

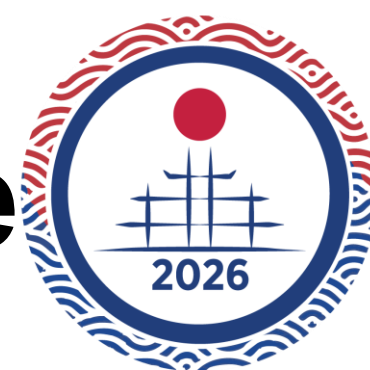


P3.022: Environmental Asbestos Exposure and the Burden of Lung Cancer and Mesothelioma in Rural Türkiye

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INTRODUCTION

Asbestos exposure is a major global public health concern because of its well-established association with malignant diseases. Extensive industrial and commercial use of asbestos throughout the twentieth century resulted in widespread environmental contamination in both urban and rural settings. Environmental asbestos exposure is particularly important in rural regions where naturally occurring asbestos contaminates surface soils.

Aim: The main objective of this study was to quantify the long-term burden of lung cancer (LC) associated with environmental asbestos exposure in rural Türkiye by evaluating mortality rates, temporal mortality patterns, and premature mortality using years of life lost (YLL). As a secondary objective, diffuse pleural mesothelioma (DPM) was evaluated within the same environmentally exposed population to provide a comparative assessment of asbestos-related malignancies.

METHODS

Design:

- This registry-based retrospective cohort study included patients with LC and DPM diagnosed between 1990 and 2022.
- Patients' residential regions were classified into two groups based on environmental asbestos exposure in rural settings. Four of the ten asbestos-contaminated districts (Seyitgazi, Çifteler, Mihalıççık, and Han) were randomly selected as the asbestos-exposed cohort, while two districts without documented environmental asbestos contamination (Mihalgazi and Günyüzü) were selected as the non-exposed control cohort.

Statistical analyses:

- Crude and Age-Standardized Mortality Rates were calculated for each study region.
- Temporal trends in LC mortality according to sex and age group were analyzed using the Joinpoint Regression Program (version 5.4.0).
- YLL due to LC and DPM were calculated using a standard life expectancy approach.
- Expected numbers of LC cases in asbestos-exposed regions were estimated by applying age- and sex-specific mortality rates from the non-exposed control regions to the exposed cohort's population structure. The expected number of DPM cases was estimated using the same approach. Risk ratios (RRs) and corresponding 95% confidence intervals (CIs) were calculated assuming a Poisson distribution.

DISCUSSION AND CONCLUSION

- A 33-year cohort quantified the long-term burden of environmental asbestos exposure.
- Environmental asbestos exposure was associated with a >4-fold increase in LC mortality.
- LC caused substantially more deaths and years of life lost than DPM.
- Years of life lost highlighted the considerable societal burden of asbestos-related LC.
- These outcomes support continued environmental surveillance, sustained asbestos control policies, risk-adapted LC screening strategies, and long-term epidemiological monitoring of environmentally exposed populations.
- More broadly, they reinforce that environmental asbestos exposure remains an important and preventable cause of LC, even in the era of declining industrial asbestos use.

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AI was not used in the development of the material presented in this poster. ChatGPT was used solely for English language editing.

RESULTS

Lung cancer mortality

Table 1. Sex-Specific Crude and Age-Standardized Mortality Rates for Lung Cancer per 100,000 Population in Asbestos-Exposed and Control Zones, 1990–2022.

Time periods	1990-1994	1995-1999	2000-2004	2005-2009	2010-2014	2015-2019	2020-2022	Cohort
Asbestos-Exposed Zones								
Population								
Male	116,980	111,591	101,496	85,774	77,754	72,037	3,102	608,734
Female	117,227	113,321	104,741	89,821	79,209	70,436	40,277	615,032
Lung Cancer								
Male: n	23	53	50	104	132	125	72	559
Crude rate	19.66	47.49	49.26	121.25	169.77	173.52	167.04	91.83
ASR	18.80	42.14	43.02	94.29	116.55	104.05	100.60	70.63
Female: n	2	4	4	5	20	23	12	70
Crude rate	1.71	3.53	3.82	5.57	25.25	32.65	29.79	11.38
ASR	1.56	2.69	3.93	5.22	16.31	21.13	13.44	8.59
Control Zones								
Population								
Male	38,481	51,444	46,418	19,107	15,935	17,216	8,495	197,096
Female	37,482	44,588	39,680	20,757	19,148	20,041	9,609	191,305
Lung Cancer								
Male: n	2	4	3	6	13	15	1	44
Crude rate	5.20	7.78	6.46	31.40	81.58	87.13	11.77	22.32
ASR	46.48	7.67	7.00	47.74	54.78	55.40	6.67	20.43
Female: n	-	-	-	-	-	1	1	2
Crude rate	-	-	-	-	-	4.99	10.41	1.05
ASR	-	-	-	-	-	3.95	6.02	0.86

ASR: Age-Standardized Rate

Temporal Trends in Lung Cancer Mortality

Table 2. Sex-Specific Temporal Trends in Lung Cancer Mortality in Asbestos-Exposed and Control Zones.

Variables	Time trends	APC (95%CI)	Time trends	AAPC (95%CI)
Asbestos-Exposed Zones				
Male	1990-2010	10.6(-0.5-22.9)	1990-2020	6.8 (1.6-12.2)*
	2010-2020	-0.6 (-22.3-27.3)		
Female	1990-2010	17.9 (10.0-26.5)*	1990-2020	13.0 (10.1-15.9)*
	2010-2020	3.6 (-5.9-14.1)		
Comparison			1990-2020	-6.2 (-0.2- -2.0)*
Control Zones				
Male	1990-2020	12.4 (3.6-21.9)*	1990-2020	12.4 (3.6-21.9)*
Female*	-	-	-	-

APC: Annual percent change; AAPC: Average annual percent change

Years of Life Lost due to Lung Cancer

Table 3. Gender-Specific Years of Life Lost (YLL) and YLL Rates per 100,000 Population Due to Lung Cancer in Asbestos-Exposed and Control Zones, 1990–2022.

	Asbestos-Exposed Zones				Control Zones			
	Male		Female		Male		Female	
	YLL	YLL rate per 100,000	YLL	YLL rate per 100,000	YLL	YLL rate per 100,000	YLL	YLL rate per 100,000
30-34	24	41.09	25	47.80	0	0.00	0	0.00
35-39	23	38.32	0	0.00	0	0.00	0	0.00
40-44	272	509.68	93	193.58	21	108.81	0	0.00
45-49	647	1236.37	176	346.91	0	0.00	0	0.00
50-54	1011	1926.49	80	151.63	56	358.53	0	0.00
55-59	1486	2847.61	147	271.09	133	980.20	19	127.31
60-64	1478	3088.42	153	294.48	191	1428.03	17	117.71
65-69	1351	3281.57	153	340.62	63	625.98	0	0.00
70-74	1038	3277.37	126	335.72	99	1252.85	0	0.00
≥75	561	1436.13	153	302.82	46	508.03	0	0.00
Total	7891	1296.26	1107	179.99	608	308.72	36	18.91

YLL: years of life lost

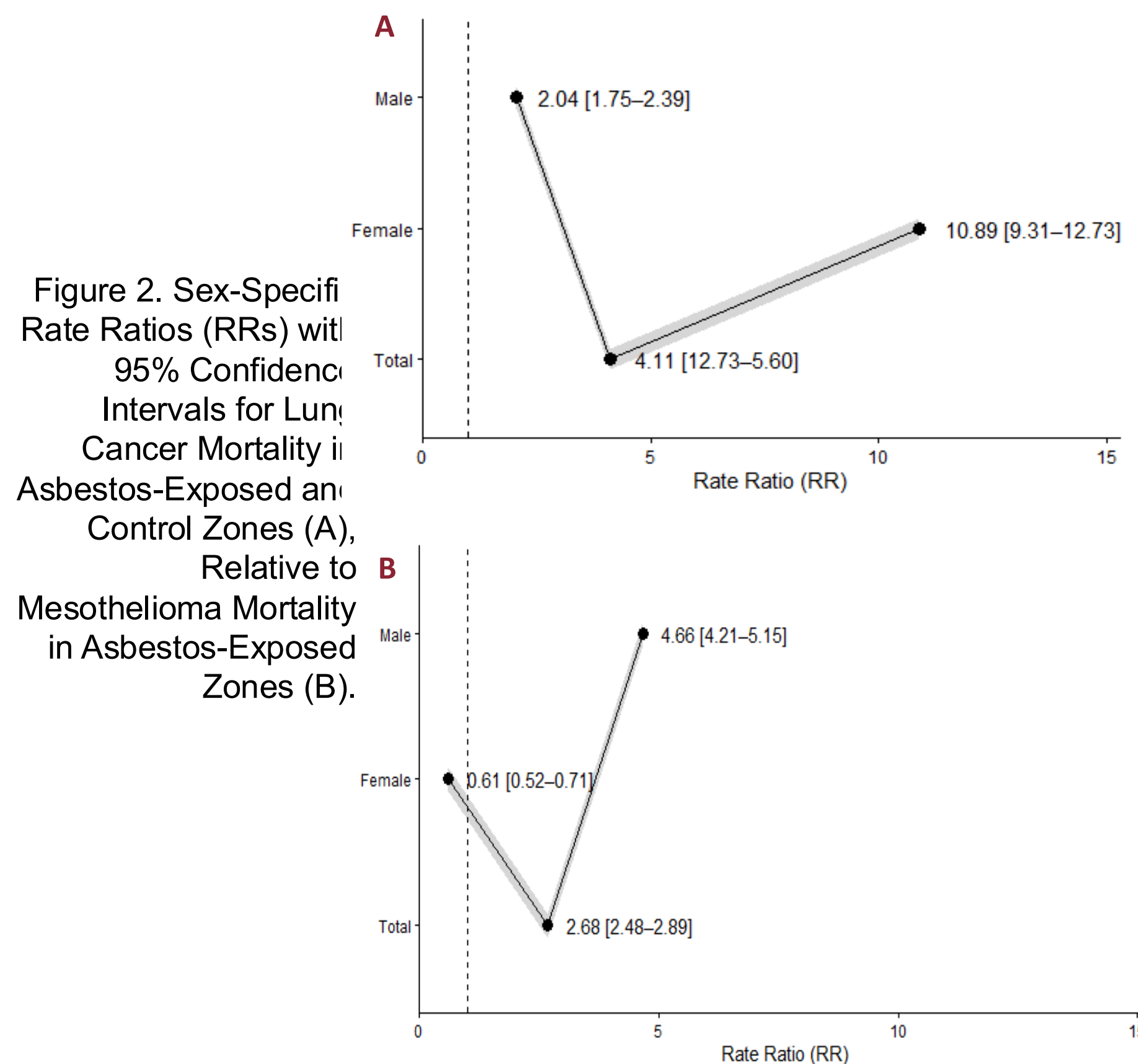
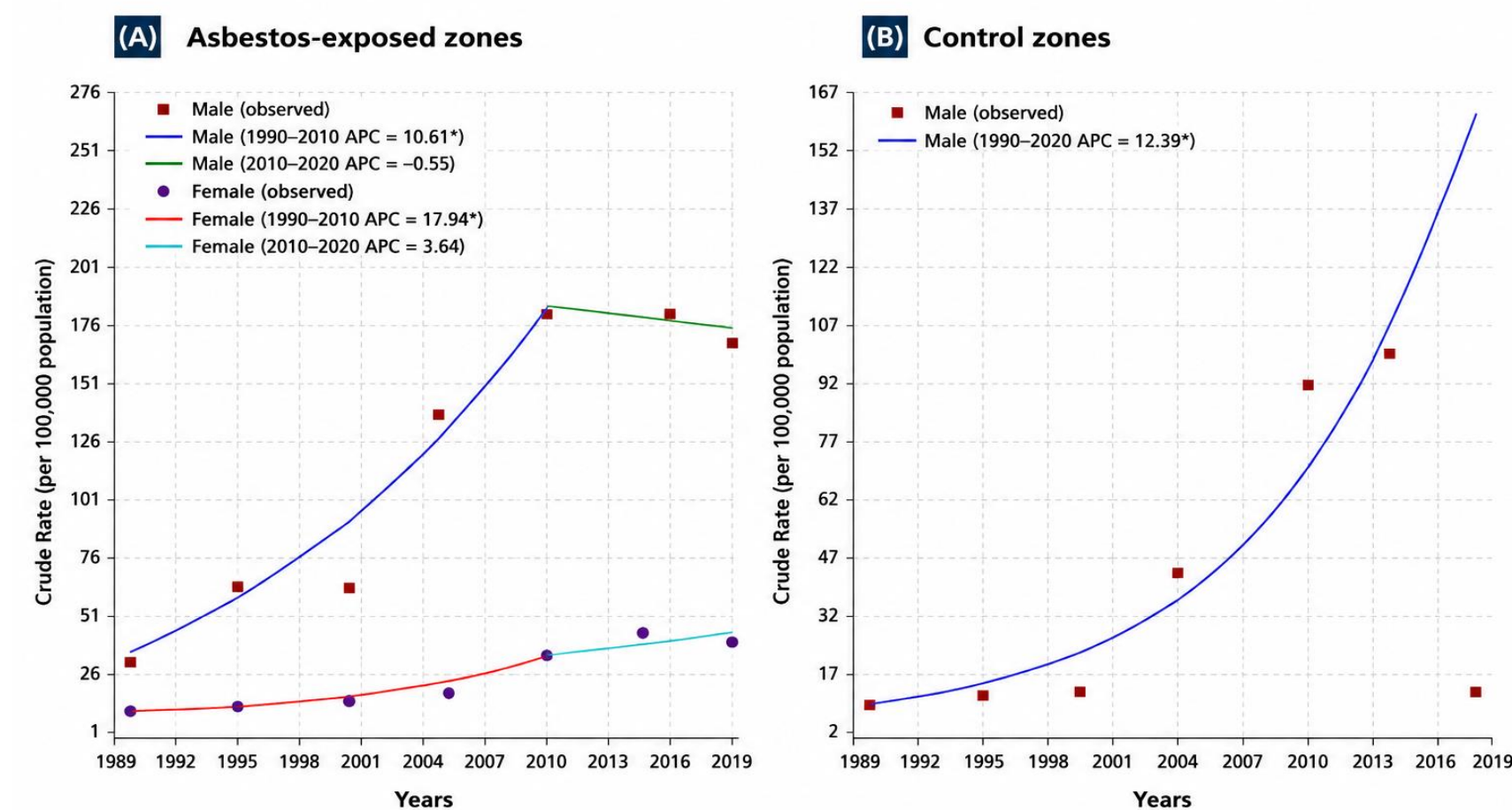


Figure 3. Sex-Specific Temporal Trends in Lung Cancer Mortality in Asbestos-Exposed (A) and Control Zones (B). *Statistically significant (p<0.05).



Lung Cancer vs. Mesothelioma

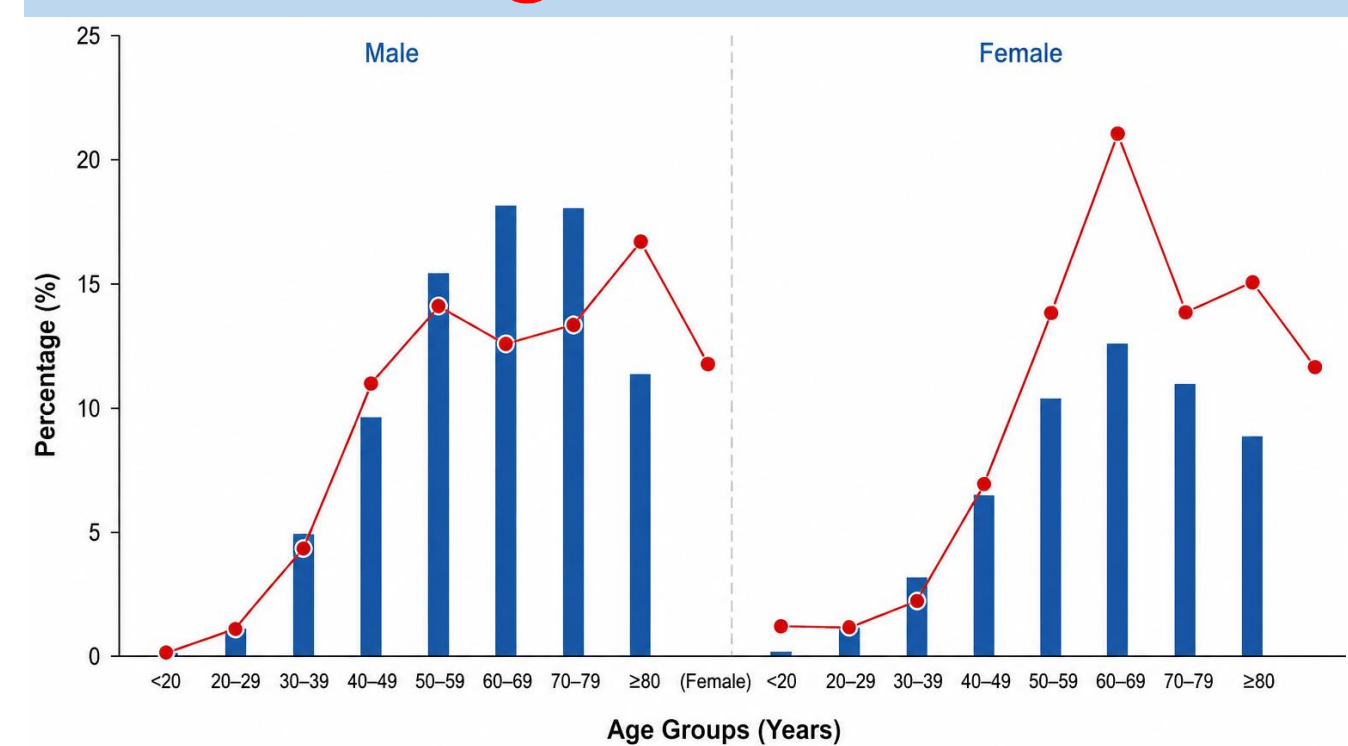


Figure 4. Age- and Sex-Specific Distribution of Years of Life Lost Due to Lung Cancer and Diffuse Pleural Mesothelioma in Asbestos-Exposed Zones, 1990–2022.

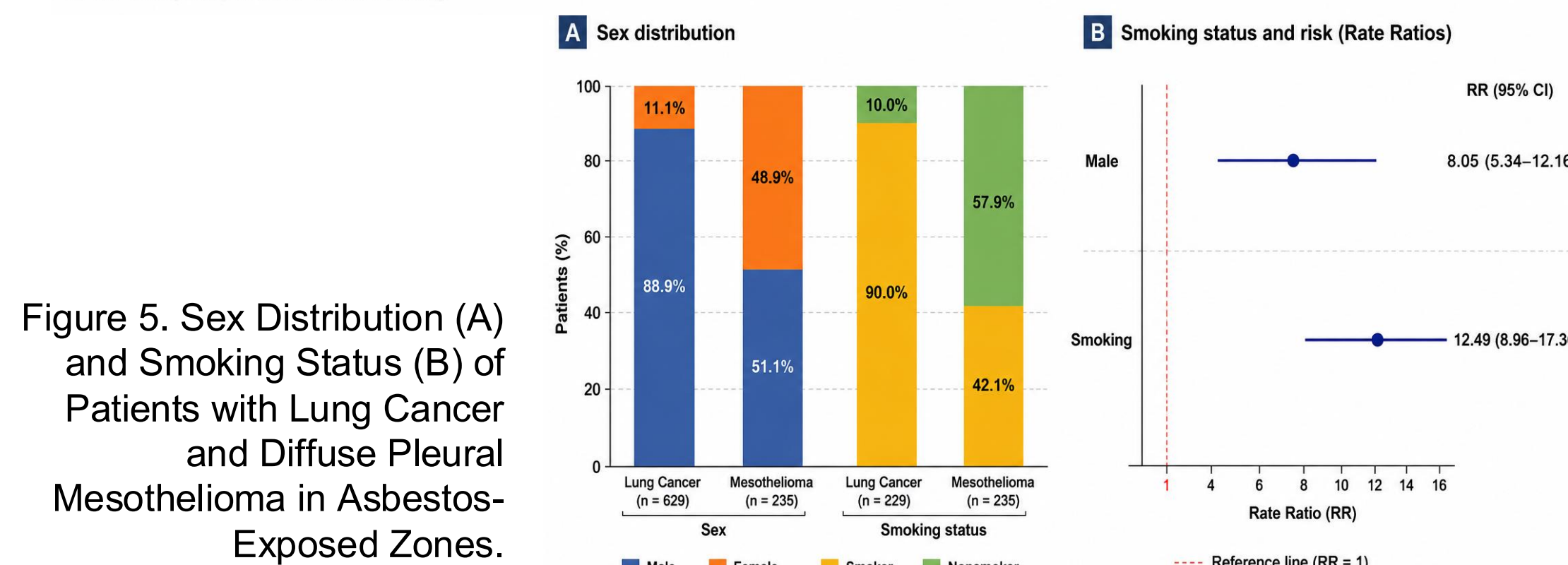


Figure 5. Sex Distribution (A) and Smoking Status (B) of Patients with Lung Cancer and Diffuse Pleural Mesothelioma in Asbestos-Exposed Zones.

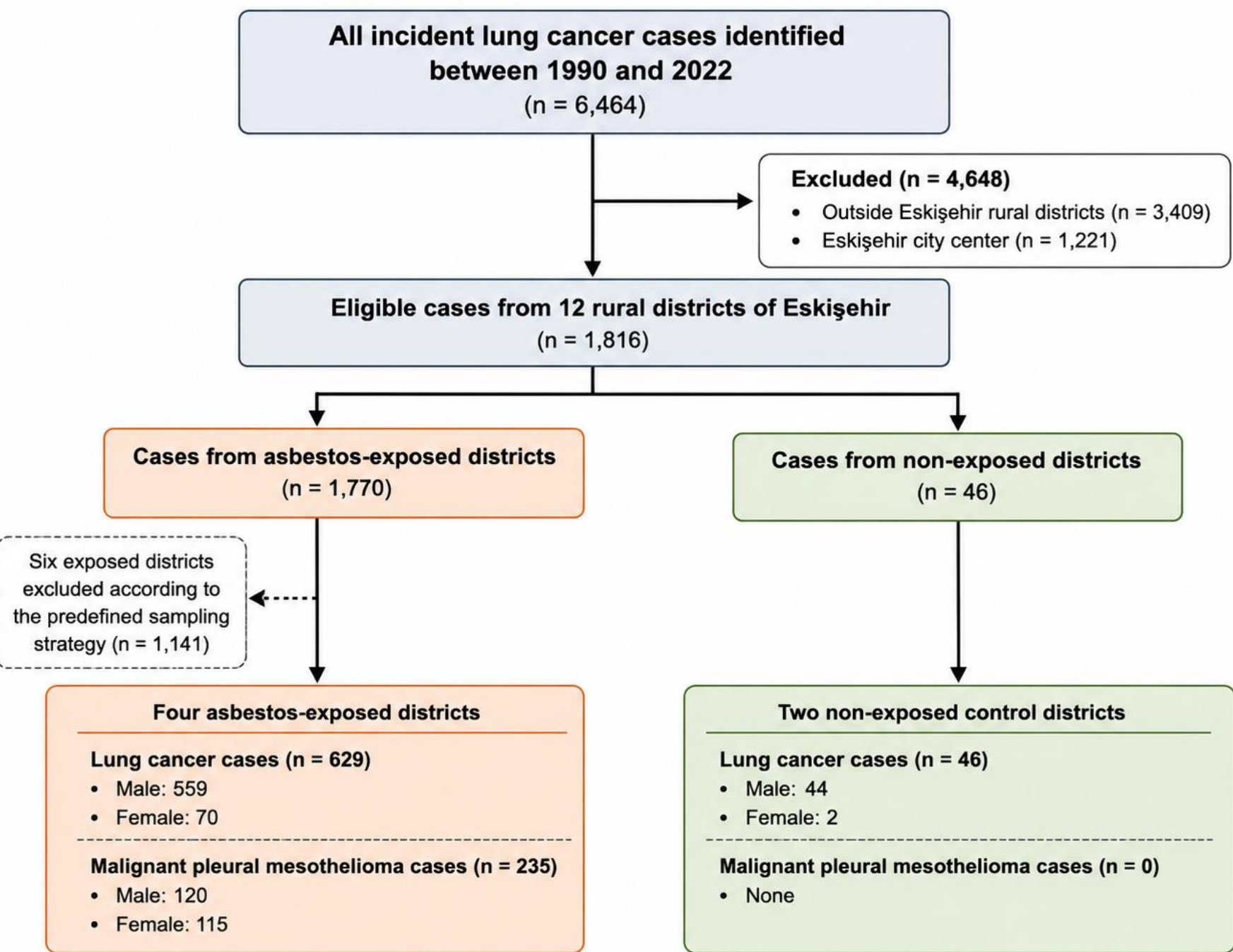


Figure 1. Flow diagram of study population selection. A total of 6,464 lung cancer cases diagnosed between 1990 and 2022 were identified. After exclusions, cases from four asbestos-exposed districts and two non-exposed control districts were included in the final analysis.