

## SUPPLEMENTARY MATERIAL

**Supplementary table 1.** Observed number of cases/deaths and standardized incidence/mortality ratios (SIRs/SMRs) with 95% confidence intervals (CIs) among male firefighters in the Norwegian Fire Departments Cohort (n=3881), follow-up from January 1, 1960 to December 31, 2018.

Cancer site	ICD-10	Incidence			Mortality		
		Obs.	SIR	95% CI	Obs.	SMR	95% CI
All cancers	C00-C97	<i>Reported previously<sup>b</sup></i>			348	1.08	0.97–1.20
Lip	C00	<5	0.56	0.11–1.62	0	0.00	0.00–13.3
Oral cavity	C02-C06	<5	0.73	0.20–1.86	0	0.00	0.00–3.04
Pharynx	C09-C14, C01	11	1.61	0.80–2.88	<5	1.05	0.29–2.69
Esophagus	C15	13	1.55	0.83–2.66	14	1.96	1.07–3.28
Esophagus, corrected†					13	1.82	0.97–3.11
Stomach	C16	38	1.35	0.95–1.85	26	1.18	0.77–1.74
Stomach, corrected†					28	1.28	0.85–1.84
Colon	C18	74	1.24	0.98–1.56	34	1.26	0.87–1.76
Rectum, rectosigmoid	C19-C21	37	0.96	0.68–1.33	18	1.16	0.69–1.84
Liver	C22	8	1.43	0.62–2.81	7	1.38	0.56–2.85
Gallbladder, bile ducts	C23-C24	<5	1.13	0.31–2.89	5	2.51	0.82–5.86
Gallbladder, bile ducts†					<5	2.01	0.55–5.15
Liver, gallbladder, bile ducts†	C22-C24	12	1.31	0.68–2.29	11	1.56	0.78–2.79
Pancreas	C25	24	1.22	0.78–1.81	20	1.09	0.67–1.68
Larynx	C32	<i>Reported previously<sup>b</sup></i>			<5	1.92	0.52–4.91
Lung	C33-C34	<i>Reported previously<sup>b</sup></i>			61	0.91	0.69–1.16
Cutaneous melanoma	C43	<i>Reported previously<sup>b</sup></i>			13	1.55	0.83–2.65
Non-melanoma skin*	C44	<i>Reported previously<sup>b</sup></i>			<5	0.95	0.02–5.31
Mesothelioma	C45	<i>Reported previously<sup>b</sup></i>			<5	1.80	0.37–5.27
Mesothelioma, corrected†					<5	2.40	0.65–6.15
Prostate	C61	214	1.18	1.03–1.35	54	1.07	0.80–1.39
Testis	C62	17	1.39	0.81–2.22	0	0.00	0.00–3.07
Kidney**	C64	<i>Reported previously<sup>b</sup></i>			10	0.97	0.46–1.78
Urinary tract***	C65-C68	<i>Reported previously<sup>b</sup></i>			15	1.14	0.64–1.88
Central nervous system	C70-C72	28	1.31	0.87–1.90	14	1.41	0.77–2.37
Thyroid	C73	6	1.45	0.53–3.15	<5	2.41	0.29–8.70
Hodgkin lymphoma	C81	<i>Reported previously<sup>b</sup></i>			0	0.00	0.00–2.31
Non-Hodgkin lymphoma	C82-C86, C96	<i>Reported previously<sup>b</sup></i>			9	0.96	0.44–1.83
Multiple myeloma	C90	<i>Reported previously<sup>b</sup></i>			7	0.97	0.39–2.00
Leukaemia	C91-C95	<i>Reported previously<sup>b</sup></i>			10	1.00	0.48–1.84
Ill-defined or unspecified	C76, C80	8	0.62	0.27–1.22	14	0.90	0.49–1.51
Other specified <sup>a</sup>		25	0.93	0.60–1.38	<5	0.43	0.12–1.11

ICD, International Classification of Diseases; Obs., observed.

†Observed number of deaths corrected to be in line with morphologically confirmed diagnoses, as described in the main text (Results, paragraph 3–6)

\*Excluding basal cell carcinoma, \*\*Excluding renal pelvis, \*\*\*Including bladder and renal pelvis.

<sup>a</sup> The 'other specified' group includes the following codes: C07-C08, C17, C26-C31, C37-C38, C40-C41, C46-C50, C56-C57, C60, C63, C69, C74-C75, C88, C97.

<sup>b</sup> Results previously reported in Marjerrison et al (2022) have been omitted from this table.

**Supplementary table 2.** Observed number of cases or deaths and standardized incidence ratios (SIRs) or standardized mortality ratios (SMRs) with 95% confidence intervals (CIs) for selected cancer sites among male firefighters in the Norwegian Fire Departments Cohort (n=3881), stratified by period of follow-up. Follow-up from January 1, 1960 to December 31, 2018.

Cancer site	ICD-10	Period of follow-up								
		≤1984 (33 180 pyr)			1985–1994 (19 644 pyr)			≥1995 (55 534 pyr)		
		Obs.	Ratio	95% CI	Obs.	Ratio	95% CI	Obs.	Ratio	95% CI
All cancers, SIR	C00-C97	140	1.21	1.02–1.43	139	1.17	0.98–1.38	566	1.13	1.04–1.23
All cancers, SMR	C00-C97	84	1.25	1.00–1.55	70	1.12	0.87–1.41	194	1.02	0.88–1.17
Esophagus, SIR	C15	<5	2.15	0.44–6.29	<5	1.60	0.19–5.78	8	1.40	0.60–2.76
Esophagus†, SMR	C15	<5	2.35	0.48–6.86	<5	1.74	0.21–6.29	8	1.69	0.73–3.33
Stomach, SIR	C16	15	1.39	0.78–2.29	10	1.64	0.79–3.02	13	1.15	0.61–1.96
Stomach†, SMR	C16	12	1.35	0.7–2.36	9	1.88	0.86–3.56	7	0.85	0.34–1.75
Colon, SIR	C18	16	2.02	1.15–3.28	14	1.41	0.77–2.37	44	1.05	0.77–1.42
Colon, SMR	C18	10	2.33	1.12–4.29	9	1.79	0.82–3.39	15	0.85	0.48–1.40
Rectum, rectosigmoid, SIR	C19-C21	<5	0.63	0.17–1.62	6	0.86	0.31–1.87	27	1.07	0.71–1.56
Rectum, rectosigmoid, SMR	C19-C21	<5	0.89	0.18–2.60	<5	0.57	0.07–2.05	13	1.51	0.80–2.58
Liver, gallbladder, bile ducts, SIR	C22-C24	5	3.62	1.17–8.44	<5	1.46	0.18–5.29	5	0.78	0.25–1.82
Liver, gallbladder, bile ducts†, SMR	C22-C24	<5	3.03	0.83–7.75	<5	1.91	0.23–6.89	5	1.07	0.35–2.5
Larynx, SIR	C32	0	0.00	0.00–1.77	5	3.57	1.16–8.33	7	1.89	0.76–3.90
Larynx, SMR	C32	0	0.00	0.00–5.58	<5	2.37	0.06–13.2	<5	2.66	0.55–7.77
Lung, SIR	C33-C34	17	1.12	0.65–1.79	17	1.11	0.64–1.77	47	0.90	0.66–1.20
Lung, SMR	C33-C34	14	1.09	0.59–1.82	15	1.11	0.62–1.83	32	0.78	0.53–1.10
Cutaneous melanoma, SIR	C43	5	1.25	0.40–2.91	11	2.09	1.04–3.74	31	1.15	0.78–1.63
Cutaneous melanoma, SMR	C43	<5	1.41	0.17–5.08	<5	2.83	0.77–7.25	7	1.26	0.51–2.60
Non-melanoma skin*, SIR	C44	<5	0.77	0.09–2.77	<5	0.60	0.12–1.77	30	1.07	0.73–1.53
Non-melanoma skin*, SMR	C44	0	0.00	0.00–16.2	0	0.00	0.00–18.1	<5	1.43	0.04–7.97
Mesothelioma, SIR	C45	<5	4.23	0.11–23.56	0	0.00	0.00–6.16	6	2.82	1.04–6.14
Mesothelioma†, SMR	C45	<5	-	-	0	-	-	<5	1.80	0.37–5.27
Prostate, SIR	C61	14	0.83	0.45–1.39	32	1.33	0.91–1.88	168	1.20	1.02–1.39
Prostate, SMR	C61	6	0.91	0.33–1.97	7	0.70	0.28–1.44	41	1.21	0.87–1.64
Testis, SIR	C62	<5	1.64	0.45–4.21	0	0.00	0.00–1.34	13	1.72	0.91–2.93
Testis, SMR	C62	0	0.00	0.00–5.24	0	0.00	0.00–25.3	0	0.00	0.00–10.5
Kidney**, SIR	C64	<5	1.07	0.29–2.74	8	2.40	1.04–4.74	17	1.09	0.64–1.75
Kidney**, SMR	C64	<5	0.43	0.01–2.37	<5	2.00	0.54–5.11	5	0.83	0.27–1.95

Urinary tract***, SIR	C65-C68	13	1.42	0.76–2.43	15	1.47	0.82–2.43	41	1.14	0.82–1.55
Urinary tract***, SMR	C65-C68	<5	1.20	0.25–3.51	<5	1.58	0.43–4.05	8	0.99	0.43–1.94
Thyroid, SIR	C73	<5	1.22	0.03–6.78	0	0.00	0.00–5.05	5	1.83	0.59–4.27
Thyroid, SMR	C73	<5	4.60	0.12–25.6	0	0.00	0.00–18.32	<5	2.22	0.06–12.38
Hodgkin lymphoma, SIR	C81	0	0.00	0.00–2.40	0	0.00	0.00–5.32	<5	1.01	0.12–3.67
Hodgkin lymphoma, SMR	C81	0	0.00	0.00–3.80	0	0.00	0.00–15.7	0	0.00	0.00–9.40
Non-Hodgkin lymphoma, SIR	C82-C86, C96	<5	1.03	0.21–3.01	7	2.00	0.81–4.13	16	1.01	0.58–1.64
Non-Hodgkin lymphoma, SMR	C82-C86, C96	<5	0.59	0.02–3.31	<5	1.01	0.12–3.66	6	1.05	0.39–2.29
Multiple myeloma, SIR	C90	<5	1.39	0.29–4.07	<5	1.03	0.12–3.72	<5	0.55	0.15–1.42
Multiple myeloma, SMR	C90	<5	1.36	0.17–4.93	<5	2.05	0.42–5.99	<5	0.47	0.06–1.69
Leukaemia, SIR	C91-C95	<5	1.18	0.32–3.03	<5	0.38	0.01–2.12	9	0.84	0.38–1.59
Leukaemia, SMR	C91-C95	<5	1.09	0.22–3.18	<5	0.57	0.01–3.15	6	1.10	0.40–2.39

ICD, International Classification of Diseases; Obs., observed; pyr, person-years. Cells lacking SMR had 0 expected deaths.

†Observed number of deaths corrected to be in line with morphologically confirmed diagnoses, as described in the text (Results, paragraph 3–6).

\*Excluding basal cell carcinoma, \*\*Excluding renal pelvis, \*\*\*Including bladder and renal pelvis.

**Supplementary table 3.** Observed number of cases or deaths and standardized incidence ratios (SIRs) or standardized mortality ratios (SMRs) with 95% confidence intervals (CIs) for selected cancer sites among male firefighters in the Norwegian Fire Departments Cohort (n=3881), stratified by age at diagnosis. Follow-up from January 1, 1960 to December 31, 2018.

Cancer site	ICD-10	Age at diagnosis								
		≤49 years (60 596 pyr)			50–69 years (37 216 pyr)			≥70 years (10 546 pyr)		
		Obs.	Ratio	95% CI	Obs.	Ratio	95% CI	Obs.	Ratio	95% CI
All cancers, SIR	C00-C97	71	1.06	0.83–1.34	374	1.09	0.98–1.20	400	1.23	1.11–1.36
All cancers, SMR	C00-C97	16	0.83	0.47–1.34	123	0.96	0.80–1.15	209	1.20	1.05–1.38
Esophagus, SIR	C15	0	0.00	0.00–6.22	7	1.54	0.62–3.17	6	1.80	0.66–3.91
Esophagus†, SMR	C15	0	0.00	0.00–9.96	7	1.88	0.76–3.88	6	1.91	0.70–4.16
Stomach, SIR	C16	<5	1.34	0.28–3.91	21	1.56	0.97–2.39	14	1.11	0.61–1.87
Stomach†, SMR	C16	<5	1.93	0.4–5.63	12	1.20	0.62–2.1	13	1.25	0.67–2.14
Colon, SIR	C18	<5	0.80	0.16–2.33	29	1.16	0.78–1.67	42	1.36	0.98–1.84
Colon, SMR	C18	<5	0.75	0.02–4.19	16	1.63	0.93–2.65	17	1.07	0.62–1.72
Rectum, rectosigmoid, SIR	C19-C21	<5	1.22	0.25–3.56	16	0.83	0.47–1.35	18	1.07	0.64–1.70
Rectum, rectosigmoid, SMR	C19-C21	0	0.00	0.00–3.97	<5	0.62	0.17–1.58	14	1.70	0.93–2.85

Liver, gallbladder, bile ducts, SIR	C22-C24	<5	1.45	0.04–8.07	<5	0.91	0.25–2.33	7	1.72	0.69–3.55
Liver, gallbladder, bile ducts†, SMR	C22-C24	<5	1.95	0.05–10.9	<5	1.26	0.34–3.24	6	1.78	0.65–3.87
Larynx, SIR	C32	0	0.00	0.00–6.12	<5	0.74	0.15–2.16	9	3.99	1.82–7.57
Larynx, SMR	C32	0	0.00	0.00–34.9	<5	1.00	0.03–5.56	<5	3.00	0.62–8.77
Lung, SIR	C33-C34	<5	1.00	0.27–2.56	29	0.68	0.46–0.98	48	1.33	0.98–1.77
Lung, SMR	C33-C34	<5	0.73	0.09–2.63	20	0.61	0.37–0.94	39	1.23	0.88–1.68
Cutaneous melanoma, SIR	C43	10	1.21	0.58–2.22	24	1.42	0.91–2.12	13	1.18	0.63–2.01
Cutaneous melanoma, SMR	C43	0	0.00	0.00–1.94	10	2.63	1.26–4.84	<5	0.99	0.20–2.88
Non-melanoma skin*, SIR	C44	<5	1.32	0.16–4.78	10	1.02	0.49–1.88	23	0.95	0.60–1.43
Non-melanoma skin*, SMR	C44	0	0.00	0.00–103	0	0.00	0.00–10.5	<5	1.36	0.03–7.58
Mesothelioma, SIR	C45	0	0.00	0.00–30.5	<5	2.33	0.48–6.80	<5	2.74	0.75–7.01
Mesothelioma†, SMR	C45	0	0.00	0.00–159	<5	3.16	0.38–11.41	<5	1.98	0.24–7.14
Prostate, SIR	C61	<5	2.65	0.72–6.79	109	1.22	1.01–1.48	101	1.11	0.91–1.35
Prostate, SMR	C61	0	0.00	0.00–22.03	7	0.72	0.29–1.48	47	1.16	0.85–1.54
Testis, SIR	C62	15	1.47	0.82–2.43	<5	1.10	0.13–3.97	0	0.00	0.00–12.7
Testis, SMR	C62	0	0.00	0.00–4.86	0	0.00	0.00–12.3	0	0.00	0.00–25.8
Kidney**, SIR	C64	<5	0.78	0.09–2.80	12	0.97	0.50–1.69	15	1.96	1.10–3.23
Kidney**, SMR	C64	<5	3.01	0.36–10.9	<5	0.83	0.23–2.13	<5	0.82	0.22–2.11
Urinary tract***, SIR	C65-C68	<5	1.05	0.22–3.06	23	0.96	0.61–1.44	43	1.52	1.10–2.04
Urinary tract***, SMR	C65-C68	0	0.00	0.00–12.0	<5	0.79	0.16–2.30	12	1.32	0.68–2.31
Thyroid, SIR	C73	<5	0.75	0.02–4.19	<5	2.06	0.56–5.27	<5	1.14	0.03–6.35
Thyroid, SMR	C73	0	0.00	0.00–48.5	<5	2.83	0.07–15.8	<5	2.40	0.06–13.4
Hodgkin lymphoma, SIR	C81	0	0.00	0.00–1.51	<5	1.49	0.18–5.37	0	0.00	0.00–7.98
Hodgkin lymphoma, SMR	C81	0	0.00	0.00–6.39	0	0.00	0.00–5.70	0	0.00	0.00–9.89
Non-Hodgkin lymphoma, SIR	C82-C86, C96	6	1.60	0.59–3.48	13	1.22	0.65–2.09	7	0.89	0.36–1.84
Non-Hodgkin lymphoma, SMR	C82-C86, C96	0	0.00	0.00–2.92	5	1.35	0.44–3.14	<5	0.87	0.24–2.22
Multiple myeloma, SIR	C90	0	0.00	0.00–3.81	5	0.93	0.30–2.16	<5	0.78	0.21–1.99
Multiple myeloma, SMR	C90	0	0.00	0.00–11.2	<5	0.70	0.09–2.55	5	1.22	0.40–2.85
Leukaemia, SIR	C91-C95	<5	0.42	0.01–2.37	8	1.05	0.45–2.07	5	0.73	0.24–1.71
Leukaemia, SMR	C91-C95	0	0.00	0.00–2.62	<5	1.09	0.30–2.79	6	1.16	0.43–2.52

ICD, International Classification of Diseases; Obs., observed; pyr, person-years.

†Observed number of deaths corrected to be in line with morphologically confirmed diagnoses, as described in the text (Results, paragraph 3–6).

\*Excluding basal cell carcinoma, \*\*Excluding renal pelvis, \*\*\*Including bladder and renal pelvis.