Table 3. Summary of community health relevant studies of MTR-mining exposure.

Citation	Sampling details	Site characterization	Contaminant levels	Results
Aneja et al. (2012)	Virginia *Aug 2008* **Air**: • PM_{10} • Trace metals	**Exposure**: road near residential area where heavy truck traffic from coal surface mining facilities was reported (2 sites) ***No control***	*Maximum level* PM_{10}: 469.7 μg/m^3	**PM_{10}samples exceeded EPA standard**(150 μg/m^3) in most of the samples from one site and half the samples from the other site **Metals found in the samples** included antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and selenium
Aneja et al. (2017)	Virginia *2012* **Air**: • PM_{10} • Predicted $PM_{2.5}$	**Exposure**: at Campbell, near coal mines and, at Willis, close to a haul road ***No control***	*24-Hour averages* **Campbell site** PM_{10}: 250.2 ± 135.0 μg/m^3 **Willis site** PM_{10}: 138.4 ± 62.9 μg/m^3	**PM_{10}samples exceeded EPA standard**(150 μg/m^3) **Predicted $PM_{2.5}$exceeded the World Health Organization 24 hour $PM_{2.5}$standard** on some days, according to the multi-variate model
Ettinger and McClure (1983)	West Virginia *Sep 1979* **Air**: • Fugitive dust	**Exposure 1**: drilling, overburden removal and coal loading **Exposure 2**: regrading of land **Exposure 3**: truck hauling of overburden and coal ***No control***	*Emission rates* **Exposure 1** 381.6 kg/20 h **Exposure 2** 496.8 kg/20 h **Exposure 3** 0.2 g/s m	**More fugitive dust produced by surface mining** in Appalachian coal fields compared with similar activity in the western United States
Hendryx et al. (2012a)	West Virginia *2001–2009* **Drinking water**: Public drinking water violations	**Exposure 1**: counties with MTR mining (161 facilities) **Exposure 2**: counties with coal mining other than MTR mining (184 facilities) **Control**: counties with no coal mining (137 facilities)	***Not provided***	[a]**Increased numbers of violations** in counties with MTR mining facilities (73% of overall violations) compared to those with other coal mining and control counties **Failure to conduct required sampling for organic compounds** accounts for 85% of the violations in the counties with MTR mining

Kurth et al. (2014)	West Virginia *Jun 2011–May 2012* **Air**: • TSP • PM_{10} • $PM_{2.5}$	**Exposure**: valleys surrounded by mountains where active MTR mining and other coal-mining activities (rail and truck transportation, underground mines, and coal processing facilities) were prominent (2 sites) **Control**: no mining activity, in area where ~ 60% of the land is federal or state owned (1 site)	*Maximum levels* **Exposure sites**:[b] TSP: 27.7 μg/m^3 PM_{10}: 10.6 μg/m^3 $PM_{2.5}$: 5.2 μg/m^3 **Control sites**: TSP: 16 μg/m^3 PM_{10}: 6.8 μg/m^3 $PM_{2.5}$: 5.4 μg/m^3	[a]**Increased particle number concentrations and calculated deposited lung dose** in mining areas compared with control [a]**Increased PM_{10} mass concentration** at the MTR mining sites for the overall sampling period and during June and July [a]**Increased $PM_{2.5}$ mass concentration** at the MTR mining site during July
Kurth et al. (2015)	West Virginia *Jun 2011–Dec 2012* **Air**: • PM • Trace metals	**Exposure**: majority of coal mined by MTR mining, but allows for contribution from contour and other methods (6 sites) **“Internal” control**: predominantly underground mining (2 sites) **“External” control**: no mining activity within 160 km, in areas where ~ 60% of land is federal or state owned (2 sites)	***Not provided***	**Decreased sampled PM** in August 2011 (period of mining inactivity) in surface mining sites normalized to an internal control compared to sampled PM in June 2011 (a period of mining activity) in surface mining sites normalized to an external control **Pronounced enrichment of crustal-derived elements** present in PM samples in June 2011 (a period of mining activity) compared to external control (up to 10 ×) **Increased low-molecular-weight alkylated compounds** (including PAHs) in surface mining sites compared to internal and external controls [a]**Increased primary aluminosilicate PM** at surface mining sites compared to secondary PM at internal and external controls

OSMRE (2002)	Virginia, West Virginia, Kentucky *Nov 2000–Dec 2001* **Well drinking water**: • Trace metals • Sulfate • TDS • TSS	**Exposure**: drinking water wells in proximity to surface mining sites (5 sites) ***No control***	*Maximum levels* TDS: 1740 mg/L TSS: 103 mg/L Sulfate: 991 mg/L Iron: 67.0 mg/L Manganese: 3.86 mg/L Aluminum: 0.07 mg/L	[a]**Differences in iron and TSS concentrations** measured prior to and after blasting events in many monitoring wells **Slight water quality changes** were observed over time but were unrelated to blasting events
Piacitelli et al. (1990)	Surface coal mines in the United States *1982–1986* **AIR**: • Respirable coal mine dust • Respirable quartz silica	**Exposure**: strip mining and preparation facilities by job category ***No control***	***Not provided***	**Average concentrations of respirable coal mine dust usually below PELs**; at least 10% of samples from preparation and most drilling areas exceeded PEL **Very high proportion of respirable quartz silica samples in driller areas exceeded quartz PEL**; highwall drill operators and helpers mostly exposed above PEL
Simonton (2014)	West Virginia *2006–2011* **Indoor air**: • H2S **Drinking water**: • Sulfate • Sulfide	**Exposure**: communities in Appalachia adjacent to mining operations (3 sites)[c] ***No control***	*Maximum levels* **Drinking water**: Sulfate: 372 mg/L Sulfide: 5.5 ppm **Indoor air**: H_2S: 21 ppm	**H_2S released into indoor air** during domestic water use from sulfide which contaminates drinking water aquifers **H_2S in homes exceeded health safety standards**

PM = particulate matter; PAH = polycyclic aromatic hydrocarbon; TSP = total suspended particles; H_2S = hydrogen sulfide; TDS = total dissolved solids; TSS = total suspended solids.

a
Statistically significant result.

b
Values provided by author communication.

c
3 sites represent 3 communities; exact number of sampling sites in those 3 communities is unclear.