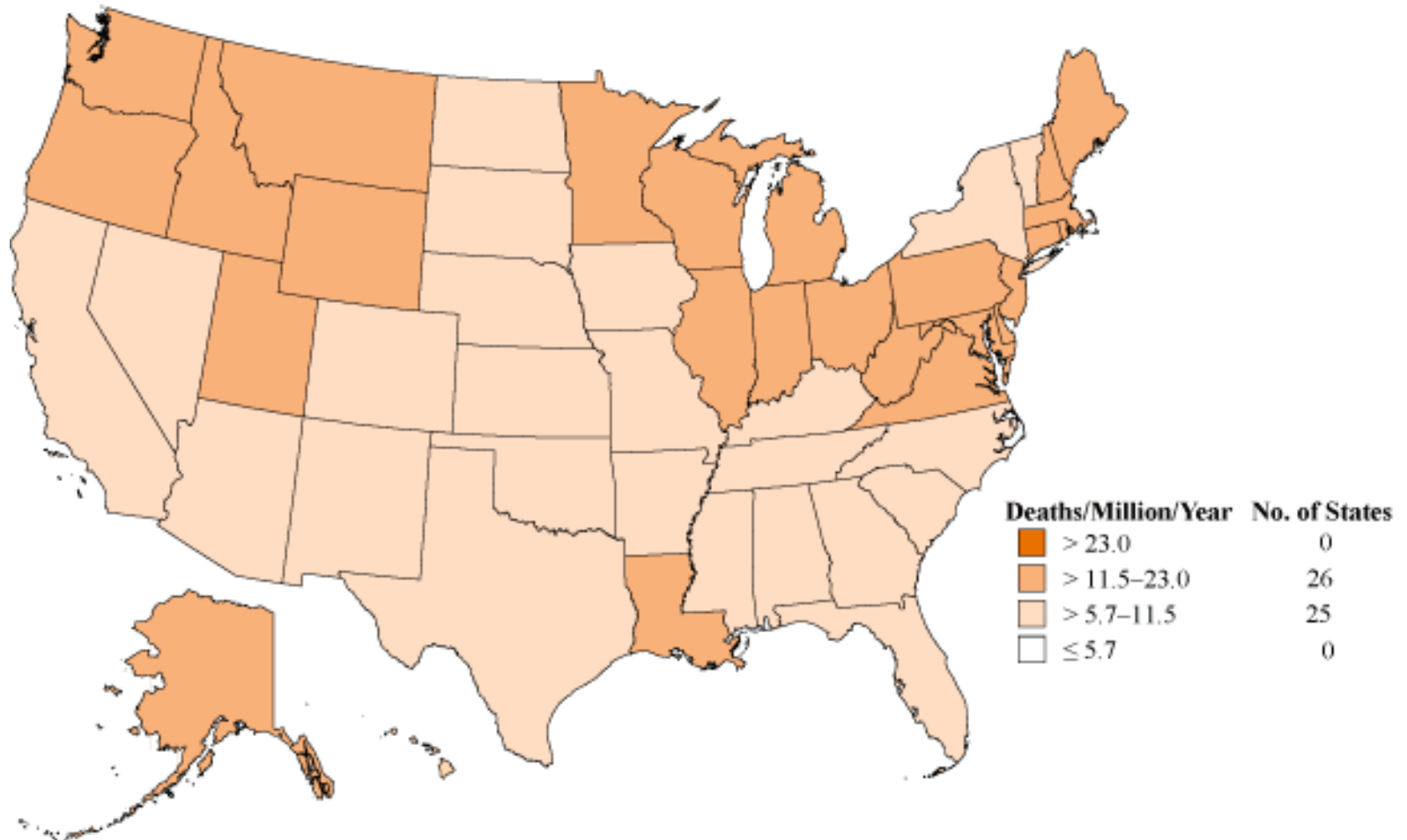




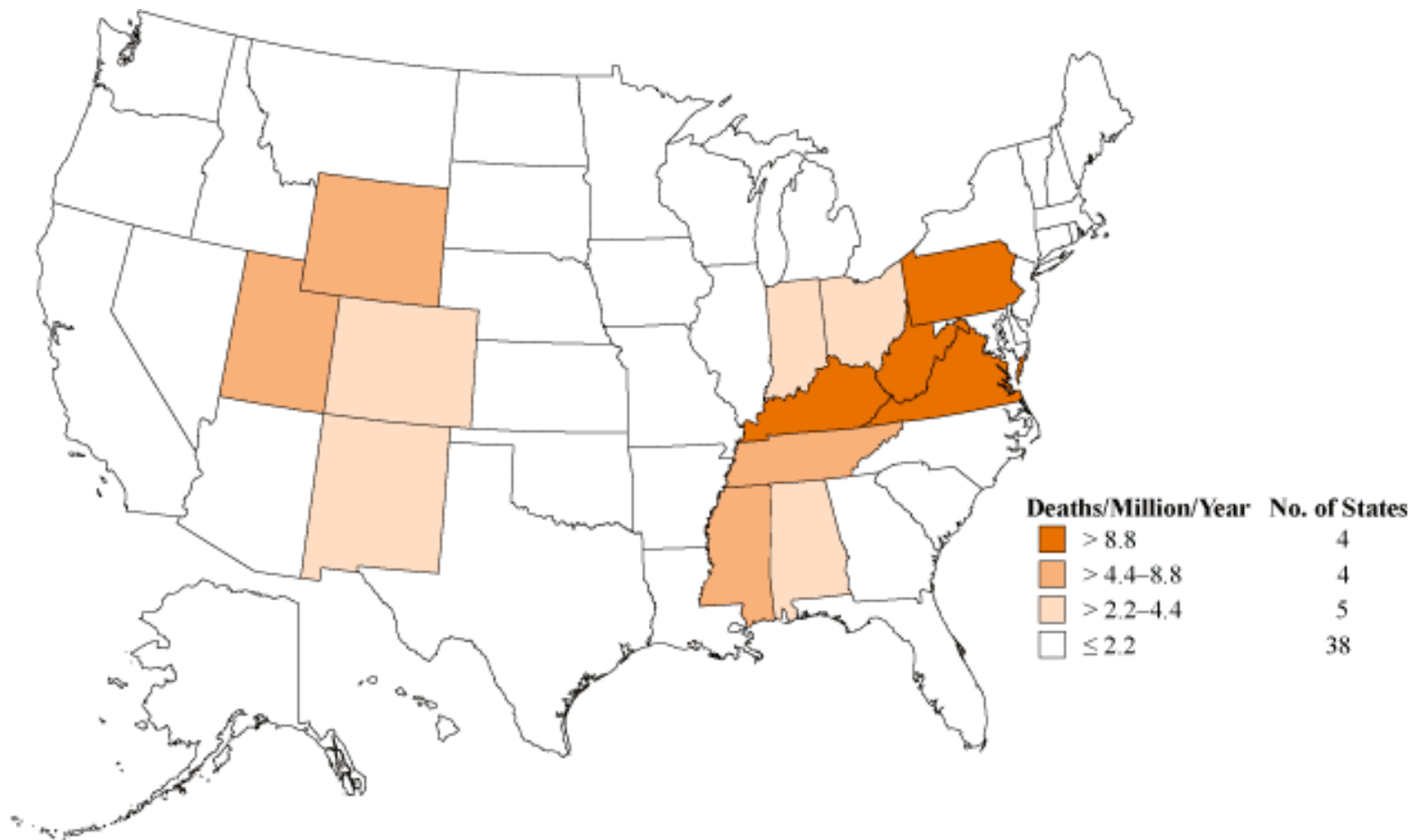
Dust Management:
Protecting your Health
Supplemental Resources

Malignant mesothelioma: Age-adjusted death rates by state, U.S. residents age 15 and over, 1999-2005



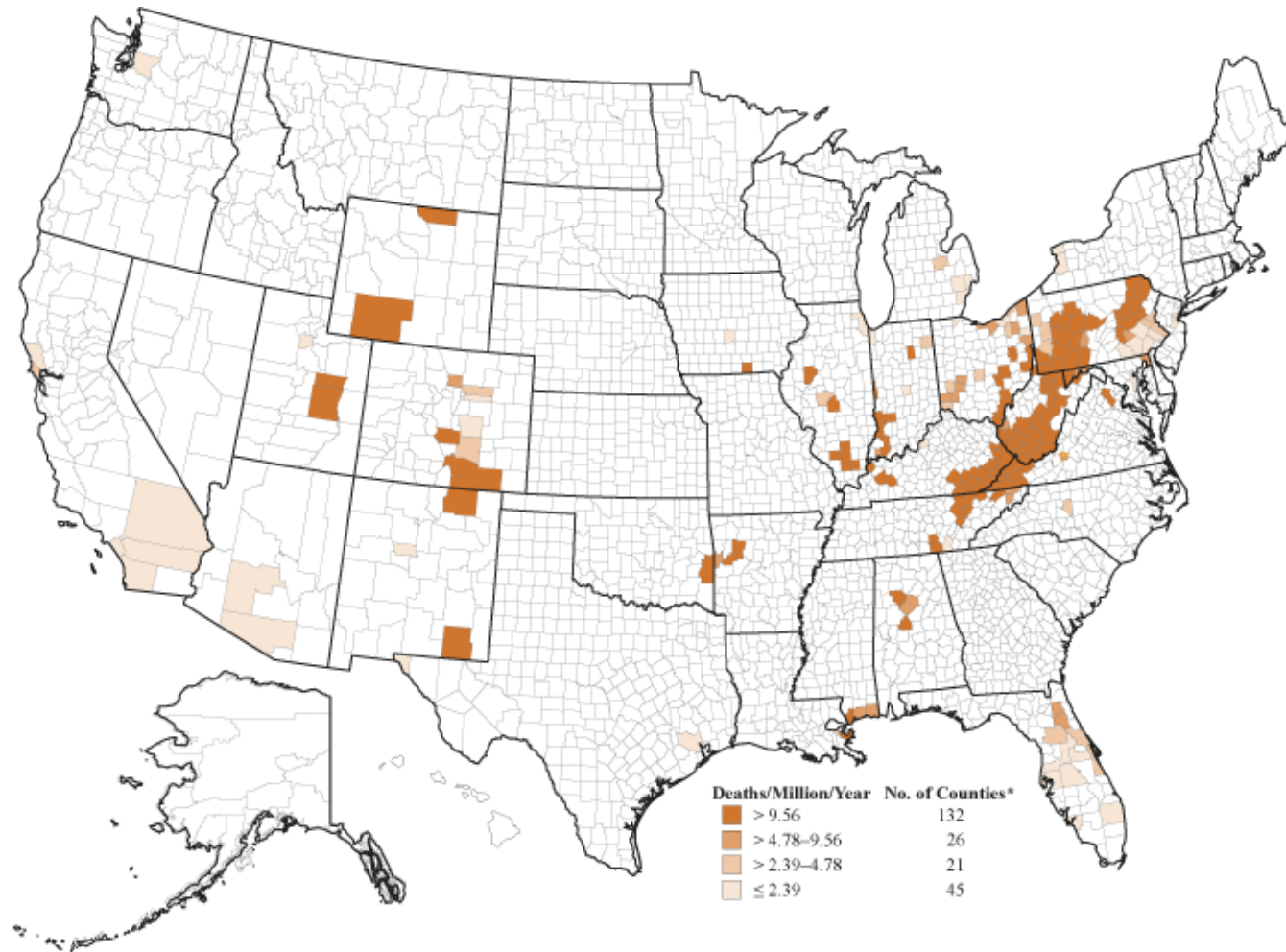
Source: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau
<http://www2.cdc.gov/drds/worldreportdata/FigureTableDetails.asp?FigureTableID=890&GroupRefNumber=F07-02>

Coal workers' pneumoconiosis: Age-adjusted death rates by state, U.S. residents age 15 and over, 1996-2005



Source: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau
<http://www2.cdc.gov/drds/worldreportdata/FigureTableDetails.asp?FigureTableID=510&GroupRefNumber=F02-02>

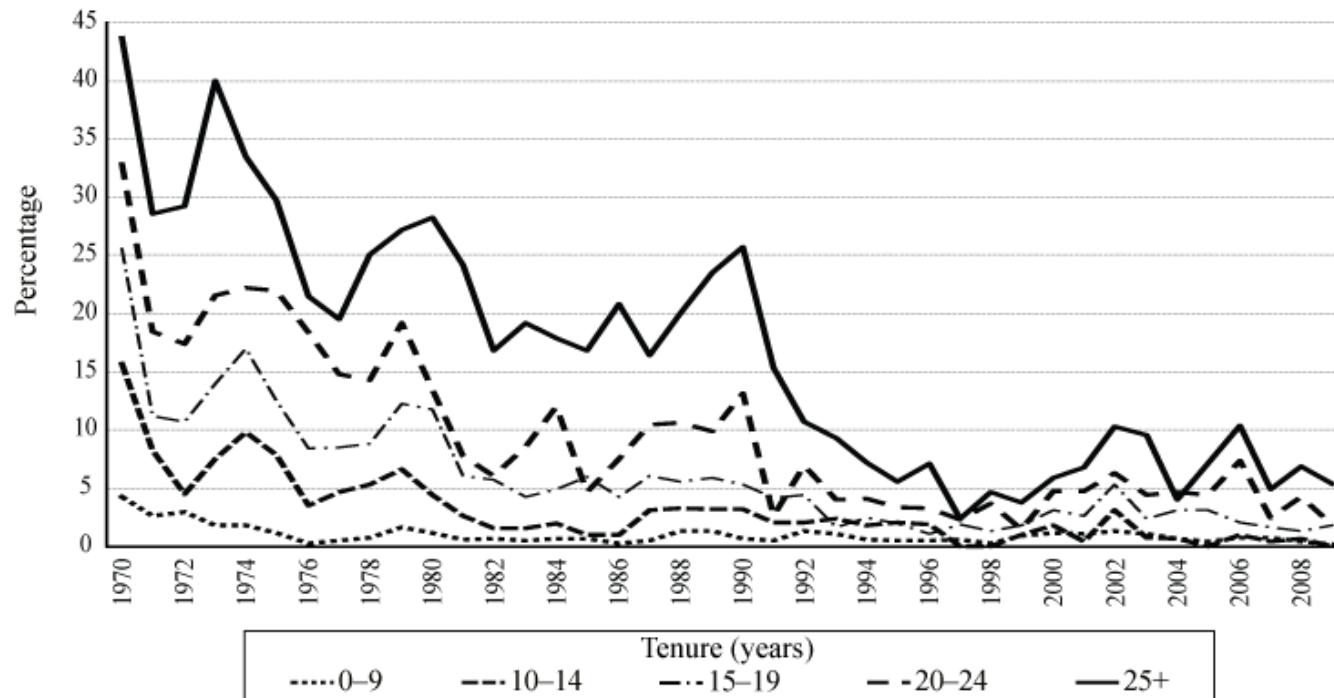
Coal workers' pneumoconiosis: Age-adjusted death rates by county, U.S. residents age 15 and over, 1995-2004



Source: National Center for Health Statistics multiple cause-of-death data. Population estimates from U.S. Census Bureau

<http://www2.cdc.gov/drds/worldreportdata/FigureTableDetails.asp?FigureTableID=521&GroupRefNumber=F02-03b>

Percentage of examined underground miners with coal workers' pneumoconiosis (ILO category 1/0+) by tenure in mining, 1970-2009



ILO - International Labour Organization

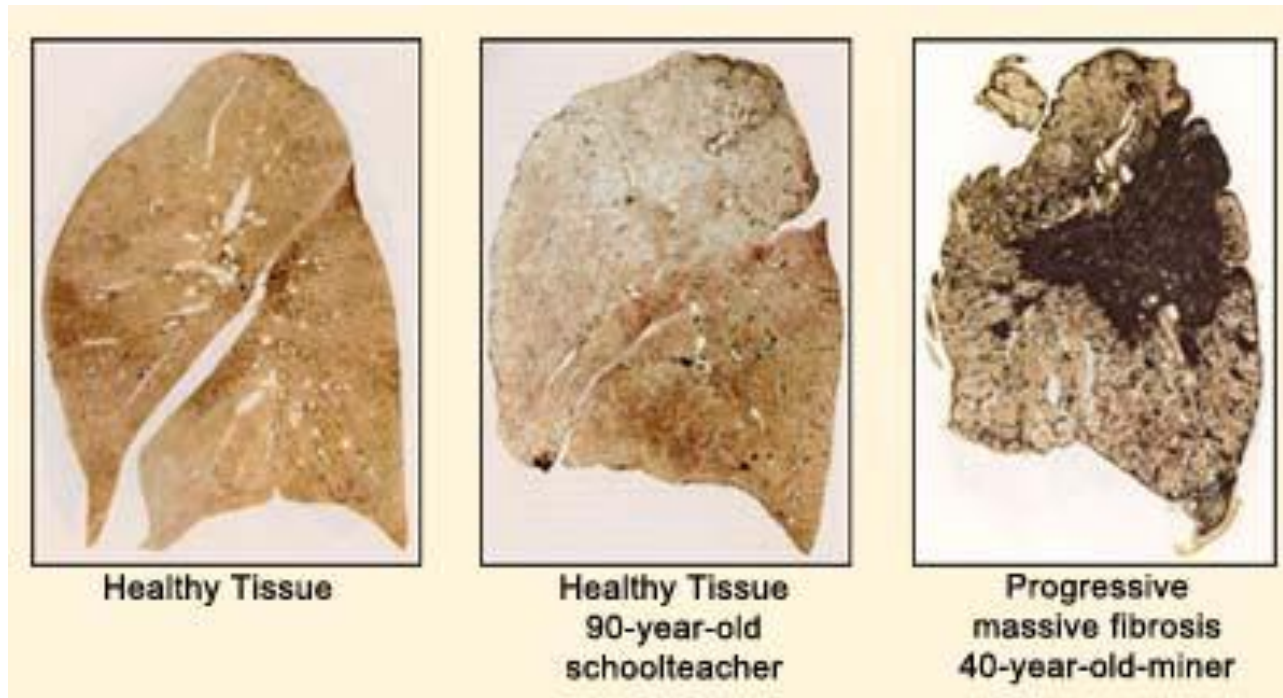
Source: Coal workers' pneumoconiosis data from NIOSH Coal Workers' X-ray Surveillance Program (CWSP). See Appendix A for data source description.

<http://www2.cdc.gov/drds/worldreportdata/FigureTableDetails.asp?FigureTableID=2549&GroupRefNumber=F02-046>

**UNITED MINE WORKERS
OF AMERICA**

Health and Safety on the Job

Black Lung



Source: <http://www.umwa.org/?q=content/black-lung>

Coal Workers' Pneumoconiosis: Number of deaths by rates by State, U.S. residents age 15 and over, 1996-2005

STATE	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Alabama	14	15	13	8	6	8	7	11	9	6	97
Alaska	-	-	-	1	-	-	-	-	-	-	1
Arizona	7	2	1	4	3	4	4	1	2	3	31
Arkansas	5	4	3	7	2	6	5	3	3	1	39
California	12	4	17	8	8	4	7	3	2	4	69
Colorado	7	11	8	9	10	6	9	6	7	1	74
Connecticut	-	-	1	1	1	2	-	-	1	-	6
Delaware	-	2	-	-	-	-	-	-	1	-	3
District of Columbia	-	-	-	-	-	-	-	1	-	-	1
Florida	28	23	14	16	11	12	13	17	11	17	162
Georgia	3	3	1	2	7	1	4	1	-	1	23
Hawaii	-	-	-	-	-	-	-	-	-	1	1
Idaho	1	2	2	1	-	-	-	-	-	-	6
Illinois	41	39	26	24	14	15	10	12	11	16	208
Indiana	16	22	22	12	11	12	11	11	5	11	133
Iowa	7	4	3	4	5	2	2	3	1	4	35
Kansas	4	1	2	1	-	1	1	-	1	2	13
Kentucky	129	99	90	90	69	70	71	86	75	79	858
Louisiana	2	2	1	1	2	2	5	5	3	4	27
Maine	-	-	-	-	-	-	-	-	1	-	1
Maryland	8	7	11	7	2	4	3	3	2	-	47
Massachusetts	-	-	1	-	-	-	-	-	-	-	1
Michigan	10	9	7	6	9	7	8	4	2	8	70
Minnesota	-	-	-	-	-	1	1	1	1	-	4
Mississippi	1	7	6	6	15	17	10	12	16	21	111
Missouri	1	2	2	3	3	2	1	1	2	3	20
Montana	2	2	-	-	1	-	-	1	-	1	7
Nebraska	-	1	1	-	-	1	-	-	-	-	3
Nevada	1	-	-	1	-	-	-	-	1	-	3
New Hampshire	-	1	-	-	1	1	-	-	-	-	3
New Jersey	8	4	5	4	2	2	1	3	3	3	35
New Mexico	7	5	5	4	6	2	6	5	2	6	48
New York	4	4	2	6	5	10	5	3	1	4	44
North Carolina	9	4	6	9	9	8	7	4	9	6	71
North Dakota	-	1	-	-	-	-	-	-	-	-	1
Ohio	64	41	52	31	43	31	30	24	19	27	362
Oklahoma	1	5	2	2	3	2	2	1	4	4	26
Oregon	1	1	1	1	-	-	-	2	-	1	7
Pennsylvania	622	550	464	409	387	348	314	294	254	196	3,838
Rhode Island	1	-	-	-	-	-	-	-	-	-	1
South Carolina	3	1	5	2	4	1	1	-	-	1	18
South Dakota	-	1	-	-	-	-	-	-	1	-	2
Tennessee	25	19	23	26	15	23	18	12	17	21	199
Texas	8	6	2	7	8	5	2	12	6	2	58
Utah	6	8	9	5	7	6	7	5	10	8	71
Vermont	-	-	-	-	-	-	-	-	-	-	-
Virginia	124	129	82	86	71	94	113	75	81	80	935
Washington	5	6	4	-	2	-	4	-	-	1	22
West Virginia	228	245	207	196	205	175	175	146	137	109	1,823
Wisconsin	-	3	1	1	1	2	-	3	-	-	11
Wyoming	2	2	1	2	2	2	1	2	2	1	17
TOTAL	1,417	1,297	1,103	1,003	950	889	858	773	703	653	9,646

- Indicates no deaths listed.

Source: National Center for Health Statistics multiple cause-of-death data.

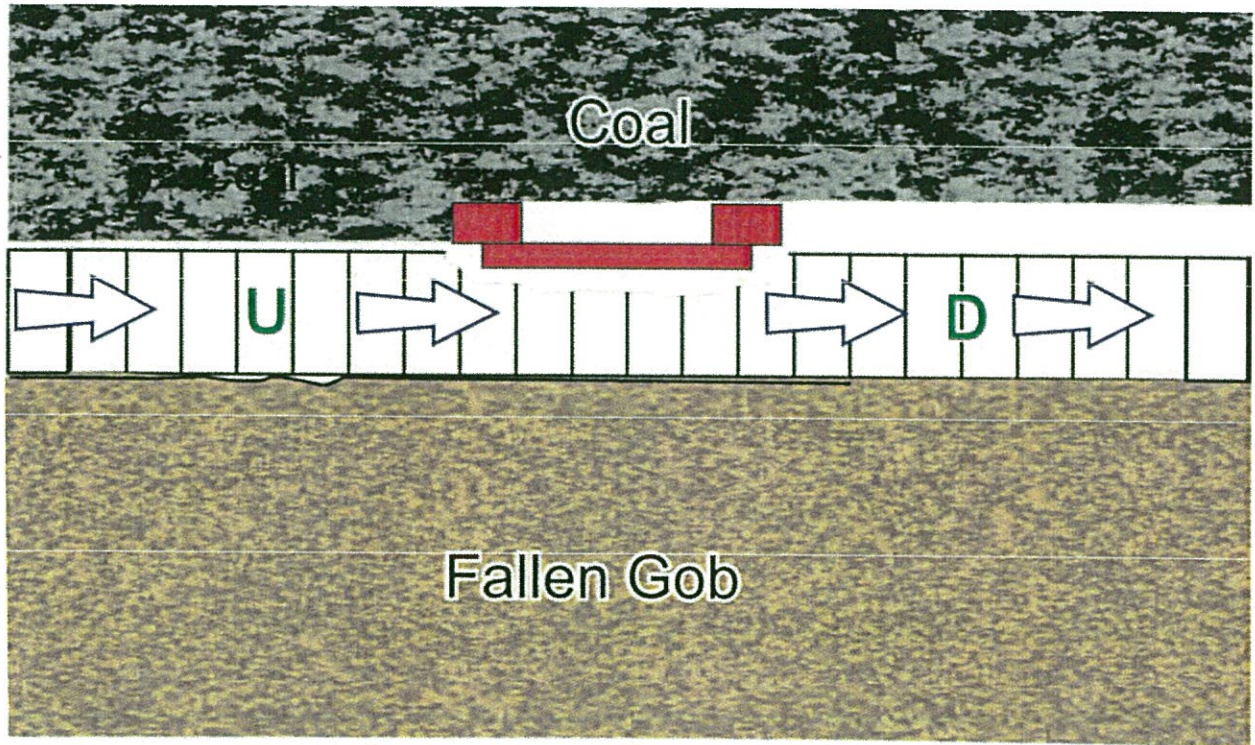
<http://www2.cdc.gov/drds/worldreportdata/FigureTableDetails.asp?FigureTableID=514&GroupRefNumber=T02-04>

Coal workers' pneumoconiosis: Most frequently recorded industries on death certificate, U.S. residents age 15 and over, selected states and years, 1990-1999

CIC	Industry	Number of Deaths	Percent
041	Coal mining	3,765	77.0
060	Construction	188	3.8
270	Blast furnaces, steelworks, rolling and finishing mills	56	1.1
392	Not specified manufacturing industries	48	1.0
400	Railroads	39	0.8
010	Agricultural production, crops	35	0.7
351	Motor vehicles and motor vehicle equipment	30	0.6
410	Trucking service	29	0.6
040	Metal mining	25	0.5
961	Non-paid worker or non-worker or own home/at home	24	0.5
	All other industries	461	9.4
	Industry not reported	193	3.9
	TOTAL	4,893	100.0

Source: National Center for Health Statistics multiple cause-of-death data.

<http://www2.cdc.gov/drds/worldreportdata/FigureTableDetails.asp?FigureTableID=29&GroupRefNumber=T02-06>



U - Upwind location D - Downwind location

Mobile sampling used to quantify shearer dust

Source: <http://www.cdc.gov/niosh/mining/pubs/pdfs/2010-110.pdf>

Venturi sprays mounted on headgate splitter arm.



Headgate splitter arm with flat-fan sprays mounted on gob side of belting.



Directional sprays mounted on face side of shearer body

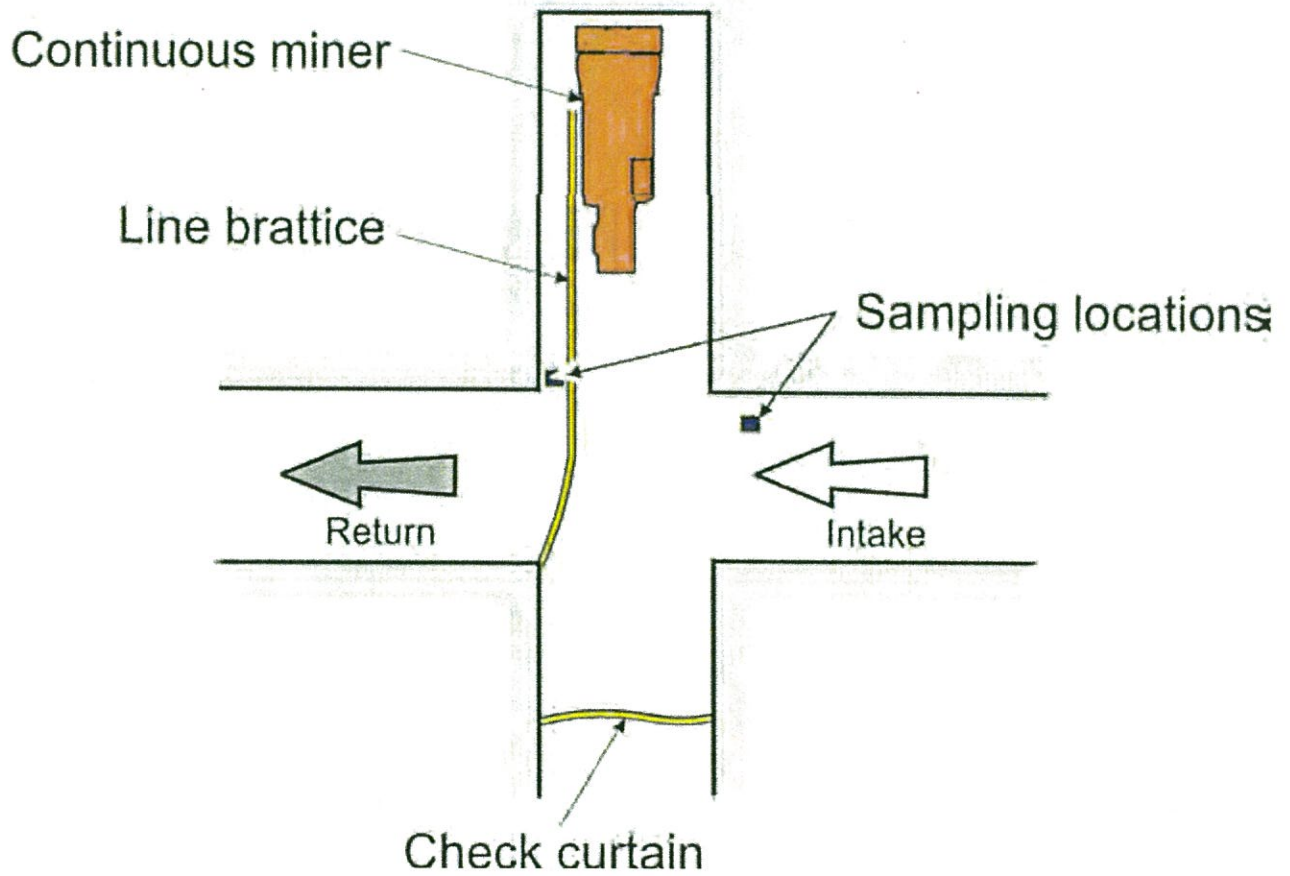


Raised deflector plate can enhance the effectiveness of the directional spray system.

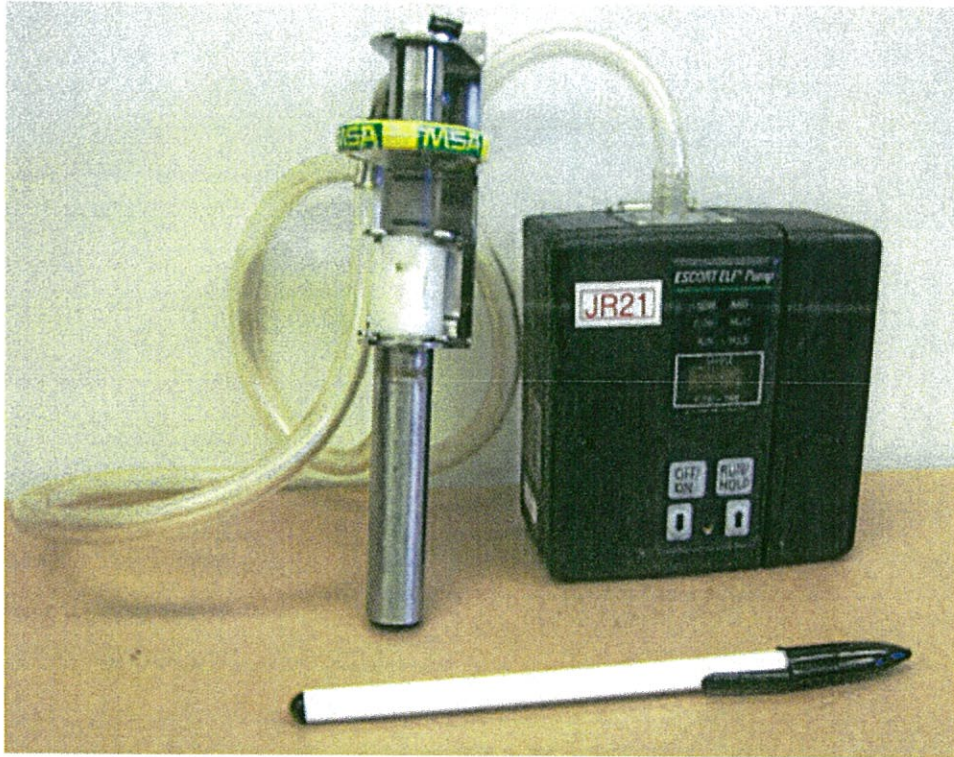


Source: <http://www.cdc.gov/niosh/mining/pubs/pdfs/2010-110.pdf>

Sampling locations used to isolate dust generated by a continuous miner.



Gravimetric sampling pump, cyclone, and filter cassette.



Personal Dust Monitor (PDM) with tapered-element oscillating microbalance (TEOM) removed.

