H, Kurita Y, Yokoyama A, et al. An evaluation of screening for lung cancer in Niigata Prefecture, Japan: a population-based case-control study. *Br J Cancer.* 2001;85(9):1326–1331.

19. Nishii K, Ueoka H, Kiura K, et al. A case-control study of lung cancer screening in Okayama Prefecture, Japan. *Lung Cancer.* 2001;34(3):325–332.

20. Sone S, Takashima S, Li F, et al. Mass screening for lung cancer with mobile spiral computed tomography scanner. *Lancet.* 1998;351(9111):1242–1245.

21. Henschke CI, McCauley DI, Yankelevitz DF, et al. Early Lung Cancer Action Project: overall design and findings from baseline screening. *Lancet.* 1999;354(9173):99–105.

22. Swensen SJ, Jett JR, Sloan JA, et al. Screening for lung cancer with low-dose spiral computed tomography. *Am J Respir Crit Care Med.* 2002;165(4):508–513.

23. Nawa T, Nakagawa T, Kusano S, Kawasaki Y, Sugawara Y, Nakata H. Lung cancer screening using low-dose spiral CT: results of baseline and 1-year follow-up studies. *Chest.* 2002;122(1): 15–20.

24. Sone S, Li F, Yang ZG, et al. Results of three-year mass screening programme for lung cancer using mobile low-dose spiral computed tomography scanner. *Br J Cancer.* 2001;84(1):25–32.

25. Jett JR. Spiral computed tomography screening for lung cancer is ready for prime time. *Am J Respir Crit Care Med.* 2001;163(4)812; discussion 814–815.

26. Diederich S, Wormanns D, Semik M, et al. Screening for early lung cancer with low-dose spiral CT: prevalence in 817 asymptomatic smokers. *Radiology.* 2002;222(3):773–781.

27. Marcus PM, Bergstralh EJ, Fagerstrom RM, et al. Lung cancer mortality in the Mayo Lung Project: impact of extended follow-up. *J Natl Cancer Inst.* 2000;92(16):1308–1316.

Appendix A
U.S. Preventive Services Task Force—Recommendations and Ratings

The Task Force grades its recommendations according to one of 5 classifications (A, B, C, D, I) reflecting the strength of evidence and magnitude of net benefit (benefits minus harms):

A. The USPSTF strongly recommends that clinicians provide [the service] to eligible patients. *The USPSTF found good evidence that [the service] improves important health outcomes and concludes that benefits substantially outweigh harms.*

B. The USPSTF recommends that clinicians provide [the service] to eligible patients. *The USPSTF found at least fair evidence that [the service] improves important health outcomes and concludes that benefits outweigh harms.*

C. The USPSTF makes no recommendation for or against routine provision of [the service]. *The USPSTF found at least fair evidence that [the service] can improve health outcomes but concludes that the balance of benefits and harms is too close to justify a general recommendation.*

D. The USPSTF recommends against routinely providing [the service] to asymptomatic patients. *The USPSTF found at least fair evidence that [the service] is ineffective or that harms outweigh benefits.*

I. The USPSTF concludes that the evidence is insufficient to recommend for or against routinely providing [the service]. *Evidence that [the service] is effective is lacking, of poor quality, or conflicting and the balance of benefits and harms cannot be determined.*

Appendix B
U.S. Preventive Services Task Force—Strength of Overall Evidence

The USPSTF grades the quality of the overall evidence for a service on a 3-point scale (good, fair, poor):

Good: Evidence includes consistent results from well-designed, well-conducted studies in representative populations that directly assess effects on health outcomes.

Fair: Evidence is sufficient to determine effects on health outcomes, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies, generalizability to routine practice, or indirect nature of the evidence on health outcomes.

Poor: Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information on important health outcomes.

Members of the U.S. Preventive Services Task Force*

Alfred O. Berg, MD, MPH, Chair, USPSTF (Professor and Chair, Department of Family Medicine, University of Washington, Seattle, WA)

Janet D. Allan, PhD, RN, CS, Vice-chair, USPSTF (Dean, School of Nursing, University of Maryland Baltimore, Baltimore, MD)

Paul Frame, MD (Tri-County Family Medicine, Cohocton, NY, and Clinical Professor of Family Medicine, University of Rochester, Rochester, NY)

Charles J. Homer, MD, MPH (Executive Director, National Initiative for Children's Healthcare Quality, Boston, MA)

Mark S. Johnson, MD, MPH (Professor of Family Medicine, University of Medicine and Dentistry of New Jersey-New Jersey Medical School, Newark, NJ)

Jonathan D. Klein, MD, MPH (Associate Professor, Department of Pediatrics, University of Rochester School of Medicine, Rochester, NY)

Tracy A. Lieu, MD, MPH (Associate Professor, Department of Ambulatory Care and Prevention, Harvard Pilgrim Health Care and Harvard Medical School, Boston, MA)

C. Tracy Orleans, PhD (Senior Scientist, The Robert Wood Johnson Foundation, Princeton, NJ)

Jeffrey F. Peipert, MD, MPH (Director of Research, Women and Infants' Hospital, Providence, RI)

Nola J. Pender, PhD, RN (Professor Emeritus, University of Michigan, Ann Arbor, MI)

Albert L. Siu, MD, MSPH (Professor and Chairman, Brookdale Department of Geriatrics and Adult Development, Mount Sinai Medical Center, New York, NY)

Steven M. Teutsch, MD, MPH (Executive Director, Outcomes Research and Management, Merck & Company, Inc., West Point, PA)

Carolyn Westhoff, MD, MSc (Professor of Obstetrics and Gynecology and Professor of Public Health, Columbia University, New York, NY)

Steven H. Woolf, MD, MPH (Professor, Department of Family Practice and Department of Preventive and Community Medicine and Director of Research Department of Family Practice, Virginia Commonwealth University, Fairfax, VA)

*Members of the Task Force at the time this recommendation was finalized. For a list of current Task Force members, go to www.ahrq.gov/clinic/uspstfab.htm.

AHRQ Pub. No. 04-0537-A
May 2004

胸部エックス線検査等における被ばく線量

胸部　間接撮影（1枚）　　　0．22〜0．31mSV

胸部　直接撮影（1枚）　　　0．05〜0．07mSV

胸部　ＣＴ撮影（1回）　　　3．0　〜7．5　mSV

胃部　間接撮影（1回）　　　10　　〜20　　mSV

マンモグラフィ（1枚）　　　　　　1　mSV

自然放射線（年間）　　　2．0　〜　3．0　mSV

出典：放射線防護マニュアル（草間朋子編著、日本医事新報社発行）