

Supplemental Table 1. Sensitivity analyses of mortality among workers with a claim for low back sprain or strain (1998-2015, West Virginia Referent Rates)^a

	Single claim (N=11,571)			First claim for low back sprain or strain only ^b (N=8,175)			Over 95% of county white ^c (N=7,766)		
	OBS	SMR	95% CI	OBS	SMR	95% CI	OBS	SMR	95% CI
All deaths	1192	0.96	0.90-1.01	726	0.87	0.81-0.94	729	0.88	0.82-0.94
All cancers	310	0.94	0.84-1.05	188	0.87	0.75-1.00	180	0.82	0.70-0.95
Heart diseases	205	0.84	0.73-0.96	128	0.80	0.66-0.95	127	0.78	0.65-0.93
Intentional self-harm	54	1.18	0.88-1.53	30	0.91	0.61-1.30	41	1.30	0.93-1.76
Accidental poisoning	92	1.56	1.26-1.91	59	1.36	1.03-1.75	61	1.51	1.16-1.94

OBS, observed number of deaths; SMR, standardized mortality ratio; CI, confidence interval

^aInternational Classification of Diseases (ICD) codes were mapped to all cancers, heart diseases, intentional self-harm, and accidental poisoning as described on the NIOSH website at <https://www.cdc.gov/niosh/ltras/pdf/NIOSH-119-table-2007.pdf>. ICD codes were mapped to drug overdose involving opioids as described in the methods section.

^bFirst claim for low back sprain or strain was for low back sprain and/or strain only

^cOver 95% of the claimant county was white only according to the 2000 census

Supplemental Table 2. Sensitivity analyses of adjusted hazard ratios for selected outcomes according to disability-related factors.^a

	All deaths		All cancers		Heart diseases		Intentional self-harm		Drug overdoses involving opioids	
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
Cohort members with a single claim										
Lost time	1.44	1.26-1.65	1.36	1.04-1.77	1.45	1.04-2.01	2.19	1.10-4.38	2.00	1.20-3.33
Weeks of lost time (per 100 weeks)	1.24	1.11-1.38	1.01	0.80-1.28	1.34	1.04-1.71	1.46	0.86-2.47	1.72	1.18-2.52
Permanent disability ^b	1.20	1.06-1.35	0.94	0.74-1.20	1.23	0.93-1.64	1.30	0.74-2.30	2.14	1.39-3.29
Permanent partial disability (vs. no disability)	1.20	1.06-1.36	0.93	0.73-1.19	1.23	0.92-1.64	1.26	0.71-2.25	2.12	1.37-3.27
Permanent total disability (vs. no disability)	1.05	0.58-1.93	1.26	0.46-3.40	1.35	0.41-4.37	3.39	0.45-25.26	3.51	0.48-25.77
Percent permanent disability (per 10%)	1.08	1.01-1.15	0.93	0.81-1.08	1.12	0.96-1.29	1.23	0.91-1.66	1.44	1.15-1.79
Surgical treatment	0.94	0.58-1.55	0.42	0.11-1.70	0.96	0.31-2.99	1.54	0.21-11.18	0	NC
First claim for low back sprain or strain only^c										
Lost time	1.42	1.20-1.67	1.64	1.17-2.31	1.72	1.14-2.58	1.91	0.84-4.31	1.51	0.87-2.63
Weeks of lost time (per 100 weeks)	1.47	1.19-1.81	1.24	0.80-1.91	1.26	0.74-2.12	2.63	1.11-6.22	3.13	1.82-5.37
Permanent disability ^b	1.26	1.06-1.49	1.06	0.75-1.49	1.46	0.99-2.15	1.34	0.57-3.20	2.51	1.44-4.36
Permanent partial disability (vs. no disability)	1.26	1.06-1.49	1.06	0.75-1.50	1.46	0.99-2.15	1.35	0.57-3.20	2.51	1.44-4.36
Permanent total disability (vs. no disability)	0	NC	0	NC	0	NC	0	NC	0	NC
Percent permanent disability (per 10%)	1.14	0.99-1.31	1.00	0.75-1.32	1.25	0.92-1.69	1.47	0.74-2.90	2.02	1.33-3.08
Surgical treatment	0.83	0.35-2.02	0	NC	2.25	0.70-7.23	0	NC	0	NC
Over 95% of county white^d										
Lost time	1.60	1.34-1.91	1.51	1.06-2.15	1.48	0.98-2.22	2.10	0.97-4.59	1.85	1.02-3.38
Weeks of lost time (per 100 weeks)	1.29	1.12-1.49	1.25	0.94-1.67	1.10	0.78-1.56	1.45	0.78-2.71	1.68	1.05-2.67
Permanent disability ^b	1.41	1.20-1.64	1.23	0.90-1.68	1.07	0.74-1.55	1.25	0.64-2.45	3.22	1.92-5.42
Permanent partial disability (vs. no disability)	1.41	1.21-1.65	1.20	0.87-1.65	1.10	0.76-1.59	1.19	0.60-2.36	3.26	1.94-5.49
Permanent total disability (vs. no disability)	1.13	0.47-2.74	2.38	0.75-7.56	0	NC	4.74	0.63-35.82	0	NC

Percent permanent disability (per 10%)	1.14	1.04-1.24	1.11	0.94-1.31	1.02	0.83-1.26	1.21	0.85-1.73	1.38	1.05-1.82
Surgical treatment	0.81	0.38-1.71	0	NC	1.69	0.54-5.35	0	NC	0	NC

HR, hazard ratio; CI, confidence interval; NC, not calculated as no cases exposed

^aModels were adjusted for age (time scale) and for sex, and birth date (± 5 years) by matching. The number of observed cases in these analyses ranged from 28 to 1295, depending on the death category, disability-related factor, and sensitivity analysis.

^bPermanent partial or permanent total disability

^cFirst claim for low back sprain or strain was for low back sprain and/or strain only

^dOver 95% of the claimant county was white only according to the 2000 census

Supplemental Table 3. Mortality among workers with a claim for low back sprain or strain (1998-2015, West Virginia Referent Rates) by sex.^a

	Overall cohort (N=14,218)			Men (N=8,948)			Women (N=5,270)		
	OBS	SMR	95% CI	OBS	SMR	95% CI	OBS	SMR	95% CI
All deaths	1,393	0.92	0.87-0.97	960	0.89	0.83-0.95	433	0.99	0.90-1.09
All cancers	353	0.88	0.79-0.98	233	0.88	0.77-1.00	120	0.87	0.72-1.04
Heart diseases	239	0.80	0.70-0.91	177	0.78	0.67-0.90	62	0.88	0.68-1.13
Intentional self-harm	65	1.14	0.88-1.45	57	1.15	0.87-1.49	8	1.08	0.47-2.13
Accidental poisoning	119	1.62	1.34-1.94	89	1.56	1.26-1.92	30	1.83	1.23-2.61

OBS, observed number of deaths; SMR, standardized mortality ratio; CI, confidence interval

^aInternational Classification of Diseases (ICD) codes were mapped to all cancers, heart diseases, intentional self-harm, and accidental poisoning as described on the NIOSH website at <https://www.cdc.gov/niosh/ltas/pdf/NIOSH-119-table-2007.pdf>.

Supplemental Table 4. Adjusted hazard ratios (HRs) for selected outcomes according to disability-related factors by sex.^a

	All deaths		All cancers		Heart diseases		Intentional self-harm		Drug overdoses involving opioids	
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
Lost time										
All	1.44	1.27-1.63	1.41	1.10-1.81	1.42	1.06-1.92	1.85	1.02-3.37	1.89	1.22-2.93
Men	1.44	1.24-1.67	1.32	0.98-1.79	1.23	0.88-1.73	2.14	1.10-4.16	2.02	1.21-3.37
Women	1.46	1.17-1.82	1.60	1.03-2.46	2.27	1.18-4.37	0.82	0.20-3.42	1.53	0.64-3.62
Weeks of lost time (per 100 weeks)										
All	1.27	1.14-1.41	1.05	0.84-1.32	1.35	1.06-1.71	1.53	0.94-2.50	1.73	1.23-2.44
Men	1.30	1.15-1.47	1.09	0.83-1.42	1.29	0.97-1.71	1.52	0.89-2.58	1.78	1.20-2.63

Women	1.19	0.97-1.46	0.96	0.62-1.48	1.53	0.97-2.42	1.64	0.45-5.91	1.59	0.78-3.26
Permanent disability ^b										
All	1.25	1.12-1.40	0.99	0.79-1.24	1.25	0.96-1.63	1.31	0.78-2.22	2.32	1.60-3.38
Men	1.20	1.05-1.38	0.90	0.68-1.19	1.12	0.82-1.53	1.42	0.81-2.49	2.44	1.59-3.75
Women	1.36	1.11-1.66	1.20	0.82-1.77	1.70	1.02-2.84	0.75	0.15-3.71	1.99	0.92-4.30
Permanent partial disability (vs. no disability)										
All	1.25	1.12-1.40	0.98	0.78-1.23	1.25	0.95-1.63	1.28	0.75-2.18	2.31	1.59-3.37
Men	1.20	1.05-1.38	0.88	0.66-1.16	1.10	0.80-1.51	1.38	0.78-2.44	2.42	1.57-3.73
Women	1.38	1.13-1.69	1.22	0.83-1.80	1.80	1.07-3.02	0.76	0.15-3.77	2.02	0.93-4.35
Permanent total disability (vs. no disability)										
All	1.11	0.61-2.03	1.37	0.51-3.71	1.38	0.43-4.50	3.36	0.46-24.8	3.16	0.43-23.0
Men	1.36	0.73-2.55	1.62	0.60-4.38	1.89	0.60-5.99	3.91	0.53-29.1	4.13	0.56-30.4
Women	0.36	0.05-2.64	0	NC	0	NC	0	NC	0	NC
Percent permanent disability (per 10%)										
All	1.10	1.03-1.17	0.97	0.85-1.11	1.13	0.98-1.31	1.27	0.96-1.68	1.40	1.14-1.71
Men	1.10	1.02-1.19	1.00	0.86-1.17	1.11	0.94-1.31	1.23	0.91-1.67	1.41	1.12-1.77
Women	1.10	0.97-1.24	0.89	0.67-1.17	1.22	0.92-1.61	1.51	0.75-3.03	1.37	0.89-2.12
Surgical treatment										
All	0.90	0.55-1.48	0.40	0.10-1.61	0.92	0.29-2.87	1.46	0.20-10.6	0	NC
Men	0.77	0.41-1.44	0.28	0.04-1.98	0.40	0.06-2.84	0	NC	0	NC
Women	1.26	0.56-2.82	0.73	0.10-5.20	2.67	0.65-11.0	14.8	1.80-121	0	NC

HR, hazard ratio; CI, confidence interval; NC, not calculated as no cases exposed

^aAll models were adjusted for age (time scale) and for birth date (± 5 years) by matching. Models for all claimants were also adjusted for sex by matching. The number of observed cases in these analyses ranged from 8 to 1295, depending on the claimant's sex, death category, and disability-related factor in the model.

^bPermanent partial or permanent total disability

Supplemental Table 1. Sensitivity analyses of mortality among workers with a claim for low back sprain or strain (1998-2015, West Virginia Referent Rates).

Supplemental Table 2. Sensitivity analyses of adjusted hazard ratios for selected outcomes according to disability-related factors.

Supplemental Table 3. Mortality among workers with a claim for low back sprain or strain (1998-2015, West Virginia Referent Rates) by sex.

Supplemental Table 4. Adjusted hazard ratios (HRs) for selected outcomes according to disability-related factors by sex.

Supplemental Figure 1: Splines depicting mortality over time in the overall cohort from the date of injury for deaths caused by international self-harm and opioid overdoses.

Supplemental Figure 2: Splines depicting the hazard ratio of lost-time vs no lost-time over time in the overall cohort from the date of injury for overall mortality, deaths from cancer, heart disease, and opioids. A p-value testing the proportional hazard assumption is included in the bottom right corner for each outcome.

Supplemental Figure 3: Kaplan-Meier survival curves and associated 95% confidence intervals for lost-time (solid line, pale curve) and no lost-time members (dotted line, dark curve) of the cohort for overall mortality and specific causes of death from the date of injury