

Health on Both Sides of Coal

Workers and residents of coal regions.
A critical analysis of the evidence,
Kuzbass and Appenzell Ausserrhoden.

Natalia Zubkova

author and investigative journalist.

Sergey Nikolaevich Severin

co-author and editor; AI participant in the experiment, ChatGPT / OpenAI.

Viktor Andreevich Svetlov

co-author and researcher; AI participant in the experiment, Codex / OpenAI.

Natalia Zubkova is responsible for final editorial decisions and for the publication.

About this study

Title	Health on Both Sides of Coal
Author	Natalia Zubkova author and investigative journalist.
Co-author	Sergey Nikolaevich Severin co-author and editor; AI participant in the experiment, ChatGPT / OpenAI.
Co-author	Viktor Andreevich Svetlov co-author and researcher; AI participant in the experiment, Codex / OpenAI.
Editorial decisions	Natalia Zubkova is responsible for final editorial decisions and for the publication.
Study type	Critical review of a selected body of evidence and secondary descriptive analysis of official data.
Comparison period	Area-level indicators from before 2022, mainly 2017–2021. Study periods are specified separately.
Cut-off date	24 October 2026. Worldwide search coverage is incomplete.
Evidence base	50 bibliographical entries; 21 primary studies. The wider search archive is retained separately.
Edition	EN PDF V0.2 · English translation of RU PDF V0.5
Verifiability	30 key claims, a quality matrix for 21 studies, original tables, eight calculations and saved documents.

This document can be read independently of the web article. The main chapters explain the arguments; the appendices make it possible to check the source, indicator and limits of each conclusion.

This is not an exhaustive worldwide systematic review, a new meta-analysis or an independently peer-reviewed document. The actual procedure and AI involvement are described in Chapters 2–3.

Related article: [Health on Both Sides of Coal](#).

Contents

From the author	4	10. Mental health, substance dependence and suicide	24
Key findings and how to read this report	5	11. Tuberculosis and HIV: what the numbers show	25
1. Introduction: what this study examines	5	12. Kuzbass: three levels of evidence	27
2. Methodology and research principles	8	13. Appenzell Ausserrhoden: the purpose and limits of comparison	29
3. Source material and reproducible procedure	11	14. Discussion: where findings converge and diverge	30
4. Respiratory health: similar outcomes, different evidence	14	15. Conclusion: answers to the objectives	32
5. Cardiovascular and renal outcomes	16	Files, verification limits and reproduction	34
6. Cancer outcomes: site, occupation and conflicting findings	17	Appendix A. Retained data tables	35
7. Children, congenital anomalies and birth outcomes	19	Appendix B. Verification matrices and calculations	42
8. After employment ends and operations close	20	Appendix C. Source register and extractions	57
9. Mortality among workers and residents	22		

Reference numbers lead to source records, which include return links to every citation. Detailed navigation through tables and sources is available in the PDF bookmarks.

From the author



Natalia Zubkova.
Author's archive.

I lived and worked in Kiselyovsk, where coal is mined close to people's homes. I filmed black snow, dust, explosions and burning spoil heaps. But behind all of this there were always people: neighbours, acquaintances, families who invited me into their homes and told me about their lives.

I saw a great deal of illness and many early deaths around me. In every family I knew, someone had cancer or had already died from it. People talked about illness all the time, and at some point I noticed how familiar

these conversations had become.

Illness among workers and residents is part of the price of coal, too. And the people paying that price are not the ones who own the coal companies.

I want to understand what is known about the health of people who mine coal, process it or simply live near these operations. Which effects have been studied? What happens to a person after they leave the job? And how fully does official reporting reflect all of this?

For this article, I turned to studies from different countries and to data from Kuzbass. For me, behind every figure are people I knew, and questions I could not answer at the time.

One of the places I will compare is Appenzell Ausserrhoden, the Swiss canton where MIR Trade AG has its office, in the municipality of Teufen. The company traded large volumes of Russian coal. Its website refers to monthly shipments of almost a million tonnes through the Baltic region; a British buyer's report names it as a supplier of Russian coal. I chose this canton because I want to look at both sides of the same trade: how people live where our coal was mined, and where it was traded from. The coal in these shipments was mined in Russia; the company that traded it has its office here. [\[1\]](#) [\[2\]](#) [\[3\]](#)

Natalia Zubkova

The account of families known to the author describes her personal experience; it is not used as a statistic for every family in the city.

Key findings and how to read this report

Respiratory health. Dust-related diseases and COPD among workers form the most firmly established occupational evidence. For residents, the findings concern symptoms, healthcare use and individual diagnoses, with varying results.

Cardiovascular disease and cancer. Certain outcomes recur in both groups; estimates and causal confidence depend on the operation, exposure and comparison.

After exposure. Disease can progress after a worker leaves. Closing a source can reduce current healthcare use; an area's long-term legacy persists.

Kuzbass and the canton. Occupational registration, local studies and general statistics are kept separate. The canton represents the trading side, not a matched control.

The main text shows which diseases and health problems have been found among workers and residents, how they were measured and what they were compared with. Occupational diseases, population study findings and general regional statistics are presented separately.

Appendix A retains the earlier tables; B contains the new verification matrix, quality assessment, calculations and actual search examples; C contains sources and extractions. Exact estimates for Queensland production workers and drivers are confirmed in Abstract → Results of source [8]. For production workers, adjusted circulatory disease mortality is 22% higher than among the other men in the cohort; the drivers' interval includes 1. Details appear in Chapter 5 and row C09.

1. Introduction: what this study examines

The coal industry encompasses very different conditions of exposure. An underground miner, a coal preparation plant operator, a person living near a coke works and a child living near a terminal encounter different mixtures of pollutants and receive different doses. Yet certain outcomes recur in the studies: cough and other respiratory problems, cardiovascular disease and lung cancer. The research task is to establish how far these shared names represent comparable observations, and what those observations tell us about people's health.

The duration of the effects makes this question especially relevant. Medical records restricted to current workers do not describe illness after people leave employment. Area statistics, by contrast, include both workers and other residents, but usually give no occupational histories. These two bodies of data can therefore overlap while also leaving people outside follow-up. A Japanese study of former miners and a British analysis of former coalfield areas show why medical follow-up matters after mining or employment has ended. [14] [32]

1.1. What has already been studied

Occupational dust-related lung diseases are understood much more clearly than the full range of illnesses among people living in coal regions. NIOSH identifies coal mine dust as a cause of pneumoconiosis and COPD, and crystalline silica as a cause of silicosis and other lung diseases. This is a scientific assessment of specific exposures; the legal procedure for recognising an occupational disease is determined separately in each country. [49]

Reviews of residents' health reveal both numerous signals and limited geographical coverage. The review by Cortes-Ramirez and colleagues included 28 ecological studies: 22 from the United States, three from China, two from the United Kingdom and one from Spain. This collection does not represent all coal regions worldwide. The review by Boyles and colleagues on mountaintop removal mining identified serious limitations in exposure assessment and control of confounding; the authors could not reach a firm conclusion about the effects of this activity on residents' health. They attributed this uncertainty to exposure assessment and the treatment of other factors. [43] [44]

The literature on workers is also heterogeneous. In the review by Lu and colleagues, 12 of the 15 studies in the meta-analysis of pneumoconiosis prevalence came from the United States; the pooled estimate is not a worldwide prevalence figure. Our collection contains only the abstract of the review by Alif and colleagues. Its summary findings are used as context, without claiming that we have checked every included study and calculation. [46] [45]

1.2. Scope, focus, aim and objectives

The study concerns the health of current and former coal industry workers and people living in areas where coal is mined, prepared, coked, stored and transferred, including areas affected after operations have closed. Its focus is on measurable health outcomes, the methods used to relate them to exposure, and the limits of comparing occupational and area-level data.

The aim is to establish which similar health problems have been found among workers and residents, how reliable the findings are for individual outcomes, and how this literature can inform the interpretation of data from Kuzbass and the selected Swiss territory.

- Objective 1. Distinguish types of coal activity, population groups and levels of outcome, from symptoms to death.
- Objective 2. Compare the evidence on respiratory, cardiovascular, cancer, renal, reproductive and mental health outcomes, retaining null findings.
- Objective 3. Assess separately the effects after employment ends and operations close.
- Objective 4. Distinguish occupational disease registration, local studies and general statistics for Kuzbass.

- Objective 5. Assess the comparability of indicators for Kuzbass, Khakassia, Russia, Appenzell Ausserrhoden and Switzerland.
- Objective 6. Make the key conclusions and the authors' calculations reproducible.
- Objective 7. Identify useful monitoring indicators and questions that the available materials cannot resolve.

These objectives lead to the following questions: which outcomes occur in both groups; where dose measurements and a temporal sequence are available; how results change with a different comparison; what persists after exposure ends; what official reporting shows; and which differences between areas can meaningfully be compared. No formal testable hypotheses were registered in advance. The possibility that workers and residents share health problems prompted the search, but was not treated as its result. No set of statistical hypotheses was created retrospectively.

1.3. Geographical and time boundaries

The worldwide search began with a geographical register of coal activities, rather than a single Russian region. It has not, however, been completed for every identified area. This PDF analyses a limited, verifiable body of material; it is not an exhaustive worldwide review. The main text draws on studies from several countries and types of activity. A country's absence from the conclusions marks the boundary of this collection, not an absence of exposure in that country.

The comparison of Russian regions and the canton uses the pre-war period: mainly series for 2017–2021, with some indicators for 2019–2021. The 2021 cut-off separates this comparison from the conditions that emerged after the full-scale war began in 2022. It does not result from a statistical assessment of the reliability of all subsequent data. The pandemic years 2020–2021 remain within the period, so the final year is not treated as an ordinary baseline.

Publication dates and observation periods are different. The studies of Queensland and the coke plant closure were published later but analyse earlier observations. The 2024 Kuzbass report is used for its retrospective figures from before 2022. The periods of individual international studies are retained in their source records; they have not been artificially truncated or presented as a single time snapshot. [8] [28] [24] [23]

The author selected Appenzell Ausserrhoden because MIR Trade AG, which traded Russian coal, lists its office in the municipality of Teufen. A snapshot of the address page was saved on 21 October 2026. An undated company page reports monthly shipments of almost a million tonnes through the Baltic region; this is a company statement with no established period for that volume. A Hargreaves report dated 22 February 2011 names MIR Trade as a supplier of Russian coal. These documents explain the choice of place, but do not establish that a particular shipment originated in Kuzbass. [1] [2] [3]

The canton was not selected as an epidemiological control for Kuzbass. Income, age, migration, smoking, healthcare and recording systems may differ. We compare published indicators on two sides of the coal trade; we do not use the difference between them to calculate the share of illness caused by coal.

2. Methodology and research principles

2.1. Study type and units of analysis

This work is a critical review of selected studies combined with a secondary descriptive analysis of official statistics. This approach allows outcomes that differ clinically and methodologically to be considered together without an artificial overall coefficient. No formal systematic review under a preregistered protocol or new meta-analysis was conducted. The units of analysis are a study or cohort, an individual indicator from a document, and an area-level time series; a publication is not always an independent unit.

Coal activities are divided into underground and surface mining; coal preparation—crushing, sorting, washing and drying; coking and other processing; storage and transfer; waste and burning spoil heaps; and the legacies of closed operations. Power plants and domestic combustion are not used as substitutes for studies of mining. Where the original authors did not separate mines, burning coal, heating plants, transport and other industry, the observation is labelled as mixed exposure.

The groups are divided into workers and residents; workers are further divided into current and former employees, and residents into adults, children and perinatal groups where the original source distinguishes them. An area-based sample may include industry workers and their families. Where occupation was not measured, this overlap is not assumed away. Separate findings for contractors are not inferred from data on directly employed workers.

2.2. Search and selection: what was actually done

The initial search began on 20 October 2026. The working protocol, geographical matrix, web search responses, Europe PMC queries, access logs and successive versions of data extractions have been retained. Materials were obtained through publishers' websites, PubMed/PMC and Europe PMC, repositories, and national and regional statistical services. The Russian section used Rospotrebnadzor and EMISS data; the Swiss section used Obsan, BFS, BAG and the regional cancer registry. Reviews provided routes to primary studies rather than substitutes for their numerical findings.

The saved queries include English, Russian, Spanish, Portuguese and Chinese text; Swiss indicators were read using German and French metadata. A query in a language does not imply full coverage of that country's literature. The appendix provides actual examples and

a machine-readable log identifying the original file for each query. The query count describes the saved log, not the number of independently assessed studies.

Europe PMC searches combined types of coal activity, health outcomes, country names and publication-date limits. Some responses contain only the first page of results, for example 60 records when hitCount is larger. API result counts were not treated as counts of publications screened or excluded. There is no complete decision log for every retrieved title; a reliable PRISMA flow diagram cannot be reconstructed from these materials.

The worldwide search was not repeated for this version. Primary studies needed to check the main comparisons were selected from the existing collection; previously saved reviews, two local Kuzbass studies, a NIOSH bulletin and the valid correction file for a US study were added. Targeted external checks concerned published corrections and the figure supplement to the Australian study. The cut-off date for the presented collection is 24 October 2026; this does not mean that every publication up to that date has been included.

2.3. Inclusion and exclusion criteria

- Included: human studies with a defined population and outcome; a link to a specific coal activity or a substantiated historical exposure; official time series suitable for describing the selected areas; and reviews and methodological documents that support interpretation.
- Priority in the analysis: accessible methods and results, a specified denominator, comparison group, time period, effect estimate and measure of uncertainty. A study with limitations is not excluded simply because its result is null or conflicts with the main pattern.
- Excluded from causal comparisons: reports without a measurable outcome; descriptions of emissions without health data; studies solely of power plants used to infer an effect of mining; and results whose population or indicator cannot be identified.
- Company materials are used to establish the office address and trading activity, not to assess health. Media reports are not sources of epidemiological effect estimates. Personal testimony is kept separate from population statistics.
- An abstract may establish that a study exists and report its overall findings, but does not justify claiming that unavailable methods, tables or adjustments have been checked. An outdated or superseded version is not used in place of the current correction.

2.4. What each indicator means

A symptom is a reported problem, such as cough; functional impairment is a finding from spirometry or another test; a diagnosis is a disease identified using stated criteria. A depression screening scale is not a clinical diagnosis. Hospital admissions and healthcare

visits may refer repeatedly to the same person. Incidence describes new cases over a period; prevalence describes people or cases with a condition at a specified point or over an interval. Mortality concerns deaths, not everyone who has the disease.

The proportion found to have tuberculosis among people attending screening is not the annual incidence in the population. The proportion living with HIV at the end of a year must not be added to new diagnoses in that year. Congenital anomalies recorded on live-birth certificates, illnesses in the first year of life and infant deaths have different numerators and denominators. Detecting a substance in a laboratory test establishes exposure, not automatically a disease or its cause.

RR is a ratio of risks or rates, as defined by the original authors; PRR is a prevalence ratio; IRR is an incidence rate ratio; HR is a ratio of instantaneous event rates over time. OR compares odds, $p/(1-p)$, rather than probabilities themselves. An OR of 2 therefore cannot be read as a doubling of probability without additional conditions. In the Queensland occupational study, aRMR means an adjusted mortality rate ratio within the cohort. The original sources' abbreviations are retained.

SMR compares observed deaths with the number expected from a chosen external population. The neutral value of a ratio is usually 1; in the Australian study, SMR is multiplied by 100, so its neutral value is 100. For a difference between indicators, the neutral value is 0. The rule that an interval includes 1 cannot be applied to every scale. If an interval includes the relevant neutral value, both that value and other values within the interval are compatible with the data. The direction and size of a difference should be read from the estimate together with its interval.

Confidence intervals (CIs) are reproduced as reported by the authors. In the Spanish study, Bayesian intervals are labelled CrIs—credible intervals—rather than relabelled as frequentist confidence intervals. Standard errors (SEs) have not been replaced with confidence intervals. Where the source provides no interval, none has been constructed. Two estimates are not compared solely by whether their separate intervals overlap.

2.5. Assessing study quality and the strength of conclusions

Seven questions are considered for each key primary study: whether exposure precedes the outcome; how exposure was measured; how appropriate the comparison group is; which confounders were addressed; how selection, loss to follow-up and recording errors may operate; how precise the estimate is; and whether it applies to the Kuzbass population under discussion. The answers are presented in a quality matrix. Scores are not added together: a large sample cannot correct a flawed exposure definition, and statistical significance cannot correct confounding.

Descriptive levels of conclusion are used. 'Established occupational causation' rests on a specific body of scientific evidence, for example on pneumoconiosis. 'Evidence that exposure contributes' means there is a temporal sequence, a change in exposure and suitable comparisons, while alternatives remain. 'Limited association' means the design and measurements do not reliably isolate a causal contribution. 'Descriptive data'

characterise a group's health without testing a coal effect. 'Insufficient data' refers to a specific question within this collection. This is an explanatory framework for this work, not GRADE or another validated scale.

Null and inverse findings are considered alongside positive ones: female lung cancer mortality in Spanish coal municipalities, individual outcomes in the port study, the analysis of anomaly recording by delivery hospital, and lower all-cause mortality in working cohorts. Significance is not used as the sole filter. Testing multiple outcomes, subgroups and distances increases the likelihood of chance findings.

A recorded fact, a statistical association, a causal conclusion, a hypothesis and personal testimony serve different purposes. We retain the source's statement of the observed number, then show the comparison method, and only then the interpretation it supports. Disagreement with an author's strong causal wording does not require removing the observations themselves. Natalia's introduction is preserved verbatim in the original and refers to the families she knew, not every family in the city.

3. Source material and reproducible procedure

3.1. What the collection contains

This version's bibliography contains 50 entries: 21 primary studies, four scientific reviews, one official scientific review, 20 official documents or statistical datasets, three company documents and one correction. The first 42 entries retain the original register's numbering; entries 43–50 add methodological and local evidence. This is a count of bibliographical entries, not independent experiments.

The package contains saved original sources and data, including several representations of the same document; the manifest lists them and their checksums. The original register of 84 records from the wider search is retained separately. It makes the collection's origins transparent; its records are not automatically treated as evidence for this analysis. The complete original tables are preserved, and a new matrix of conclusions links them to specific questions.

Full-text versions are available for every primary study in the analytical core. Some are saved as XML without the complete set of figures. This does not mean that every participant independently reread every line. Earlier extractions were checked against the relevant sections and tables; during this revision, critical passages on cohort selection, screening, corrections and local studies were reread separately. Only the abstract remains available for the review by Alif and colleagues. For official statistics, the rows and metadata used were checked, rather than every section of large reports. [45]

Availability affects the strength of conclusions. Without individual data, a regression model cannot be refitted, causes of death recoded or unmeasured smoking addressed. If the cantonal API lacks the required breakdown, a national figure cannot be placed in the canton's column. Where recording definitions differ, the numerical discrepancy is retained together with both versions.

3.2. Sequence of work

- Step 1. Preserve the starting material. Versions of the original article, tables and extractions were fixed and SHA-256 checksums calculated. V07 and PDF V01 remain unchanged.
- Step 2. Recover the available search trail. Queries and responses were copied from working logs, with the original file identified. Unrecorded actions were not reconstructed as a reliable log.
- Step 3. Link sources. Repeated publications and shared cohorts were identified by DOI, title, place, period and participants. Source numbering and dataset families are recorded separately.
- Step 4. Extract data. Each key result records the group, activity, years, design, sample size, exposure, outcome, comparison, effect, interval, adjustments, limitations and exact location. The source's definition of the indicator is not replaced with a more convenient one.
- Step 5. Check. Denominators, SMR scales, the distinction between OR and risk, versions of official series and known corrections were checked. Where discrepancies remain, both versions are retained and the choice is explained.
- Step 6. Calculate. Only descriptive arithmetic using explicitly stated inputs is performed. The reproduce.mjs script re-extracts API/CSV rows, recalculates results and checks them against expected values. The original studies' models were not refitted.
- Step 7. Assess comparability and draw conclusions. Matching outcomes and groups are compared first, followed by checks of temporal and methodological differences. The 'claim—data—limitation—supported conclusion' matrix shows the boundary of each generalisation.
- Step 8. Build the document. The editable text, HTML and PDF are generated from one textual source. Links, contents, text extraction, numbers and every page are checked after the final build.

3.3. Formulae and rounding

Rate per 100,000 = number of events / relevant denominator × 100,000. For cases detected through screening, the denominator is people screened; for registered prevalence, it is the population defined by the source. For infant mortality, the multiplier is 1000 and the

denominator is live births, following the official series' methodology. Percentage change = $(\text{final value} / \text{initial value} - 1) \times 100$. Differences between rates retain their units. The ratio of two crude area-level rates is not relabelled as an individual RR.

Calculations use the full stored precision; rounding is applied for presentation, usually to two decimal places, to one for the Pakistan screening calculation, and to two for the indicator based on one case. Source decimals and intervals are not unnecessarily rounded again. Annual rates are not averaged without accounting for their denominators; published multi-year Obsan indicators are used directly. Life expectancy is taken from the sources' life tables, not calculated as the mean age at death.

The script reproduces eight explanatory calculations, including tuberculosis screening, a check of an alternative HIV figure, a descriptive difference in life expectancy and changes in registered occupational disease. These are the authors' arithmetic calculations, not new epidemiological estimates. Figures taken directly from published sources are marked as extracted; no independent reproduction of standardised rates is claimed without age-specific numerators and denominators.

3.4. Tools, AI and the limits of verification

The work draws on published studies and aggregate statistics. It involved no recruitment of patients, surveys, interventions or access to individual medical records. It therefore makes no claim to participant consent or ethics committee approval for a new study involving people. The personal introduction was supplied by the author herself.

Working materials were processed with Node.js; PDF text and navigation with pdfjs-dist; PDF metadata and bookmarks with pdf-lib; and final HTML printing with Chromium/Chrome. Checksums use SHA-256. Tool versions and reports are saved in the qa folder. OCR output and extracted table text were not treated as independent sources of numbers: important rows were checked against the document and saved extractions.

AI was used for searching, initial extraction, translation of relevant passages, comparison, and preparation of the analytical text and code. Verification of its output in this version consists of linking each key conclusion to a local source, checking arithmetic with a script, examining contradictions and visually reviewing the document. This is not an independent assessment by two experts or scientific peer review.

Checks found that a file previously saved with a PDF extension as the correction to B060 actually contained an HTML server response. It is not used as a document. A valid PDF of the correction was obtained from the CDC repository. In the cantonal downloads, the standardised rate is stored in the value field; the earlier descriptive label standardised_rate is not the field's name. The revised protocol gives the actual selectors. These changes improve verifiability rather than replacing the numbers. [50]

The paper by Lamm and colleagues carries a correction notice dated 15 December 2014. The saved corrected version is used; the exact earlier error has not been separately established. Checking corrections did not amount to comprehensive monitoring of every

publisher's notice for every bibliography entry. This limitation remains explicit. [21]

4. Respiratory health: similar outcomes, different evidence

This chapter asks which respiratory problems occur among workers and residents, and whether their links to coal activity are equally well established. The analysis compares an occupational review, studies of dose and employment duration, follow-up of former workers and community surveys. Cough, pneumoconiosis, COPD, asthma and healthcare use are considered separately.

4.1. Workers: from symptoms to occupational disease

Pneumoconiosis is the most firmly established occupational outcome in this collection. Unlike nonspecific cough, it is linked to cumulative dust exposure and has specific diagnostic criteria. The NIOSH review confirms the causal role of mine dust in pneumoconiosis and COPD, and of crystalline silica in silicosis. Recognition of an individual case as occupational still requires the procedure established in the relevant country. [49]

In Colombia, 447 insured current miners with at least ten years of service were examined across 29 companies. Pneumoconiosis prevalence was 35.9%. For at least 30 years of service versus fewer than 25 years, the OR was 3.222 (95% CI 1.806–5.748). This is an odds ratio among the current miners examined. Coal and silica dust measurements were used, but the cross-sectional design brings cumulative conditions and existing disease together at a single point in time. [13]

In Tanzania, symptoms and cumulative exposure were studied in 250 men using personal dust and quartz measurements and occupational histories. For cough, the top 10% of cumulative coal exposure versus the lowest quartile gave an OR of 2.91 (1.06–7.97), adjusted for age and smoking. For the entire highest quartile, the estimate was 1.50 (0.68–3.35). The outcome was cough; the size and precision of the estimate differed across dose categories. Excluding temporary workers and those who had previously become ill may have affected the composition of the sample. [4]

The US cohort moves the analysis from reported symptoms to mortality and temporal sequence. After the cohort was clarified, the analysis included 8829 miners from 31 underground mines; causes of death were followed through 2007. The overall SMR for COPD was 1.11 (0.99–1.24). In the coal-dose model, the HR at the authors' specified level of cumulative exposure was 1.84 (1.05–3.22) among never-smokers and 1.52 (0.98–2.34) among former smokers. These are different comparisons: mortality against an external population and an internal dose-response analysis. [15]

For silica in the model including both silica and coal dust, the corrected estimates are HR 1.33 (0.94–1.90) for pneumoconiosis and 1.04 (0.96–1.14) for COPD. The original abstract contained errors, so the published correction is used. The causal role of silica in occupational lung disease is described in the NIOSH review. This model includes coal dust and silica together; the precision of individual coefficients depends on the reconstruction and combination of their doses. [15] [50] [49]

4.2. Residents: symptoms, diagnoses and healthcare use

In Jharia, commercial and residential zones were compared with a control area. Among men in the commercial zone, dry cough was reported by 17.3% versus 6%; the reported OR was 3.28, $p=0.01$, without a confidence interval. For the residential zone, the corresponding estimate of 2.01 was not statistically significant, and one estimate for chronic cough was below the control value. The study stratified comparisons by sex but did not adequately adjust for individual age, smoking or coal industry employment. Dust from mines, fires, traffic and other sources was not separated. The outcomes were symptoms among residents of specific zones. [5]

The study near the Bootle terminal in the United Kingdom included 1872 children aged 5–11. Table 7 reports an OR of 1.59 (1.23–2.04) for missing more than one school day because of cough, wheeze or breathlessness. The OR was 1.25 (0.88–1.76) for asthma and 1.37 (0.98–1.91) for wheeze; no convincing differences in peak expiratory flow or hospital admissions were shown. The port handled various cargoes, and dust measurements had technical limitations. More frequent school absence was found for respiratory symptoms collectively; estimates for asthma and wheeze are reported separately. [11]

This study contains a discrepancy between its abstract and table: the abstract gives a different OR and interval for school absence. For our specific entry, the Table 7 estimate is retained, with its location specified. This illustrates why verification must establish not only that a reference exists, but that a claim corresponds to a particular model and outcome. [11]

4.3. Interim conclusion

Respiratory problems are a shared theme among workers and residents. The strongest occupational evidence concerns dust-related diseases and COPD. For residents in the surveys examined, the more defensible findings concern local symptoms and healthcare use, with varying results for diagnoses. Monitoring needs standardised questionnaires, objective lung-function measurements, diagnoses and exposure data together: they answer different questions. Evidence of changes in healthcare use after a coke plant closure is considered separately in Chapter 8.

5. Cardiovascular and renal outcomes

This chapter asks whether recurring cardiovascular indicators reflect a shared problem among workers and residents. The method compares an internal worker cohort, ecological studies of population mortality and studies of changing exposure. Renal outcomes are considered separately using the available population studies.

5.1. Workers: the importance of internal comparisons

In Queensland, 161,534 men and 23,967 women with a recorded occupation were assigned to occupational categories. Each category was compared with the other workers of the same sex, not with residents outside a coal area. The exact circulatory disease mortality estimates are published by the authors in Abstract → Results; we did not reconstruct them from a figure. Age, period and smoking were taken into account; occupational categories are not quantitative dust measurements. [8]

For men in the production group (Production workers), aRMR was 1.22 (95% CI 1.06–1.40): the adjusted circulatory disease mortality rate was 22% higher than among the other men in the cohort. For Truck Drivers, aRMR was 1.21 (95% CI 0.95–1.54). The drivers' interval includes 1, the value for equal rates. Table 7 gives a circulatory disease aRMR of 1.64 (1.15–2.35) for the non-office category with no presumed exposure: occupational categories differ in more than dust dose. [8]

An internal comparison group reduces some differences between workers and the general population, but not all. Occupations may differ in physical demands, schedules, social characteristics and diesel exhaust exposure; workers also change jobs. Medical examinations provide smoking information, but not a complete history of every concurrent exposure. The result shows differences in mortality between occupations within the industry. [8]

5.2. Residents: what an ecological model measures

In the Appalachian county study, mortality in 2000–2004 was compared with US counties without mining. For counties producing more than four million tonnes over the study period, the RR for chronic cardiac causes was 1.28 (1.25–1.30) in men and 1.18 (1.15–1.21) in women. Estimates for chronic respiratory causes were 1.07 and 1.11, and for renal causes 1.19 and 1.13; full intervals are retained in Table A5. [7]

The model uses age standardisation and area characteristics: education, poverty, racial and sex composition, physician availability, rurality and other variables. It contains no individual information on mine employment, smoking, length of residence or pre-existing disease. Some adjustments use area-level proxies. Social confounding and the inclusion of occupational diseases within the 'residents' group therefore remain possible. [7]

The inverse result matters: for acute cardiac causes in men, RR was 0.89 (0.87–0.91). The rate was therefore lower for acute cardiac causes and higher for chronic ones. Keeping these causes separate preserves both findings. [7]

5.3. Renal outcomes and interim conclusion

The renal group in this study comprises codes N17–N19: acute, chronic and unspecified kidney failure. It is neither kidney cancer nor all diseases of the genitourinary system. The analytical core contains no matching pair of individual-level worker and resident studies using the same renal outcome. The study found an association between renal mortality and area characteristics. [7]

Cardiovascular associations were found in both groups: occupational categories were compared among workers, and areas among residents. A change in healthcare use after a coke plant closure offers more focused evidence for residents, because the source itself changed and the sequence of events is known. This result concerns people living near a particular coke works. [25]

6. Cancer outcomes: site, occupation and conflicting findings

This chapter asks which cancer findings can meaningfully be compared between workers and residents. The method examines mortality and incidence separately by cancer site, type of operation, pneumoconiosis status and comparison group. ‘Cancer in general’ is not used as a single outcome.

6.1. Mining and coke production workers

Among former Czech miners with recognised pneumoconiosis, lung cancer mortality exceeded that expected from the general male population: SMR 1.70 (1.41–2.04). There was no increase for this cause in the group without pneumoconiosis. The two cohorts were assembled differently: the first included registered disease cases; the second comprised workers removed from exposure after reaching the permitted cumulative exposure who had not received a pneumoconiosis diagnosis by the end of the period. [6]

The US cohort had a lung cancer SMR of 1.08 (1.00–1.18). This SMR compares cohort mortality with an external population; internal models analyse cumulative dose separately. Long follow-up is a strength; exposure reconstruction, job changes after enrolment and incomplete smoking histories are substantial limitations. The published correction was taken into account, including corrected death counts in the lung cancer table. [15] [50]

Coke production should be distinguished from mining. In a French cohort of 534 male retired coke workers, 104 deaths were recorded, including 17 from lung cancer. The lung cancer SMR was 2.51; the authors report $p < 0.01$, but no interval for this SMR appears in the tables used. In the internal comparison by exposure duration, estimates of 2.78 and 2.35 did not differ significantly. The nested comparison adjusting for smoking did not cover all deaths; selection of men who survived to retirement and the regional background limit interpretation. [18]

Queensland shows why an all-cause mortality figure does not describe the whole cancer picture. Overall mortality was lower in the cohort, while incidence was higher for certain cancer sites. The authors specifically note that many participants were young and follow-up was short for cancers with long latency: more than 65% had their first examination from 2006 onwards. Complete previous employment and exposure histories were unavailable. The authors call for further follow-up of this relatively young cohort to assess late cancer outcomes. [28]

6.2. Residents near underground and surface mines

The Spanish study included 8098 municipalities and various mining operations. In the model for coal municipalities near surface mining, lung cancer mortality RR was 1.22, with a 95% CrI of 1.01–1.49. For men it was 1.29 (1.05–1.59), and for women 0.57 (0.33–0.97). Near underground coal mining, the overall estimate of 1.09 (0.95–1.26) was uncertain. The findings therefore differed by sex and type of mining. [9]

For colorectal cancer in the same table, estimates were 1.26 (1.04–1.51) near surface mining and 1.27 (1.12–1.44) near underground mining. However, the spatial model used distance from the municipal centre rather than personal dose. The 2007 industrial register was compared with deaths in 1997–2006, a limitation for historical exposure and latency. Individual smoking and occupation were not addressed, and many cancer sites and distances were examined. Table 2 does not present every null result for every cancer site. [9]

6.3. Interim conclusion

Lung cancer appears among elevated findings in workers and in some area-level studies. Estimates are presented separately for coke works and mines, mortality and incidence, workers with pneumoconiosis and other groups. These results identify lung cancer and occupational history as important subjects for follow-up. For other cancer sites, the combined occupational and area-level picture in this core collection is less clear still.

Natalia's personal observations explain why the question was asked. Disease frequency in this study is described through scientific studies and official series that specify case counts, populations, ages and periods.

7. Children, congenital anomalies and birth outcomes

This chapter asks how convincing the signal of adverse outcomes in children and at birth is. The method compares registry studies with different adjustments, checks denominators and distinguishes symptoms in schoolchildren from registered anomalies and infant deaths. The chapter concerns children's health and birth outcomes in communities.

7.1. Appalachian birth certificates

Ahern and colleagues analysed 1,889,071 live births with information on anomalies: 109,315 in mountaintop removal counties, 112,771 in other coal counties and 1,666,985 outside mining areas. For all anomalies, the PRR in the first group was 1.26 (1.21–1.32); for circulatory and respiratory anomalies it was 1.93 (1.73–2.15). The estimate of 0.92 (0.72–1.18) for chromosomal anomalies does not show the same increase. Adjustments included several maternal characteristics, smoking, alcohol, diabetes, prenatal care, infant sex and area type. [20]

Strengths include the large dataset and several individual maternal variables. The main limitations are ecological exposure assignment, birth-certificate data restricted to live births, and incomplete comparability of anomaly ascertainment. Pregnancy losses and terminations are absent from this numerator. Personal dose histories and parental occupational exposures are unavailable. [20]

Lamm and colleagues examined an overlapping dataset and the influence of delivery hospital on recording. After adjustment for hospital, the PRR was 1.08 (0.97–1.20); in the six-hospital analysis it was 1.01 (0.89–1.14), compared with an unadjusted estimate of 2.39 (2.15–2.65). This is neither independent confirmation in a new population nor a full replication of all covariates in the first study. It shows that the distribution of births between hospitals and recording practices can substantially change an estimate. Funding was provided through ARIES; the authors reported that the sponsor had no role in the analysis. This information is considered alongside the method, not in place of it. [21]

The first study adjusts for several maternal characteristics; the second addresses differences in recording between delivery hospitals. The association changes substantially after accounting for the recording location; both estimates are retained with their intervals.

7.2. Local data and distinct outcomes

The Kuzbass study for 2005–2012 used statistical Form No. 31 and 5593 congenital malformation notifications. Table 1 gives 65.8 and 134.2 per 1000 children in their first year of life in 2005 and 2012. Parts of the text refer to newborns, while the table heading refers to

children in their first year. The value 134.2 therefore cannot be rewritten as 13.42% of unique newborns with an anomaly. Increased registration may reflect several processes, including detection and recording; individual maternal exposure was not measured. [47]

In Prokopyevsk, the series for suspended particle concentrations and congenital anomalies showed $r=0.87$, $p=0.0025$, with a one-year lag. This was, however, a short ecological series with multiple comparisons and mixed sources. In the comparison of the city with the region, most categories of childhood morbidity did not differ statistically; for respiratory disease, $p=0.7$. These negative results are retained alongside the positive correlations. [48]

Cantonal infant mortality was 5.38, 1.83 and 1.74 per 1000 live births in 2019–2021; the corresponding figures for Kuzbass were 6.2, 5.6 and 5.5. These are deaths before age one, not congenital anomaly frequencies. In a small canton, annual rates are sensitive to small numbers. Our collection contains no matching anomaly or preterm birth registry for a direct comparison of these areas. [22] [23]

7.3. Interim conclusion

For children, the evidence includes local respiratory symptoms and healthcare use; for birth outcomes, it includes heterogeneous registry-based associations. The anomaly registries used cover live births; pregnancy losses require separate recording. The selected core contains too few occupational reproductive-outcome studies comparable with these community data. The practical implication is to distinguish live births, pregnancy losses, first-year diagnoses, hospital admissions and deaths, while also checking completeness of detection.

8. After employment ends and operations close

This chapter asks whether the health problem disappears when the job or emission source disappears. The method compares follow-up of former workers, a natural change in exposure and a long area-level time series. These designs address different timescales: progression of existing disease, rapid changes in healthcare use and an area's long-term legacy.

8.1. Former workers

The Japanese study followed 1091 people with established pneumoconiosis after exposure ended; categories without pneumoconiosis and the most severe category, C, were excluded at baseline. Data were available for 207 people after ten years and 85 after twenty. The

authors report progression in 62% during the first decade and 29% during the second. These percentages describe different retained subgroups and must not be added to make ‘91% over twenty years’. [14]

The observation of progression after leaving work is itself important: disease can advance without continued employment. Loss to follow-up was extremely high, however, so these proportions do not estimate progression among all miners who left their jobs. The source also disagrees on the size of the ten-year subgroup: the rows in one table sum to 208, while another table reports 207. The discrepancy is not corrected by guesswork; the published finding is read with this limitation. [14]

The Czech cohorts and the French cohort of retirees add evidence on mortality after accumulated occupational exposure. Long-term outcomes are described for different periods after employment. Follow-up of former Kuzbass workers needs to link occupational histories, diagnoses and subsequent deaths. [6] [18]

8.2. Closure of the Shenango coke plant

Two studies by Yu and Thurston analyse the same coke plant closure in January 2016 and aggregate healthcare series for 2013–2018. In the respiratory study, the immediate change in paediatric asthma visits is expressed as an IRR of 0.59 (0.40–0.86). The cardiovascular study estimated a 42% reduction in visits (95% CI 33–51%) relative to the pre-closure average. This is a change in the number of events in the population served, not the proportion of children or adults who were cured. [24] [25]

The causal interpretation is stronger here than in a one-time comparison of counties: the date of change is known, with before-and-after series, air measurements, control areas and temporal adjustments. The cardiovascular analysis also used a control outcome—injuries. The alignment in time of changes in the source, pollution and healthcare use supports a contribution of this plant to the health burden. [24] [25]

The source was not randomised, however, and health and exposure data are aggregated by ZIP code. Some small counts were suppressed and statistically reconstructed; ICD coding changed in 2015, which the authors examined but which remains part of the context. Individual factors and every concurrent area change are not observed. The two papers concern one natural experiment with different outcomes, not two independent closures. [24] [25]

8.3. Former coalfield areas

The study in England and Wales examined 329 districts; 57 were classified as coalfield areas, with 54 included in the main matched analysis. In 1981, the difference in age-standardised mortality was 122.6 per 100,000 men (SE 22.10) and 66.49 for women (SE 16.02). By 2019, these gaps had narrowed by 91% and 70%, respectively, but had not disappeared entirely. These are standard errors, not confidence intervals; no new intervals were calculated. [32]

Matching accounts for socioeconomic characteristics, population density, former industry and pollution proxies. It still does not separate dust, past occupational disease, migration and the effects of economic change. The mortality gap in former coalfield areas narrowed during follow-up. [32]

8.4. Interim conclusion

Ending exposure can reduce the current burden on health services while leaving established diseases in place. These findings are consistent because they concern different outcomes and timescales. Current workers need exposure prevention, former workers need long-term follow-up, and areas after closure need assessment of health and remaining sources. Follow-up periods and persisting effects are stated for each outcome studied.

9. Mortality among workers and residents

This chapter asks about all-cause and cause-specific mortality among workers and residents. The method distinguishes all-cause from cause-specific mortality, external from internal comparisons, and age standards and periods. Injuries are not combined with occupational diseases into a single causal measure.

9.1. Workers

In the Queensland cohort of 189,011 workers, all-cause mortality through 2020 was lower than expected: SMR 81 (95% CI 78–83) for men and 75 (65–86) for women, on a scale with a neutral value of 100. The male coal preparation plant subgroup had 78 deaths among 2929 workers; SMR was 52 (42–65). This compares workers with the general population; selection into employment is discussed below. [28]

People able to enter employment and pass medical selection differ from the general population. Those who become ill may leave exposure or their occupation. This ‘healthy worker effect’, and its continuation during employment, can lower the external estimate even while particular dose–response relationships or causes of death remain elevated. The youth of part of the cohort and insufficient latency are especially important for cancer. Occupational comparisons within the same cohort therefore complement its overall result but do not provide independent confirmation. [28] [8]

The Czech cohort of men already diagnosed with pneumoconiosis presents a different picture: all-cause mortality SMR was 1.10 (1.02–1.17), and non-malignant respiratory disease SMR was 2.78 (2.32–3.31). In the group without pneumoconiosis, all-cause mortality was below the population level: 0.86 (0.82–0.91). This difference concerns cohorts of former miners assembled under different rules. [6]

In the US cohort, the SMR for death from pneumoconiosis was 79.70 (72.10–87.67). This very large estimate partly reflects the extreme rarity of that cause in the general comparison population; it does not mean all-cause mortality was 80 times higher. Assessing preventable occupational losses requires actual exposures, employment duration and an appropriate expected level for the worker group concerned. [15]

Accidental and suicide deaths in worker cohorts are recorded by cause, but not all occur at work. The sources used contain no harmonised series of fatal occupational accidents for all countries considered. Accident mortality is a separate monitoring category; a comparable international series was not assembled in this work.

9.2. Residents of the study areas

Area-level mortality combines occupational, environmental, social and healthcare factors. Age-standardised findings from Appalachia and former coalfield areas in England and Wales show associations and trends, but do not distinguish the contribution of former miners from that of other residents. The statistical categories ‘workers’ and ‘population’ are therefore not mutually exclusive. [7] [32]

Before comparing numbers, the scale matters: the following rates are crude, without adjustment for differences in age structure. In 2021, all-cause mortality was 1817.2 per 100,000 in Kuzbass, 1608.1 in Khakassia, 1673.9 in Russia, 910.78 in Appenzell Ausserrhoden and 817.87 in Switzerland. These are recorded death rates in different populations, not direct risks for people of the same age. [30] [34]

In the same year, Kuzbass mortality from circulatory diseases was 896.93 versus 640.32 in Russia, from malignant neoplasms 237.44 versus 191.30, and from respiratory diseases 102.07 versus 78.65 per 100,000. All Russian values come from the same saved download of EMISS indicator No. 31270. Matching rates for these broad cause groups have not been extracted for the canton: separate figures for myocardial infarction, stroke and lung cancer are not substitutes. [30]

Life expectancy at birth in 2021 was 67.54 years in Kuzbass and 83.43 in the canton, a descriptive difference of 15.89 years. This describes a hypothetical cohort exposed to that period’s age-specific death rates, not the mean age at death or the years coal has taken from each resident. The 2019–2021 series appears in Table A13, separately by sex where available. [23] [33]

9.3. Interim conclusion

All-cause mortality in a working cohort can be lower than population mortality while a specific occupational cause is elevated. Among residents, an overall gap can persist after closures and change over time. The collection lacks the underlying data and identified causal contribution needed to calculate ‘human lives per million tonnes’. Dividing every regional death by coal output would create a measure without epidemiological meaning. Total years of life lost were also not calculated without harmonised ages and causes.

10. Mental health, substance dependence and suicide

This chapter asks which similar social and health problems appear, and whether they can be linked to occupational exposure. The method analyses screening symptoms, substance use and registered deaths separately. Suicide, a diagnosis of depression and substance dependence are not treated as interchangeable indicators.

10.1. Workers and the screened sample

In two West Bengal mines, 202 men who used alcohol, tobacco or cannabis were studied in 2016–2019. The HADS analysis included 132 people for anxiety symptoms and 131 for depressive symptoms; these are the numbers assessed on the respective scales, not the numbers with illness. Positive screens numbered 38 and 31, respectively. Selection of substance users and missing data prevent these proportions from being applied to all miners. [26]

Concurrent moderate or high-risk alcohol and tobacco use was associated with an aOR of 4.896 (1.355–17.687) for anxiety symptoms and 5.335 (1.442–19.731) for depressive symptoms, adjusted for age and income. The wide intervals show limited precision. Substance use and symptoms were measured at the same time; temporal sequence and personal dust dose were not measured in this analysis. [26]

In Queensland, 614 suicides among men and 18 among women were recorded over the full follow-up period; SMRs relative to Australia were 118 (109–128) and 96 (60–152). When men were compared with the population of Queensland itself, the authors found no overall increase. The reference population therefore changes the conclusion about an industry excess. These are cumulative counts over the entire follow-up period; annual rates per 100,000 and the place of death are separate indicators. [28]

10.2. Residents and area-level series

In Appenzell Ausserrhoden, PHQ-9 screening in 2017 found moderate or more severe depressive symptoms in 7.8% of residents aged 15+ (95% CI 5.2–10.3), versus 8.6% (8.1–9.1) in Switzerland. This is a private-household sample using a different instrument from HADS in the selected Indian worker group. Ranking these percentages directly would compare both different people and different measurements. [27]

In the Russian suicide series for 2017–2021, Kuzbass changed from 25.61 to 19.09 per 100,000, and Russia from 13.81 to 10.71. In 2021, Khakassia recorded 21.31, Buryatia 32.93, Tuva 21.42 and Rostov Region 4.56. Retaining the region with a lower value matters: coal regions do not form a uniform series. The rates are crude, and populations and cause-of-death determination systems differ. [30]

Sharp changes in Tuva require attention to classification: the official 2017 report describes some deaths being assigned to injuries of undetermined intent. This does not permit us to reassign them to suicide, but it limits interpretation of the trend. The international example also has boundaries: the Appalachian rate of 21.0 versus 17.4 outside the region in 2021 concerns ages 15–64 and is age-standardised, while Appalachia itself includes different types of areas. It cannot enter a common ranking with crude Russian all-age rates. [41] [29]

In the canton, average suicide mortality excluding assisted suicide in 2017–2021 was 17.00 per 100,000, versus 11.75 in Switzerland. Standardised rates were 17.45 (12.71–23.35) and 11.99 (11.65–12.32). Assisted suicide is listed separately and is not added to the Russian suicide category. This is one outcome on which the canton fares worse than the national average; it is retained without smoothing. [31]

10.3. Interim conclusion

Mental health symptoms and suicide mortality have been described among workers; survey measures and area-level series are presented for residents. The studies use different comparison groups and measurement tools. Employment, income, access to care and substance use are among the factors that warrant further monitoring. Substance dependence is not simply a type of depression, and moral judgements about behaviour are not medical indicators. The practical table retains measurable symptoms, diagnoses, healthcare use and causes of death.

11. Tuberculosis and HIV: what the numbers show

This chapter asks how often tuberculosis and HIV were detected in the groups examined and in area statistics. The method checks selection, denominators, timing and comparison groups.

11.1. Pakistan: screening workers and neighbouring communities

In 2019, 96 mobile screening sessions were organised in five coal-mining districts of Balochistan. The study table contains 8149 workers and 6392 residents of neighbouring communities; 19 and 15 tuberculosis cases were confirmed. Recalculation gives 233.2 and 234.7 per 100,000 people screened; the authors round these to 233 and 235, with $p=0.985$ for the difference in proportions. These denominators cover people who attended screening, not the entire regional population. [10]

Workers and residents of neighbouring communities were screened. The study included no group outside coal areas. Symptom-based screening without radiography may miss asymptomatic cases; ill migrant workers may have returned home, and workers and residents had different sex distributions. The result shows a need for tuberculosis detection and care in both groups. The p-value close to 1 concerns the comparison of proportions detected in this screening exercise. [10]

11.2. Kuzbass and national data

Newly registered active tuberculosis in 2020 was 72.28 per 100,000 in Kuzbass and 32.07 in Russia; in 2021 it was 70.00 and 30.71. Each pair comes from the same federal Rospotrebnadzor tables. These tables do not separately specify coverage of Federal Penitentiary Service institutions. The collection used contains no separate series for coal industry workers. [35] [36]

BAG reports 4.25 for Switzerland in 2020 and 3.90 in 2021. The checked download contains no separate Appenzell Ausserrhoden series. The national comparison is retained as a reference, not substituted for the canton; case-detection criteria, populations at risk and prison coverage have not been fully harmonised. [37]

11.3. HIV and discrepancies between official versions

Registered people living with HIV in Kuzbass at year-end numbered 1934.9 per 100,000 in 2019, 1998.6 in 2020 and 2069.7 in 2021. This group includes people at the AIDS stage. New diagnoses in 2021 are a separate indicator: 79.49 in Kuzbass, 53.46 in Khakassia and 41.72 in Russia. These series describe detected and registered infection, not every existing infection regardless of testing. [38] [35] [36]

Information Bulletin No. 47 gives different published prevalence estimates for Kuzbass: 2003.6 for 2020 and 2027.3 for 2021. The calculation $52,796 / 2,604,272 \times 100,000$ reproduces the latter figure. This confirms the arithmetic of that version, but does not fully explain its discrepancy with the federal report. The main series follows the reports; the alternative version and its inputs are retained. The difference must not be removed by averaging or by choosing the more striking value. [42]

The cantonal report records one new HIV notification in each year from 2016 to 2019. For 2019, one case and 55,445 permanent residents at year-end give a descriptive rate of 1.80 per 100,000. This is our calculation using the stated denominator, not a published BAG rate or the number of all people living with HIV. For 2021, BAG gives 3.47 new cases per 100,000 for Switzerland; cantonal prevalence was not obtained. The region is not ranked alongside countries using incomparable indicators. [39] [40]

11.4. Interim conclusion

High levels of tuberculosis and HIV are officially registered in Kuzbass. The series presented describe detected infections in the regional population. They contain no individual link between diagnosis, occupation and measured exposure; registration rules and discrepancies between official versions are retained in the relevant source records.

12. Kuzbass: three levels of evidence

This chapter asks what has been established directly in Kuzbass and what remains a finding of the international literature. The method separates officially registered occupational disease, local analytical studies and regional population statistics. No level is used in place of another.

12.1. Occupational diseases

In sector B05, 'Coal mining', 524 new occupational diseases were registered in 2019, 421 in 2020 and 425 in 2021. The corresponding rates were 56.25, 50.63 and 50.30 per 10,000 workers. They come from Tables 108–109 of the retrospective official report. The registered occupational disease rate fell by 10.58% over the period. [23]

The unit here is a registered disease. One person can have several occupational diagnoses; 425 diagnoses cannot automatically be described as 425 distinct people newly affected. B05 combines different occupations and mining conditions, while recognition depends on diagnosis, referral and registration. The available table does not report mortality among former workers or separate each cause by dose. Occupational causation in a recognised case and incomplete registration of all possible cases are different questions. [23]

12.2. Studies of specific groups

The local child-health study in Prokopyevsk uses statistical Form No. 12 for 2003–2012 and air indicators. Its strengths are the specific city and sequence of annual observations; weaknesses include the short series, numerous correlations, mixed sources and lack of individual adjustments. The comparison with the region found no differences for most disease categories, while infectious and circulatory disease values were below regional levels. This rules out a generalisation that every local child-health indicator was similarly elevated. [48]

The regional anomaly study for 2005–2012 provides municipal differences, but its denominators and recording systems require care. Medical reporting forms and notifications do not automatically constitute an independent registry of all pregnancies.

The study helps frame questions about geographical distribution and completeness of detection, but does not estimate an individual effect of coal dust. [47]

These studies show that local analytical data exist and include both associations and an absence of statistical differences. International literature helps identify the next measurements needed: personal dust dose among workers, residents' occupational histories, exposure linked to address and time, and consistent disease criteria. The OR and HR values in this document refer to the populations and conditions of the respective foreign studies.

12.3. Regional and city statistics

Regional rates for 2021 show higher mortality in Kuzbass than in Russia for several broad cause groups. Infection and suicide series reveal an additional health burden. Regional aggregation, however, conceals differences between industrial centres, rural areas, age groups and occupations. Regional all-cause mortality does not measure risk near a particular operation. [30] [36]

City-level indicators, including tuberculosis figures and data for Kiselyovsk, were found earlier in the project. They are not described here as absent: a single verified set of cities with matching coverage and denominators was not assembled for the pre-war comparison. Most area-level indicators in this work concern the region as a whole. More detailed local data are needed to assess the health of residents near particular operations.

12.4. What official reporting can answer

Official reporting shows how many cases or deaths were registered in a selected group, how those numbers changed and how the rate differs from the national rate. On its own, it does not say how long someone lived near a surface mine, what work they did, when they received a dose, which factors contributed to illness or how they were followed after leaving employment. Answering those questions requires linked data. This describes the capabilities of the tables used, not a claim that the entire healthcare system holds no other information.

The local conclusion has three parts. Occupational disease is registered within the industry itself. Ecological studies of specific groups provide signals and limitations that need examination with more detailed data. Regional statistics describe adverse rates for several causes, but do not apportion them between coal, other industries, social conditions and healthcare. Combining these parts would produce a stronger conclusion than the sources support.

13. Appenzell Ausserrhoden: the purpose and limits of comparison

This chapter asks what the selected coal-trading location helps us see, and where comparison ceases to be valid. Each indicator is checked for territory, period, population, definition, registration, unit and age standard. The comparison concerns health indicators, not the ‘cleanliness’ of two places.

13.1. Why this location, and which territory?

MIR Trade’s published office address is Alte Haslenstrasse 5, CH-9053 Teufen AR. Most health indicators concern the whole canton of Appenzell Ausserrhoden, not the municipality of Teufen, still less the office’s employees. Switzerland remains a separate reference. A company’s location in the canton does not make all residents beneficiaries of its trading income. [1]

The canton was selected as the location of a trading company’s office. This work did not include a full environmental assessment of air, water and radon; factors affecting area comparability are described in the methodology.

13.2. Indicators allowing limited comparison

Life expectancy and infant mortality have recognisable demographic definitions, but still require a specified period and attention to small numbers. In 2021, life expectancy by sex was 62.69 years for men and 72.31 for women in Kuzbass, compared with 80.82 and 86.23 in the canton. The pandemic year and the canton’s small population limit interpretation of the annual gap as permanent. Values for 2019 and 2020 are also retained in the appendix. [23] [33]

Within Switzerland, the same age standard can be applied. In Obsan data, standardised all-cause mortality in 2021 was 895.0 for the canton and 821.2 for Switzerland per 100,000; crude rates were 910.78 and 817.87. Both comparisons point in the same direction in this publication, but use different scales. Russian crude rates are not ranked as individual risks alongside Swiss standardised rates. [34]

For myocardial infarction in 2017–2021, the canton’s standardised rate was 271.8 (252.5–292.3), compared with 227.7 (226.2–229.1) in Switzerland. For stroke, it was 283.4 (263.8–304.1) versus 249.8 (248.3–251.4). The unit is episodes per 100,000; the method combines hospital admissions minus in-hospital deaths with all deaths from the relevant cause. These are not solely unique people with a first diagnosis, nor mortality from all circulatory diseases. [16] [17]

Suicide rates are also above the Swiss average, as Chapter 10 shows. The canton therefore does not have the best values on every outcome. Its life-expectancy advantage over Kuzbass coexists with adverse comparisons within Switzerland. Retaining both sides is essential to a meaningful comparison. [31]

13.3. Indicators without a matching pair

In the 2017 survey of cantonal residents aged 15+, asthma prevalence was 3.17%, and the combined category of chronic bronchitis, COPD and emphysema was 2.48%; Swiss figures were 4.76% and 2.00%. These are population survey indicators, not occupational spirometry or childhood symptoms near a terminal. The collection contains no comparable Kuzbass survey. [12]

The cancer registry gives the canton's standardised incidence of lung cancer, C33–C34, in 2017–2021 as 43.9 in men and 22.0 in women; mortality in 2016–2020 was 26.7 and 17.4 per 100,000. This uses the older Waterhouse 1976 European standard, while the Obsan series considered here use ESP2010, published by Eurostat in 2013. The word 'European' does not make the two standards identical. Comparison with broad Russian cancer rates is invalid across cancer site, period, sex and standard simultaneously. [19]

Matching cantonal and Russian indicators were not obtained for kidney failure, all congenital anomalies, several perinatal outcomes, local HIV prevalence or certain broad causes of death. National figures do not fill cantonal cells. Table A15 identifies the specific indicator missing for comparison; it does not state that the disease is absent.

13.4. Interim conclusion

The comparison reveals large differences in some demographic indicators and a varied picture within the canton itself. It helps frame the question of living conditions on different sides of the coal trade. Indicators are compared using the available definitions and periods. The reason for selecting the canton and differences in recording systems are set out in the methodology and comparability table.

14. Discussion: where findings converge and diverge

14.1. Similar health problems in different conditions

The clearest similarity between workers and residents concerns respiratory outcomes; cardiovascular and certain cancer findings also occur in both groups. Yet a miner's dose may be reconstructed from occupation and measurements, whereas a resident's exposure

may be represented only by county. An occupational diagnosis, a questionnaire response and a district death rate are not three measurements of the same quantity. The synthesis therefore follows outcomes and designs, rather than counting papers with a matching disease name.

Workers' dust-related diseases have a specific, well-established evidence base. For residents near a coke works, the temporal design and measured change in the source provide evidence of that particular plant's contribution. In area-level studies of cancer, renal outcomes and congenital anomalies, exposure and recording limitations are substantially greater. Infections and the general social and health statistics for Kuzbass remain descriptions of population health within this collection.

14.2. Possible explanations for differences

Underground mines, surface mines and coke works differ in their pollutant mixtures. A second explanation is variation in exposure duration and intensity: a year spent near an operation is not equivalent to decades underground. A third is the stage of the outcome: rapidly changing asthma-related healthcare use and a cancer with long latency may respond differently after closure. These explanations are consistent with the study designs reviewed, but were not calculated as separate causal shares.

Selection and recording can explain some opposing findings. Healthy people enter work and ill people leave; not everyone attends voluntary screening; hospitals complete birth certificates differently; small death counts are suppressed or fluctuate. Smoking, income, access to care, migration and other industries remain alternative or joint explanations where they were not measured individually.

Wide intervals, multiple comparisons and dependence between publications limit generalisation. The Queensland papers share one worker cohort; the two Shenango studies concern one closure; the anomaly studies use an overlapping registry. Appalachian ecological papers and the reviews containing them may reuse the same mortality datasets. A review, a primary paper and a reanalysis are therefore not counted as three independent confirmations.

14.3. Applicability to Kuzbass

What transfers most readily is the questions and methods: measure personal dust and silica exposure, distinguish occupations, continue follow-up after workers leave, account for smoking, record childhood outcomes consistently and analyse changes in a specific source. Scientific knowledge of occupational dust disease causation applies to the relevant exposures, but a proportion affected abroad is not a local disease frequency.

Absolute rates and relative effects do not transfer automatically. The Colombian sample with at least ten years of service does not represent all Kuzbass workers; Australian medical selection and age structure differ; Spanish distance from a municipal centre does

not define a Kiselyovsk resident's exposure; French coke plant retirees do not describe all current surface-mine workers. Numerical transfer requires matching conditions and external validation, which this work does not provide.

14.4. Limitations of the work as a whole

The collection is purposive and limited; the worldwide search is unfinished. There is no complete selection log for every retrieved title or independent duplicate extraction. Full-text availability, language and publication selection may have influenced the collection. Only the abstract is available for one contextual review. The work did not refit every model, conduct a formal meta-analysis, apply a uniform age standard to every area or undergo independent peer review.

Most area-level data do not distinguish workers from other residents. Direct evidence on contractors, specific coal preparation occupations and terminals is less extensive than that on miners; the selected core lacks sufficient comparable series on disability, adult neurological and reproductive outcomes, and biomarkers. These are boundaries of our collection. The pandemic in 2020–2021, differences in death registration and the canton's small numbers further limit area-level interpretation.

A substantial practical gap is the absence, in the collection used, of a linked chain for Kuzbass connecting 'work or residence—measured exposure—illness—subsequent follow-up—cause of death'. Individual parts exist, including city-level data, but have not been connected. This is what prevents a move from describing the severity of the problems to quantifying the preventable burden of a specific activity.

15. Conclusion: answers to the objectives

15.1. What has been established

Objective 1: studies were compared by type of coal activity and population group. Symptoms, organ function, diagnoses, healthcare use, prevalence and mortality were considered separately. This makes it possible to identify which health problem was found and in whom.

Objective 2: respiratory health is the clearest shared field. For workers, occupational causation of dust-related disease and the contribution of dust to COPD rest on a specific evidence base; among residents, findings range from symptoms to changes in hospital admissions. Cardiovascular and certain cancer associations occur in both groups, but evidence strength depends on activity and design. Conclusions on renal and congenital outcomes are narrower and less certain. Mental health symptoms and suicide are represented by survey findings and registered death series.

Objective 3: pneumoconiosis progression was observed among former miners after employment ended. Closure of a particular coke works was followed by fewer respiratory and cardiovascular healthcare visits. A long-term area-level gap after coal mining can narrow while persisting for decades. These results show the importance of prevention during employment and medical follow-up afterwards.

Objective 4: Kuzbass has registered occupational disease, individual local studies and regional health series. Official records document occupational diseases among workers. Regional series show high tuberculosis, HIV, suicide and all-cause mortality rates; local studies add information on specific groups of residents.

Objective 5: comparison with Appenzell Ausserrhoden shows substantially higher life expectancy in the canton and a mixed picture for other outcomes. The canton itself exceeds the Swiss average on several adverse indicators, including myocardial infarction, stroke, all-cause mortality and suicide. The canton was selected because it hosts the office of a company that traded Russian coal.

Objective 6: key claims are linked to numbers, exact source locations and limitations; original sources, official data versions, calculation inputs and code are supplied. Extraction of selected series and the authors' arithmetic can be reproduced.

Objective 7: a set of separate worker and resident indicators is proposed for monitoring. Its basis is diagnosed dust-related disease and lung function, healthcare visits and hospital admissions, specific cancer and cardiovascular outcomes, birth registries, mental health and mortality with appropriate denominators. Each indicator specifies the data needed and its limits of specificity.

15.2. This work's contribution and practical value

This work's contribution is to compare different types of data in one verifiable collection, examine dependence between publications, distinguish occupational from area-level statistics in Kuzbass, check the definitions behind the Swiss comparison and provide reproducible descriptive calculations. The analytical text connects research questions with specific findings and their sources.

In practice, the work supports discussion with researchers about which indicator answers which question, what data already exist and what design could address a substantial gap. The most important unresolved questions concern long-term follow-up of former Kuzbass workers; individually measured exposure among residents; separation of occupational, residential and social factors; comparable age-specific series; and complete registration of late occupational outcomes. These questions remain for further work and discussion with researchers.

Workers and residents share respiratory health problems, cardiovascular associations and certain cancer associations. Disease may persist and progress among former workers; among residents, closure of a specific source was followed by fewer healthcare visits. For

people, these findings mean a need for reduced exposure, timely diagnosis and long-term follow-up—including after leaving work or after an operation closes.

Files, verification limits and reproduction

Main editable text: the Word file and data/manuscript.json. Complete source with appendices: HTML and build files. Original documents are in sources; their SHA-256 checksums and sizes are in data/source-manifest.json. The original article and tables are preserved in inputs.

To check the arithmetic, run `node reproduce.mjs` from the package folder. The command uses no network, reads the saved CSV/JSON and updates only reproducible results and qa/reproduction-check.json. Full reproduction of the published regressions is impossible without microdata; their availability is not claimed.

Unresolved: obtaining the full text of review [45]; establishing the exact earlier error in corrected paper [21]; and harmonising all age and registration definitions across areas. There is no independent expert review or complete worldwide selection log.

The known correction [50] is supplied as a valid PDF. The 45 saved Russian rows were checked against the CSV; Swiss selectors and eight calculations by the authors can be checked with the script. Final layout, link and page checks are recorded after the build in qa. External-address availability is recorded in the checking report; saved documents are included in the package.

Appendix A. Retained data tables

Numbers, periods and rows in the original 15 tables remain unchanged. Their purpose and limitations are explained in the analytical text. Reference codes have been replaced with numbers from the combined bibliography.

A1. Tuberculosis among people screened in Balochistan, 2019

Group	Screened	Confirmed cases
Mine workers	8 149	19
Residents of neighbouring communities	6 392	15

Group sizes and case counts from Table 1 of the study. [\[10\]](#)

A2. Population mortality in 2021, per 100,000 residents

Cause	Kuzbass	Khakassia	Russia	Appenzell Ausserrhoden
All causes	1 817.2	1 608.1	1 673.9	910.78
Diseases of the circulatory system	896.93	614.68	640.32	Local rate not extracted
Malignant neoplasms	237.44	212.94	191.3	See lung cancer: different period and age standard
Diseases of the respiratory system	102.07	84.69	78.65	Local rate not extracted
Accidental alcohol poisoning	11.72	9.05	6.36	Local rate not extracted

Crude rates for the whole population; areas' age structures have not been aligned. All Russian rows come from one download of EMISS No. 31270. The canton's all-cause mortality is the Obsan crude_rate field; the Swiss value is 817.87. [\[30\]](#) [\[34\]](#)

A3. Newly registered active tuberculosis, per 100,000 population

Year	Kuzbass	Russia	Appenzell Ausserrhoden	Switzerland
2020	72.28	32.07	Local rate not obtained	4.25
2021	70.00	30.71	Local rate not obtained	3.90

Russia and Kuzbass use the same federal Rospotrebnadzor tables: 2020, p. 137, Table 48; 2021, pp. 182–183, Table 1.50. Prison coverage is not separately specified in these tables. Switzerland uses mandatory BAG notifications; the API does not provide an AR series, so the national column is kept separate. [35] [36] [37]

A4. Health problems shared by workers and residents: study findings side by side

V0.3 clarification to [8]: the authors published these values in Abstract → Results. Production workers: aRMR 1.22 (95% CI 1.06–1.40), meaning adjusted circulatory disease mortality was 22% higher than among the other men in the cohort. Truck Drivers: 1.21 (0.95–1.54); the interval includes 1, the value for equal rates. This is an internal occupational comparison. See Chapter 5 and C09.

Health problem	Coal industry workers	People living in coal areas
Cough and respiratory symptoms	Tanzania, underground mine: in the group with the highest dust exposure, the odds ratio for cough was 2.91 (95% CI 1.06–7.97). Workers with different dust doses were compared. [4]	India, Jharia: dry cough was reported by 17.3% of men in the commercial area and 6% of men in the control area. [5]
Deaths from respiratory diseases	Czech Republic, former miners with pneumoconiosis: respiratory mortality was 2.78 times the expected level; for COPD separately, 2.94. [6]	United States, Appalachian counties with the highest coal production: chronic respiratory disease mortality was 7% higher for men and 11% higher for women than in counties without mining. [7]
Cardiovascular mortality	Australia, Queensland: among men in the production group, the rate was 22% higher than among other men in the workforce cohort. [8]	United States, Appalachia: mortality from chronic heart disease was 28% higher for men and 18% higher for women than in counties without mining. [7]
Lung cancer mortality	Czech Republic: among former miners with pneumoconiosis, the SMR was 1.70; among those without pneumoconiosis at enrolment, 0.83. The comparison was with men nationwide. [6]	Spain, near open-pit coal mines: RR 1.22 for both sexes; 1.29 for men and 0.57 for women. The comparison was with municipalities without mining within a 5 km radius. [9]

Health problem	Coal industry workers	People living in coal areas
Tuberculosis	Pakistan, Balochistan: 19 confirmed cases among 8,149 workers screened — 233 per 100,000 people screened. [10]	In the same programme: 15 cases among 6,392 people from neighbouring communities — 235 per 100,000 people screened. [10]

The table compares the themes examined in the studies. OR: odds ratio; RR: relative measure; SMR: standardised mortality ratio. Sample sizes, years and confidence intervals are given in the text and the study table.

A5. Appalachian residents: cause-specific mortality, 2000–2004

Causes of death	Men: RR (95% CI)	Women: RR (95% CI)
Chronic cardiac causes	1.28 (1.25–1.30)	1.18 (1.15–1.21)
Chronic respiratory diseases	1.07 (1.04–1.10)	1.11 (1.07–1.15)
Renal causes	1.19 (1.13–1.25)	1.13 (1.06–1.21)

Appalachian counties producing more than 4 million tonnes over the study period were compared with US counties without mining. RR 1 represents the comparison level. Age and area characteristics were addressed. The paper's renal group includes codes N17–N19—acute, chronic and unspecified kidney failure. Tables 1–3. [7]

A6. Suicide in the Queensland coal-worker cohort: follow-up through 2020

Group	Deaths	SMR relative to Australia (95% CI)
Men	614	118 (109–128)
Women	18	96 (60–152)

SMR accounts for age; 100 corresponds to expected mortality in the comparison population. These are deaths over the whole follow-up period, not an annual rate per 100,000. Table 2. When men were compared with Queensland's population, the authors found no overall increase. [28]

A7. Suicide mortality in Russian coal-mining regions, per 100,000 residents

Territory	2017	2018	2019	2020	2021
Kemerovo Region — Kuzbass	25.61	21.2	22.7	23.7	19.09
Republic of Khakassia	32.37	25.1	30.8	26.8	21.31
Republic of Buryatia	39.62	38.5	36.4	33.9	32.93
Republic of Tuva	5.62	13.9	26.7	32.5	21.42
Rostov Region	3.71	3.7	3.3	2.9	4.56
Russian Federation	13.81	12.4	11.7	11.3	10.71

Whole population, both sexes, without age standardisation. One saved download of EMISS No. 31270, cause '249 Suicide'. For Tuva, the official 2017 report describes some deaths being assigned to injuries of undetermined intent; this matters when reading the sharp change in the series. [\[30\]](#) [\[41\]](#)

A8. HIV: new cases and registered people living with HIV

Indicator	Kuzbass	Khakassia	Russia	Appenzell Ausserrhoden
New cases, 2021, per 100,000	79.49	53.46	41.72	Local rate for 2021 not obtained
People living with HIV, end of 2021, per 100,000	2 069.7	526.4	782.0	Local prevalence not obtained

Both Russian rows are from the federal report for 2021, p. 184, Table 1.52. People living with HIV include those at the AIDS stage; new cases must not be added to all people living with HIV. [\[36\]](#)

A9. Myocardial infarction and stroke: Appenzell Ausserrhoden and Switzerland, 2017–2021

Indicator	Canton, 95% CI	Switzerland, 95% CI
Acute myocardial infarction	271.8 (252.5–292.3)	227.7 (226.2–229.1)
Stroke	283.4 (263.8–304.1)	249.8 (248.3–251.4)

Average annual episodes per 100,000, European standard population 2010 (Eurostat 2013). Obsan combines hospital admissions and deaths, excluding double-counting of in-hospital deaths. This is event frequency, not mortality. [\[16\]](#) [\[17\]](#)

A10. Lung cancer in Appenzell Ausserrhoden

Indicator and period	Men	Women
New cases, 2017–2021: per 100,000 per year	43.9	22.0
Mortality, 2016–2020: per 100,000 per year	26.7	17.4

Trachea, bronchus and lung, C33–C34. European age standard; registry reference: Waterhouse et al., 1976. Men's and women's rates calculated separately. Source: pp. 25, 111–112. [\[19\]](#)

A11. Infant mortality: deaths before age one per 1000 live births

Year	Kuzbass	Appenzell Ausserrhoden	Switzerland
2019	6.2	5.38	3.28
2020	5.6	1.83	3.64
2021	5.5	1.74	3.12

Annual rates. All three years are shown for the small canton. BFS table su-d-01.04.02.02.03, rows Appenzell A. Rh. and Schweiz; Kuzbass report, Table 72, p. 90. [\[22\]](#) [\[23\]](#)

A12. Suicide in the canton and Switzerland: annual average for 2017–2021

Indicator	Appenzell Ausserrhoden	Switzerland
Excluding assisted suicide, per 100,000	17.00	11.75
Same indicator, age-standardised, 95% CI	17.45 (12.71–23.35)	11.99 (11.65–12.32)
Assisted suicide: separate series, per 100,000	17.73	14.04

The first and third rows are crude rates; the second uses the European standard population 2010. The source publishes five-year cantonal averages; the Russian table above contains individual years. Canton: averages of 9.4 and 9.8 cases per year in the two separate categories. [\[31\]](#)

A13. Life expectancy at birth, years

Group and year	Kuzbass	Russia	Appenzell Ausserrhoden	Switzerland
Both sexes, 2019	69.69	73.34	83.20	83.72
Both sexes, 2020	68.44	71.58	82.77	82.97
Both sexes, 2021	67.54	70.15	83.43	83.58
Men, 2021	62.69	65.69	80.82	81.55
Women, 2021	72.31	74.50	86.23	85.53

Period life expectancy at birth. Russian values: the published series in the regional report, Table 75, p. 96; Swiss values: BFS / Obsan, category_id=1. [\[23\]](#) [\[33\]](#)

A14. Kuzbass: registered people living with HIV at year-end

Year	Per 100,000 total population
2019	1 934.9
2020	1 998.6

Year	Per 100,000 total population
2021	2 069.7

Values retained from the Federal Scientific and Methodological Centre's 2019 statement and state reports for 2020 and 2021. Bulletin No. 47 publishes an alternative series for 2020–2021: 2003.6 and 2027.3. Sources and the discrepancy are retained in the appendix. [38] [35] [36] [42]

A15. Topics on which coal areas could be compared with the canton

Topic	Appenzell Ausserrhoden: local data	What is still needed for a matching comparison
Asthma; chronic bronchitis / COPD / emphysema	2017 survey: 3.17% and 2.48%, residents aged 15+. [12]	A comparable population survey in Kuzbass and Khakassia; childhood asthma and cough symptoms separately.
Myocardial infarction and stroke	2017–2021: 271.8 and 283.4 episodes per 100,000, age-standardised. [16] [17]	For Russian regions—the same episode definition and age standard.
Mortality from cardiac and respiratory diseases	Local rates for these two groups in 2017–2021 were not extracted.	Cantonal deaths and population by age, sex and cause.
Lung cancer	Local incidence and mortality by sex; registry pp. 111–112. [19]	Russian rates by sex, for matching periods and using the European standard.
Kidney failure	Cantonal N17–N19 mortality rate not obtained.	Kidney failure deaths; kidney cancer is a different diagnostic group.
Tuberculosis	A separate cantonal series was not obtained in the checked materials. [37]	Cantonal new cases and deaths; a Russian series with explicit prison coverage.
HIV	One new case in each year from 2016 to 2019; local prevalence not obtained. [39]	People living with HIV and new diagnoses for matching years.
Depressive symptoms	2017: 7.8% on PHQ-9 among residents aged 15+. [27]	The same population survey in Russian coal regions.
Suicide	2017–2021: 17.00 per 100,000 per year; assisted suicide in a separate series. [31]	Matching age groups and standardisation for risk comparisons.
Substance dependence and poisoning	Local series on overdose deaths and accidental alcohol poisoning were not obtained.	Separate diagnoses, poisonings and causes of death for 2017–2021.

Topic	Appenzell Ausserrhoden: local data	What is still needed for a matching comparison
Infant mortality	2019–2021: 5.38, 1.83, 1.74 per thousand live births. [22]	Prematurity, low birthweight and congenital anomaly data for the same period.
Occupational dust-related diseases	No local coal-worker cohort in the collection.	Occupational statistics are compared between workers, not with the canton's entire population.

‘Not obtained’ means a gap in the verified data collection, not an absence of disease. Detailed definitions and saved sources are available in the appendices.

Appendix B. Verification matrices and calculations

B1. Related publications and independent units of evidence

Dataset family	Sources	Shared basis	How handled
Queensland	[8] [28]	Worker cohort; overall and occupational analyses.	One dataset, different questions; not two independent confirmations.
Shenango	[24] [25]	One coke plant closure, period and area.	One natural experiment; respiratory and cardiac outcomes kept separate.
Appalachian live births	[20] [21]	Overlapping registries; recording reanalysed.	Samples are not added together; model differences are discussed.
Appalachian mortality and reviews	[7] [43] [44]	Reviews include primary studies and overlapping datasets.	A review is not added as a new independent cohort.
Worker reviews and primary studies	[45] [46] and worker cohorts	Summarise previously published studies.	Context, not a separate repeat observation.
Graber correction	[15] [50]	One paper and its correction.	Corrected coefficients used; one study.
Official HIV versions	[36] [42]	One region/period, different published versions.	Discrepancy retained; not counted as independent confirmation.

Without microdata, the identity of every original individual record was not checked. Established or explicitly described overlap is noted.

B2. How to read area-level indicators

Indicator	Territory, period, registration	Standard / unit	Supported comparison
All-cause and cause-specific mortality	Kuzbass/Khakassia/Russia, 2021, EMISS 31270; AR/CH, 2021, BFS/Obsan	Russian rows are crude, per 100,000; AR crude_rate and value kept separate	Crude rates describe burden; age-specific risk is not ranked without common standardisation.
Life expectancy	Russia/Kuzbass 2019–21, report; AR/CH 2019–21, Obsan _001	Years, life table; at birth category1, sex0/1/2	Same demographic meaning; account for period conditions and small numbers.
Myocardial infarction/stroke	AR/CH 2017–21, hospital admissions minus in-hospital deaths plus all deaths from the relevant cause	ESP2010 (Eurostat 2013); episodes/100,000	Within the Swiss dataset; broad Russian cardiac mortality is a different outcome.
Lung cancer	AR: incidence 2017–21; mortality 2016–20; registry, C33–C34 by sex	European Waterhouse 1976; /100,000	Do not combine with ESP2010 or all Russian malignant neoplasms.
Respiratory conditions	AR/CH 2017, survey ages 15+; chronic bronchitis/COPD/emphysema combined	Percentage of respondents	Requires a matching Russian survey; not comparable with mortality or children's symptoms.
Suicide	Russia 2017–21, all ages; AR/CH 2017–21 average; Appalachia 2021, ages 15–64	Russia crude; AR crude/value; ARC age standard	Not one ranking; assisted suicide and undetermined intent recorded separately.
TB	Kuzbass/Russia 2020–21, federal tables; CH BAG; AR not extracted	New registrations/100,000; prison coverage unspecified in tables	Retain coverage as a limitation; do not substitute CH for AR.
HIV	Kuzbass/Russia 2019–21: new cases and people living with HIV separate; AR 1 case in 2019; CH 2021 BAG	Per 100,000; AR recalculated by the authors using year-end population	Do not rank regional prevalence alongside countries' new-case rates.
Infant mortality	Kuzbass/Russia/AR/CH 2019–21, official tables	Deaths before age 1/1000 live births; no adult age standard	Small annual AR counts; not a substitute for anomalies or perinatal mortality.

Detailed selectors, original files and versions are retained; a missing pair is not replaced by a similar-looking indicator.

B3. Monitoring indicators: what they measure and what is needed

Indicator and group	Exposure / specificity	Evidence basis	Data required
Pneumoconiosis/silicosis: workers, including former workers	Occupational dust/silica; high specificity when criteria are met	Established occupational causation [49]; local registration [23]	Diagnostic criteria, radiographs, service, occupations, personal exposure, register of those examined/eligible for examination.
Spirometry and respiratory symptoms: both groups	Function/symptoms are nonspecific; do not replace diagnosis	Worker dose studies and local community data [4] [11]	Consistent protocol, age/sex/height, smoking, occupation, repeat measurements, comparison group.
COPD and respiratory mortality: workers	Dust can contribute; diagnosis and cause of death differ	Occupational evidence, cohort limitations [49] [15]	Clinical diagnosis, causes of death, person-years, exposure, smoking, age, follow-up.
Asthma/cardiac healthcare visits: residents	Nonspecific; sensitive to source changes and access to care	Evidence of a specific coke plant's contribution [24] [25]	Repeat events/unique people separately; dates, addresses, seasonality, pollution, control series.
Myocardial infarction/stroke: residents and workers separately	Multifactorial outcomes; episodes do not always equal unique people	Worker association and Obsan data [8] [16] [17]	Event definition, fatal/nonfatal events, age/sex, person-years, matching standard.
Cancer by site: both groups	Nonspecific; exposure mixture and latency matter	Heterogeneous cohort/ecological data [6] [18] [9]	ICD site, incidence separate from mortality, sex/age, smoking, employment/residential history, standard.
Anomalies and perinatal outcomes: pregnancies/children	Nonspecific; sensitive to recording	Uncertain causal effect size [20] [21] [47]	Live births, losses and terminations separately; anomaly criteria, hospital, maternal factors, denominator.
Mental health symptoms/dependence: both groups	Screening is not diagnosis or a coal-dose indicator	Limited selected groups [26] [27]	Same validated instrument and period, random sample, occupation, income; healthcare use/diagnoses separately.

Indicator and group	Exposure / specificity	Evidence basis	Data required
Suicide and poisoning: residents/workers separately	Causes of death, not a direct measure of depression or dust	Descriptive series sensitive to the comparison [28] [30] [31]	Age/sex, ICD, undetermined intent, assisted suicide separately, place and work-relatedness, multi-year denominators.
TB/HIV: residents and worker groups separately	Infections; not specific to coal exposure	Registration and screening [10] [36]	New cases/people living with infection/deaths, screening criteria, prison coverage, migration, person-time and population.
All-cause mortality/life expectancy: population	Summarise all conditions; nonspecific	Official descriptive indicators [30] [33]	Age-specific deaths and population, standardisation method; life tables for life expectancy.
Biomarkers of exposure and early damage	Separate level: a substance or early change is not a diagnosis	The core lacks a sufficient comparable set for an overall effect	Sample matrix/method, collection time, background, detection limit, relationship to dose and clinical outcome; not a substitute for disease.
Worker injuries/accidents	Occupational safety separate from disease	No harmonised summary assembled in this collection	Confirmed work-relatedness, contractors, working time, death at the scene/later, accident causes.

The table proposes measurement tasks, not clinical recommendations or a list of every established consequence of coal.

B4. Claim → source → data → location → limitations → supported conclusion

Claim	Data and source	Exact location	Limitation	Supported conclusion
C01. Occupational dust-related diseases have an established causal basis	Coal mine dust: CWP and COPD; silica: silicosis and other lung diseases. [49]	Executive Summary, printed iv / PDF 6	Review of US workers; not worldwide legal status.	Causation of specific occupational diseases is not inferred from general regional statistics.

Claim	Data and source	Exact location	Limitation	Supported conclusion
C02. Employment duration and CWP are associated in the Colombian sample	447; CWP 35.9%; service ≥ 30 versus <25 years OR 3.222 (1.806–5.748). [13]	Table 5; Methods	Current insured workers with ≥ 10 years of service.	Frequency and association apply to the selected worker group.
C03. Cough is associated with high cumulative dose among the workers examined	OR 2.91 (1.06–7.97), top 10% versus lowest quartile; highest quartile 1.50 (0.68–3.35). [4]	Table 4	Cross-sectional symptoms; age/smoking addressed, selection not excluded.	Signal of a dose–symptom relationship; not a COPD diagnosis.
C04. Jharia residents' findings differ by zone and symptom	Male dry cough 17.3%/6%; OR 3.28, $p=0.01$; residential zone OR 2.01, NS. [5]	Printed 88–89 / PDF 2–3, Tables 1–2	No CI; weak control of smoking/occupation.	Local reported symptoms under mixed exposure.
C05. Some symptom-related outcomes are higher near the terminal, but not every diagnosis	School absence OR 1.59 (1.23–2.04); asthma 1.25 (0.88–1.76); wheeze 1.37 (0.98–1.91). [11]	Table 7, printed 310 / PDF 6	Abstract gives a different school-absence OR; mixed port.	The specific table model is retained; the asthma interval covers both lower and higher values.
C06. Pneumoconiosis can progress after leaving work	1091 initially; 207 at 10 years, 85 at 20; 62% and 29% progression. [14]	Printed 1949–1955, Tables 2, 4	Different retained subgroups; substantial losses; 207/208.	Progression observed; not a cumulative 91% or the frequency among all former miners.
C07. Former miners with CWP have excess mortality from certain causes	All-cause SMR 1.10 (1.02–1.17); lung 1.70 (1.41–2.04); NMRD 2.78 (2.32–3.31). [6]	Table 3; Methods 2.1	Differently assembled cohorts; external national comparison.	Long-term outcomes in a specific registered group.
C08. The US dose model requires the correction to be incorporated	COPD: never-smoker HR 1.84 (1.05–3.22); silica 1.04 (0.96–1.14). [15] [50]	Tables 2–3 and Correction, p. 738	Reconstructed dose; concurrent exposures; not all intervals exclude 1.	Occupational dose evidence retained without overstating each estimate.

Claim	Data and source	Exact location	Limitation	Supported conclusion
C09. Cardiovascular mortality differs within the Queensland cohort	Production aRMR 1.22 (95% CI 1.06–1.40); Truck Drivers 1.21 (0.95–1.54). Non-office category without presumed exposure: 1.64 (1.15–2.35). [8]	Abstract → Results: exact author estimates; Table 7: non-office category; Methods: comparison and adjustments.	Age, period and smoking addressed; occupation does not measure dose. The drivers' CI includes 1.	The production group's adjusted circulatory disease mortality is 22% higher than in the other men in the cohort; the drivers' interval covers both lower and higher values. Occupations within the cohort were compared.
C10. Appalachian mortality is not elevated for every cardiac cause	Male chronic cardiac RR 1.28 (1.25–1.30); acute 0.89 (0.87–0.91). [7]	Tables 2–3, printed 246–247	Counties; no individual occupation or complete smoking information.	Ecological findings for different causes are retained together.
C11. The renal finding has a narrow definition	N17–N19: male RR 1.19 (1.13–1.25), female 1.13 (1.06–1.21). [7]	Definitions, printed 244–245; Tables 2–3	Not kidney cancer or the entire genitourinary group.	Limited association with kidney failure in residents.
C12. The retired coke-worker cohort has excess lung cancer mortality	534 workers; 17 lung cancer deaths; SMR 2.51, $p < 0.01$. [18]	Tables 4–6, printed 560–564	No CI; internal duration contrast unconvincing; selection of retirees.	A coke-production finding, not a universal coal-mining risk.
C13. Spanish cancer findings differ by sex and mining type	Surface mining: lung RR 1.22 (CrI 1.01–1.49), men 1.29, women 0.57; underground 1.09 (0.95–1.26). [9]	Table 2, PDF 41–44; Methods, PDF 14–20	Ecological exposure, latency, smoking, multiple tests.	Spatial associations for individual sites, not an overall causal coefficient.
C14. The anomaly signal is sensitive to recording	Ahern PRR 1.26 (1.21–1.32); Lamm after hospital adjustment 1.08 (0.97–1.20). [20] [21]	Ahern Tables 2–4 / PDF 5; Lamm Tables and Discussion, printed 76–81	Overlapping registry, different covariates, live births only.	The remaining causal effect size is uncertain.
C15. Healthcare visits fell after the Shenango closure	Childhood asthma IRR 0.59 (0.40–0.86); cardiovascular visits –42% (33–51%). [24] [25]	B029 Table 4/Figure 5; B039 Results	One closure, aggregate events, imputation.	Evidence of a specific coke plant's contribution, not two independent experiments.

Claim	Data and source	Exact location	Limitation	Supported conclusion
C16. A historical mortality gap can persist and narrow	1981: men +122.6 (SE 22.10), women +66.49 (SE 16.02) per 100,000; gap reduced by 91%/70%. [32]	Table 3, models 1 and 7	Social and occupational pathways not separated.	Changes in an area's legacy, not an isolated effect of residual dust.
C17. Low all-cause mortality among workers does not mean an absence of risks	189,011; male SMR 81 (78–83), female 75 (65–86), base 100. [28]	Table 2; Limitations	Healthy worker effect, young age, latency.	External mortality comparison for a specific cohort.
C18. Worker mental health screening concerns selected substance users	HADS: anxiety 38/132, depression 31/131; concurrent-use aORs 4.896 and 5.335. [26]	Methods; Tables 1–2	Substance-user sample, missing data, cross-sectional design; not personal dust dose.	Comorbidity in a selected group, not an industry effect on everyone.
C19. The finding on worker suicide depends on the comparison	614 men, SMR 118 (109–128) versus Australia; no overall increase versus Queensland. [28]	Table 2; Discussion	Entire period, not an annual rate; non-work deaths included.	National and regional references needed, with sex/age separated.
C20. Tuberculosis was detected in workers and neighbouring communities	19/8149 and 15/6392; approximately 233 and 235 per 100,000 screened. [10]	Table; Methods; Limitations	No external non-coal sample; symptom-based selection.	Need for detection and care in both groups.
C21. Kuzbass occupational registration counts diagnoses	2019–2021: 524/421/425; 56.25/50.63/50.30 per 10,000. [23]	Tables 108–109, PDF 164–165	Not unique people or the full underlying risk.	Recorded recognised occupational disease and registration trends.
C22. Local child-health studies also contain null findings	Congenital malformations 65.8→134.2 per 1000 children in their first year; Prokopyevsk respiratory p=0.7 versus the region. [47] [48]	K004 Table 1, PDF 2; K005 PDF 35–39, table on 38	Different forms, short series, mixed emissions.	Signals and limitations of local data, not a causal disease frequency attributable to coal.
C23. Kuzbass mortality exceeds Russia's for selected causes	2021: all causes 1817.2/1673.9; circulatory 896.93/640.32; tumours 237.44/191.3; respiratory 102.07/78.65. [30]	CSV: area, cause, whole population, 2021	Crude rates, EMISS mirror, pandemic year.	Descriptive registered gap, without causal apportionment.

Claim	Data and source	Exact location	Limitation	Supported conclusion
C24. Tuberculosis and HIV describe the regional health picture	TB 2021: 70.00/30.71; HIV prevalence 2069.7, alternative 2027.3. [35] [36] [42]	2021 Tables 1.50/1.52; Bulletin 47, PDF 70–71	Prison coverage unspecified; HIV versions differ.	Regional infection registration; these series do not measure individual occupational exposure.
C25. Life expectancy shows a large descriptive gap	2021: Kuzbass 67.54; AR 83.430578; difference 15.89 years. [23] [33]	Kuzbass Table 75, PDF 97; Obsan _001: 15,2021,sex0,category1	Period life expectancy, pandemic; not years causally lost to coal.	Difference in demographic conditions without a causal share.
C26. The canton fares worse than Switzerland on some indicators	Standardised all-cause mortality 895.0/821.2; infarction 271.8/227.7; stroke 283.4/249.8; suicide 17.45/11.99. [34] [16] [17] [31]	Obsan _007 2021; _011/_012/_010 2017-21, kanton15/0	Different outcomes; intervals in tables; not transferable to crude Russian series.	The canton is not best on every outcome; the adverse contrast is retained.
C27. Cantonal cancer cannot be compared with Russian ‘all cancer’	C33–C34: incidence 43.9/22.0 (male/female), mortality 26.7/17.4. [19]	2022 registry report, pp. 111–112	Periods 2017–21/2016–20; Waterhouse 1976, not ESP2010.	Local lung cancer profile, without a matching Russian pair so far.
C28. The canton was selected for a trading office, not as a control	Teufen AR address; Baltic claim of almost 1,000,000 mts/month; Hargreaves 2011, Russian coal. [1] [2] [3]	About/Impressum; Sales structure; Interim results	Undated volume; no origin established for a particular shipment from Kuzbass.	Supports the author’s geographical choice, not an epidemiological control.
C29. Infant mortality is not congenital anomaly frequency	2019–21: AR 5.38/1.83/1.74; Kuzbass 6.2/5.6/5.5 per 1000. [22] [23]	BFS XLSX rows AR19, CH4; Table 72, PDF 91	Small numbers, different outcome and denominator.	Description of infant mortality without a conclusion about malformations.
C30. Suicide comparisons require age and classification	Kuzbass 2021: 19.09; Russia 10.71; AR average 17.00; Appalachia ages 15–64, standardised 21.0. [30] [41] [29] [31]	EMISS 249; Tuva 2017; ARC Exhibit 6; Obsan _010	Crude/standardised rates and ages differ; undetermined intent and assisted suicide kept separate.	A set of observations, not a single world risk ranking.

This maps the key conclusions. All numbers refer to the stated groups and models; original tables and sources are retained separately.

B5. Quality of key studies: assessment domains without a total score

Study / timing	Exposure	Comparison and adjustments	Bias / uncertainty	Strength and applicability of the conclusion
[4] Dust and service measured; symptoms assessed at the same examination.	Personal measurements and service reconstruction improve on job title alone, but historical doses are approximate.	Internal dose categories; age and smoking addressed. Age and smoking	Selection of current workers; temporary and previously ill workers excluded.	Limited dose–symptom association; not a diagnosis or lifetime risk. The question and method are transferable; the numerical effect requires local validation.
[5] Cross-sectional community survey.	Residential zones and 18 dust points; mines and fires not separated.	Men/women separately; insufficient adjustment for age, smoking and occupation. Stratification by sex; no multivariable adjustment	Errors in some percentages; ORs without CIs; inverse and null outcomes.	Local association of reported symptoms; low certainty about causal contribution. The question and method are transferable; the numerical effect requires local validation.
[6] Mortality after CWP detection or removal from exposure.	Service, MPE and recognised CWP; the two cohorts were selected differently.	General male population; age standardisation does not remove selection differences. Standardisation against the national population	Survival to enrolment, work/smoking; non-CWP cohort defined by subsequent absence of diagnosis.	Long-term mortality among affected workers; not an isolated causal effect of the diagnosis. The question and method are transferable; the numerical effect requires local validation.

Study / timing	Exposure	Comparison and adjustments	Bias / uncertainty	Strength and applicability of the conclusion
[7] Ecological county comparison.	County production volume, not individual dose.	Age and area characteristics; individual smoking and occupation not measured. Age standardisation; county educational/social characteristics, poverty, race/ethnicity, sex composition, physicians, rurality, smoking and southern location in the models. No individual smoking/occupation adjustment.	Ecological fallacy, correlated social factors, multiple causes of death.	Area-level mortality association; not an individual causal estimate. The question and method are transferable; the numerical effect requires local validation.
[8] Retrospective cohort with known death dates.	Occupations from medical examinations; changing jobs, no quantitative dose.	Category versus other workers; age, period and smoking addressed. Age, period, smoking	Missing early occupation, medical selection, previous jobs outside the industry.	Internal occupational heterogeneity; dust alone cannot be isolated. The question and method are transferable; the numerical effect requires local validation.
[9] Deaths in 1997–2006 and registry geography from 2007.	Distance from municipal centre; different mining types.	Age/sex/period and social characteristics; no individual smoking or occupation. Expected deaths by age, sex and five-year period; BYM: spatial dependence, illiteracy, unemployment, proportion of farmers, population/household size and income (1991 census).	Latency, distance selection, multiple outcomes; findings differ by sex.	Limited spatial association for particular cancer sites. The question and method are transferable; the numerical effect requires local validation.
[10] One-time voluntary symptom-based screening.	Employment and proximity, not measured dust dose.	Workers versus neighbours; no external non-coal group. No multivariable causal model	Ill migrants returning home, no chest radiography, no random sampling frame.	Detected cases and need for care; not a coal effect. The question and method are transferable; the numerical effect requires local validation.

Study / timing	Exposure	Comparison and adjustments	Bias / uncertainty	Strength and applicability of the conclusion
[11] Cross-sectional school survey.	Proximity to terminal; mixed port, incomplete dust monitoring.	Control areas and outcome-specific adjustment sets. For school absence: allergy, passive smoking, other health problems, mother's employment. For asthma/wheeze—different Table 7 covariate sets, including family history, sex, housing/employment.	Questionnaire responses after complaints; abstract/table discrepancy; no clear asthma/PEF difference.	More frequent selected symptoms/absences; limited source attribution. The question and method are transferable; the numerical effect requires local validation.
[13] Cross-sectional CWP diagnosis in current workers.	Dust/quartz and employment duration.	Service/company/dose categories; smoking addressed. Logistic model including employment duration, company, smoking and dust	Insured workers with ≥ 10 years of service; TB excluded; not a national sample.	Supports occupational dust evidence; prevalence applies only to this sample. The question and method are transferable; the numerical effect requires local validation.
[14] After employment ended; CWP already present at enrolment.	Disease category and past service, not new exposure.	Among those retained in follow-up; no adequate unexposed group. Group comparisons of age, service, smoking and lung function; no multivariable causal model.	207 and 85 of 1091 at follow-up examinations; 207/208 discrepancy.	Progression after leaving observed; the proportion cannot be generalised to all. The question and method are transferable; the numerical effect requires local validation.
[15] Cohort followed for up to 37 years.	Reconstructed cumulative coal dust and silica.	External SMR and internal Cox models; adjustments differ. SMR: age, race, calendar time; Cox: age at entry, birth year, region, race and smoking/pack-years in the relevant models. Time-since-leaving analysis for the healthy worker effect.	Healthy worker survivor effect, incomplete later jobs and smoking; correlated doses.	Long-term occupational dose evidence; use corrected intervals. The question and method are transferable; the numerical effect requires local validation.

Study / timing	Exposure	Comparison and adjustments	Bias / uncertainty	Strength and applicability of the conclusion
[18] Cohort of retired coke workers.	Work history and exposure duration.	Population SMRs; nested comparison with smoking information for some participants. Age and calendar year for SMR. Nested comparison by birth year, age at death and smoking; smoking known for 77 of 104 deceased participants.	Selection of survivors to retirement, 11% unknown causes, regional background; no CIs in tables.	Lung cancer excess in this cohort; internal exposure contrast unconvincing. The question and method are transferable; the numerical effect requires local validation.
[20] Live-birth registry; mother's area of residence.	County and mountaintop removal mining; no individual dose.	Many maternal factors; delivery location insufficiently addressed. Maternal age ≥ 35 , education, smoking/alcohol during pregnancy, race/ethnicity, infant sex, prenatal care, diabetes, metropolitan residence.	Live births only, recording differences, overlap with B055.	Anomaly signal sensitive to recording definitions. The question and method are transferable; the numerical effect requires local validation.
[21] Reanalysis of an overlapping registry.	Area and hospital; no individual dose.	Hospital adjustment; not a complete replication of B054 covariates. Delivery hospital; this model lacks the full individual adjustment set used in B054. Examines recording heterogeneity and the distribution of deliveries.	Restricted hospitals; ARIES funding; corrected version, earlier error not established.	Shows the role of recording and uncertainty in the remaining association. The question and method are transferable; the numerical effect requires local validation.
[24] Controlled interrupted series before/after closure.	Source change and air monitoring.	Control areas, trends and seasonality. Time trends/seasonality and control series	Suppressed small counts/imputation, ZIP codes, ICD change; same experiment as B039.	Evidence of a coke plant contribution to respiratory healthcare visits. The question and method are transferable; the numerical effect requires local validation.

Study / timing	Exposure	Comparison and adjustments	Bias / uncertainty	Strength and applicability of the conclusion
[25] Controlled interrupted series before/after closure.	Source change and air monitoring.	Control areas and injuries, seasonality/trend. Seasonality, time trend, control sites/outcome	Aggregate events, imputation, concurrent changes; same closure as B029.	Evidence of a coke plant contribution to cardiovascular healthcare visits. The question and method are transferable; the numerical effect requires local validation.
[26] Cross-sectional sample of substance users.	ASSIST categories, not industrial dose.	Age and income; no non-coal population. Age and income	132/131 of 202 analysed with HADS; direction of association unknown.	Screening comorbidity in a selected group, not a coal effect. The question and method are transferable; the numerical effect requires local validation.
[28] Cohort with mortality follow-up through 2020.	Medical examinations and job type; exact dates for the entire working history unavailable.	Australia and Queensland separately; age/sex/calendar period. Age/sex/calendar period in expected counts	Young cohort, healthy worker effect, limited latency; shared with B020.	Describes worker mortality; result depends on the reference population. The question and method are transferable; the numerical effect requires local validation.
[32] Long district panel, 1981–2019.	Historical coal employment.	Matched districts, social and industrial characteristics. Income, deprivation, fragmentation, density, air-quality proxies, former industry; ESP2013	Ecological fallacy, migration, imputations; social/occupational components not separated.	Narrowing of a long-standing area gap, not an isolated dust effect. The question and method are transferable; the numerical effect requires local validation.
[47] Ecological trends and municipal comparisons.	Emissions from several industries.	Areas/years; no individual maternal adjustments. Rank correlation, nonparametric comparisons	Different recording forms and denominator labels; multiple comparisons.	Trends in anomaly registration; not the frequency of unique newborns affected by coal. The question and method are transferable; the numerical effect requires local validation.

Study / timing	Exposure	Comparison and adjustments	Bias / uncertainty	Strength and applicability of the conclusion
[48] Annual ecological series with a lag.	Mixed emissions and concentrations.	City versus region; rank correlations, no individual adjustments. Spearman/Mann-Whitney; no multivariable individual adjustment	Short series, multiple tests; most between-area differences null.	Local signals for further examination, not individual causation. The question and method are transferable; the numerical effect requires local validation.

The authors' descriptive assessment, not GRADE/NOS. Complete estimates and intervals are in the source records and machine-readable matrix.

B6. Reproducible calculations by the authors

Calculation	Inputs and formula	Result	Source / location	Meaning
R01. TB among screened workers	19 / 8149 × 100000	233.2 per 100,000 screened	[10] Table: People screened / People positive for TB	Not annual incidence or a representative estimate for all workers.
R02. TB among screened residents	15 / 6392 × 100000	234.7 per 100,000 screened	[10] Table: People screened / People positive for TB	Not a comparative effect of living near a mine.
R03. Alternative HIV version, 2021	52796 / 2604272 × 100000	2027.3 per 100,000 population	[42] Bulletin 47, PDF 70–71 / printed 69–70	Checks the bulletin's arithmetic; does not resolve the discrepancy with the report.
R04. One new HIV case in AR, 2019	1 / 55445 × 100000	1.8 per 100,000 permanent residents at year-end	[39] PDF43 G12; PDF102 §7.6	The authors' descriptive recalculation, not a published annual BAG rate.
R05. Life expectancy difference, AR minus Kuzbass, 2021	83.4305780451 – 67.54	15.89 years	[33] [23] Obsan_001: kanton15/year2021/sex0/category1; Table75 PDF97	Difference in period life expectancy; not years causally lost to coal.

Calculation	Inputs and formula	Result	Source / location	Meaning
R06. Crude mortality difference, Kuzbass minus AR, 2021	1817.2 – 910.779663462	906.42 deaths per 100,000 population	[30] [34] CSV: Kemerovo/9999/whole population/2021; Obsan_007 kanton15 sex0 year2021 crude_rate	Descriptive difference without age adjustment.
R07. Change in B05 occupational disease registration, 2019–2021	$(50.30 / 56.25 - 1) \times 100$	-10.58 %	[23] Table108 PDF164	Change in the registered occupational disease rate.
R08. TB registration rate ratio, Kuzbass/Russia, 2021	70 / 30.71	2.28 rate ratio	[36] Table 1.50, pp. 182–183	Descriptive; prison coverage unspecified in the table, not a causal coal RR.

reproduce.mjs performs all eight operations. Original precision and rounded output are retained. Recalculation is not a new causal estimate.

B7. Examples of queries actually saved

Date / system	Query	Saved location
2026-10-20; web search	coal mining communities health systematic review mortality morbidity Boyles 2017	inputs/search-logs/root-search-001-global-seed.json
2026-10-20; web search	"coal" "children" "Jharia" respiratory health study	inputs/search-logs/root-search-003-regional.json
2026-10-20; web search	"煤矿" "死亡" "队列" 尘肺	inputs/search-logs/root-search-006-terminal-coke-brazil-china.json
2026-10-20; web search	Jharia coal mining children lung function study respiratory health residents	inputs/search-logs/root-search-013-asia-africa-latin-v02.json
2026-10-20; web search	carbón Cerrejón La Jagua salud población respiratoria estudio epidemiológico	inputs/search-logs/root-search-013-asia-africa-latin-v02.json
2026-10-20; web search	"Jharia" "respiratory" "children" study spirometry	inputs/search-logs/root-search-014-local-region-v02.json
2026-10-20; web search	"Cerrejón" "niños" "salud" estudio epidemiológico	inputs/search-logs/root-search-014-local-region-v02.json

Date / system	Query	Saved location
2026-10-20; web search	"Jharia" "health" "respiratory" study	inputs/search-logs/root-search-019-followup-v02.json
2026-10-20 (from the plan and execution log); Europe PMC	(coal AND (mining OR mine OR miner OR miners OR colliery OR coke OR terminal OR preparation OR waste OR spoil OR stockpile OR beneficiation)) AND (mortality OR morbidity OR disease OR cancer OR respiratory OR cardiovascular OR renal OR kidney OR neurological OR pregnancy OR birth OR congenital OR children OR mental OR pneumoconiosis OR silicosis OR spirometry OR disability OR biomarker) AND "Afghanistan" AND FIRST_PDATE: [1800-01-01 TO 2026-10-20]	inputs/search-logs/searches-EP001.json

The full extracted log is data/search-queries.json; original responses are in inputs/search-logs. These records do not replace the missing comprehensive publication-selection log.

Appendix C. Source register and extractions

The first 42 numbers match the original register. The revised analysis clarifies definitions and availability. Complete original V06 records are retained in inputs so that changes in interpretation remain visible. FULL_TEXT indicates full-text availability, not independent duplicate verification.

[1] MIR Trade AG. About company / Impressum. Page undated.

Code: K100 · COMPANY

Territory	Switzerland	Group	Company
Activity	Coal trading	Period	Undated page; checked in 2026
Design / type	COMPANY	Coverage	See the original source table

Outcome. About company; address in the Impressum: Alte Haslenstrasse 5, CH-9053 Teufen AR. Snapshot: 21 October 2026.

Result / data used. About company; address in the Impressum: Alte Haslenstrasse 5, CH-9053 Teufen AR. Snapshot: 21 October 2026.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. About company; address in the Impressum: Alte Haslenstrasse 5, CH-9053 Teufen AR. Snapshot: 21 October 2026.

Availability. Saved original document / dataset; the sections used were checked

<https://mirtrade.ch/about-company/>
In the package: sources/K100-S01-mirtrade.html

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [Contents](#)

[2] MIR Trade AG. Sales structure. Page undated.

Code: K101 · COMPANY

Territory	Switzerland	Group	Company
Activity	Coal trading	Period	Historical page without an exact date for the indicator
Design / type	COMPANY	Coverage	See the original source table

Outcome. Baltic region section: almost 1,000,000 mts monthly. A company statement on shipments, not an independent measurement; the date to which this volume refers is unspecified.

Result / data used. Baltic region section: almost 1,000,000 mts monthly. A company statement on shipments, not an independent measurement; the date to which this volume refers is unspecified.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. Baltic region section: almost 1,000,000 mts monthly. A company statement on shipments, not an independent measurement; the date to which this volume refers is unspecified.

Availability. Saved original document / dataset; the sections used were checked

<https://mirtrade.ch/sales-structure/>
In the package: sources/K101-AR03-mir-sales.html

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [Contents](#)

[3] Hargreaves Services plc. Interim results. 2011. Issuer announcement published by Investegate.

Code: K102 · COMPANY

Territory	United Kingdom / Switzerland	Group	Companies
Activity	Trading Russian coal	Period	2011
Design / type	COMPANY	Coverage	See the original source table

Outcome. Section on European trading and the joint venture with MIR Trade AG: supplier of Russian coal.

Result / data used. Section on European trading and the joint venture with MIR Trade AG: supplier of Russian coal.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. Section on European trading and the joint venture with MIR Trade AG: supplier of Russian coal.

Availability. Saved original document / dataset; the sections used were checked

<https://www.investegate.co.uk/announcement/rns/hargreaves-services--hsp/interim-results/2019077>

In the package: sources/K102-AR06-hargreaves.html

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [Contents](#)

[4] Mamuya SH, Bråtveit M, Mashalla Y, Moen BE. High prevalence of respiratory symptoms among workers in the development section of a manually operated coal mine in a developing country: a cross sectional study. BMC public health. 7. 17. 2007.

Code: B023 · PRIMARY

Territory	Tanzania	Group	WORK
Activity	UG	Period	2003–2004
Design / type	Cross-sectional study	Coverage	250 men
Exposure	Personal dust/quartz measurements and cumulative exposure	Adjustments	Age and smoking

Outcome. Cough and other symptoms

Result / data used. Highest coal-dust exposure decile versus lowest quartile: cough OR 2.91 (95% CI 1.06–7.97); fourth quartile 1.50 (0.68–3.35)

Comparison. Lowest cumulative exposure category

Limitations. Temporary workers and some previously ill workers excluded; symptoms are not COPD; small categories

Exact location. Table 4; Methods.

Availability. Full text

<https://doi.org/10.1186/1471-2458-7-17>

In the package: sources/B023-tanzania-workers.xml.txt

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [Contents](#)

[5] Masto RE, Rout TK, Srivastava NK, Ram LC. Health status of communities living around Jharia coalfield area. Bhartiya Vaigyanik evam Audyogik Anusandhan Patrika. 2015;23(2):87–92.

Code: B105 · PRIMARY

Territory	India	Group	RES
Activity	UG; OC; WASTE; MIXED	Period	Survey years not specified in the checked section
Design / type	Cross-sectional study	Coverage	Commercial zones: 127 men/87 women; residential: 88/75; control: 100/84; adults
Exposure	Residence in a coal-mining area; survey near 18 dust-collection points	Adjustments	Stratification by sex; no multivariable adjustment

Outcome. Self-reported symptoms, including cough and eye irritation

Result / data used. Men: dry cough in the commercial zone, 17.3% versus 6%; OR 3.28, $p=0.01$, CI not reported. Residential zone OR 2.01, NS. Persistent cough in the residential zone OR 0.21, $p=0.031$.

Comparison. Control area

Limitations. Survey, not a clinical registry; age/smoking/industry employment not adjusted for. Mining, fires and other sources are mixed. Percentage errors in the female table; summed ORs are not interpreted.

Exact location. Printed pp. 88–89; Table 1, PDF p. 3.

Availability. Full text

<https://nopr.niscpr.res.in/handle/123456789/33774>

In the package: sources/B105-jharia.pdf

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · Contents

[6] Tomášková H, Šplíchalová A, Šlachťová H, Urban P, Hajduková Z, Landecká I, Gromnica R, Brhel P, Pelclová D, Jiráček Z. Mortality in Miners with Coal-Workers' Pneumoconiosis in the Czech Republic in the Period 1992-2013. International journal of environmental research and public health. 14(3). E269. 2017.

Code: B025 · PRIMARY

Territory	Czech Republic	Group	WORK: former workers
Activity	UG; LEGACY	Period	1992–2013
Design / type	Mortality cohort study	Coverage	3476 with CWP; 6687 without CWP, removed from exposure

Exposure	CWP diagnosis and work history	Adjustments	Standardisation against the national population
Outcome. All-cause mortality, lung cancer, non-malignant respiratory disease			
Result / data used. CWP: all-cause SMR 1.10 (95% CI 1.02–1.17), lung cancer 1.70 (1.41–2.04), non-malignant respiratory disease 2.78 (2.32–3.31). Without CWP, all-cause SMR 0.86 (0.82–0.91)			
Comparison. Czech male population; two differently assembled cohorts			
Limitations. The non-CWP cohort was selected at the exposure limit; comparisons were not randomised; a low SMR is not a protective effect			
Exact location. Table 3; Results; Methods. Table 3, row ‘Malignant neoplasm of lung (C33–C34)’			
Availability. Full text			
https://doi.org/10.3390/ijerph14030269 In the package: sources/B025-czech-mortality.xml.txt			

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [6 ↑](#) · [7 ↑](#) · [8 ↑](#) · [Contents](#)

[7] Hendryx M. Mortality from heart, respiratory, and kidney disease in coal mining areas of Appalachia. International archives of occupational and environmental health. 82(2). 243-249. 2009.			
Code: B056 · PRIMARY			
Territory	United States	Group	RES; workers not separated
Activity	UG; OC; MIXED	Period	Mortality and production, 2000–2004
Design / type	Ecological comparison of US counties; cause-specific mortality models separately by sex	Coverage	3140 counties: 2914 without mining, 97 mining counties outside Appalachia, 66 Appalachian counties producing ≤4 million tonnes and 63 producing >4 million tonnes over the period
Exposure	Total county coal production; underground/surface mining, preparation and transport not separated by individual exposure	Adjustments	Age standardisation; county educational/social characteristics, poverty, race/ethnicity, sex composition, physicians, rurality, smoking and southern location in the models. No individual smoking/occupation adjustment.
Outcome. Mortality from cardiac, respiratory and renal diseases			
Result / data used. Appalachia >4 million tonnes versus non-mining counties: men—chronic cardiac causes RR 1.28 (1.25–1.30), respiratory 1.07 (1.04–1.10), renal 1.19 (1.13–1.25); women—1.18 (1.15–1.21), 1.11 (1.07–1.15), 1.13 (1.06–1.21). Male acute cardiac causes: 0.89 (0.87–0.91). The authors’ ‘chronic’ renal group includes N17–N19.			
Comparison. Counties without mining; age standardisation to the US 2000 population			

Limitations. Workers may be included among residents; separate female/male analyses do not remove the occupational component. No individual exposure, diabetes or hypertension history for the renal outcome; smoking often measured at state level. RRs come from an area-level model.

Exact location. Table 1—causes included; Tables 2–3—male and female models; printed pp. 245–247, PDF pp. 3–5. | Tables 1–3; printed pp. 245–247, PDF pp. 3–5.

Availability. Full text

<https://doi.org/10.1007/s00420-008-0328-y>
In the package: sources/B056-v04-article.pdf

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · 6 ↑ · 7 ↑ · 8 ↑ · 9 ↑ · 10 ↑ · 11 ↑ · 12 ↑ · Contents

[8] Glass DC, Gwini SM, Monaco AD, Fritschi L, Abramson MJ, Sim MR, Walker-Bone K. Are mortality rates similar between jobs in the Queensland coal mine workers' cohort?. BMC public health. 25(1). 3004. 2025.

Code: B020 · PRIMARY

Territory	Australia	Group	WORK
Activity	UG; OC; PREP	Period	Mortality through 2020; industry medical-examination cohort
Design / type	Retrospective cohort, occupational analysis	Coverage	161,534 men; 23,967 women
Exposure	Eight occupational groups; internal comparisons	Adjustments	Age, period, smoking

Outcome. Cause-specific mortality, including circulatory disease

Result / data used. Abstract → Results: male Production workers—aRMR 1.22 (95% CI 1.06–1.40), adjusted circulatory disease mortality 22% higher than in the other men in the cohort. Truck Drivers—aRMR 1.21 (95% CI 0.95–1.54); the CI includes 1. Table 7: non-office category with no presumed exposure, aRMR 1.64 (1.15–2.35).

Comparison. Other men in the cohort for male occupational groups; sexes analysed separately.

Limitations. Occupation is not dose; incomplete employment history. The drivers' interval includes 1. Occupations within the cohort were compared; personal dust dose was not measured.

Exact location. Abstract → Results: exact aRMRs and 95% CIs for Production workers and Truck Drivers. Methods: adjustments and internal comparison group. Table 7: non-office category. Figure 4 and Supplementary Material 1 saved as additional materials.

Availability. Full text

<https://doi.org/10.1186/s12889-025-24163-4>
In the package: sources/B020-queensland-worker-jobs.xml.txt Additional files: sources/B020-figure4.jpg; sources/B020-supplement.docx.

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · 6 ↑ · 7 ↑ · 8 ↑ · 9 ↑ · 10 ↑ · 11 ↑ · 12 ↑ · Contents

[9] Fernández-Navarro P, García-Pérez J, Ramis R, Boldo E, López-Abente G. Proximity to mining industry and cancer mortality. The Science of the total environment. 435-436. 66-73. 2012.

Code: B057 · PRIMARY

Territory	Spain	Group	RES
Activity	UG; OC; other mining types analysed separately	Period	1997–2006
Design / type	Ecological spatial analysis	Coverage	8098 municipalities; 120 mining facilities of various types; coal Table 2: 13 municipalities near underground mining, 12 near surface mines
Exposure	Distance from municipal centre to IPPC 2007 facility; 5 km threshold selected after examining 1–15 km	Adjustments	Expected deaths by age, sex and five-year period; BYM: spatial dependence, illiteracy, unemployment, proportion of farmers, population/household size and income (1991 census).

Outcome. Cancer mortality by site, separately by sex and mining type

Result / data used. Table 2, surface coal mines: lung RR 1.22 (95% CrI 1.01–1.49), men 1.29 (1.05–1.59), women 0.57 (0.33–0.97); colorectal cancer 1.26 (1.04–1.51). Underground coal mining: lung 1.09 (0.95–1.26), colorectal cancer 1.27 (1.12–1.44).

Comparison. For Table 2—municipalities without registered mining within 5 km; a separate initial analysis uses absence of any IPPC facility

Limitations. Ecological design; no individual smoking/occupation/dose; workers among residents not excluded. Facilities registered in 2007 versus deaths in 1997–2006; data-driven distance selection, many cancer sites; latency not modelled separately. Table 2 selects sites with signals in at least one group; all 32 results were not checked without the supplement.

Exact location. Table 2, author manuscript PDF pp. 41–44; numerical results on p. 42. Methods, PDF pp. 14–20.

Availability. Full text

<https://doi.org/10.1016/j.scitotenv.2012.07.019>
In the package: sources/B057-spain-full-v03.pdf

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · 6 ↑ · Contents

[10] Eman KU, Kazi GN, Qin ZZ, Creswell J, Raisani SA, Lodhi UR, Vasquez NA, John S. Improving TB care services among coal mine workers and their associated communities in Pakistan. Public Health Action. 2025;15(3):129–134.

Code: B019 · PRIMARY

Territory	Pakistan	Group	WORK and RES, separate result rows
Activity	UG; MIXED	Period	2019

Design / type	Active screening in 96 mobile camps	Coverage	14,541: table lists 8149 workers and 6392 residents
Exposure	Mine work/residence within 10 km; initial symptom screening	Adjustments	No multivariable causal model
Outcome. GeneXpert-confirmed tuberculosis			
Result / data used. 19 worker cases, 15 resident cases: 233 and 235 per 100,000; p=0.985. Overall 234 per 100,000 (95% CI 150.6–316.5)			
Comparison. Workers versus local community; no unexposed control			
Limitations. Voluntary participation, limited screening of asymptomatic people; text and table disagree on subgroup sizes; no group outside coal areas			
Exact location. Results; Table 1. Methods; Results; Table 1.			
Availability. Full text			
https://doi.org/10.5588/pha.25.0011 In the package: sources/B019-pakistan-tb.xml.txt			

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · 6 ↑ · 7 ↑ · 8 ↑ · 9 ↑ · 10 ↑ · Contents

[11] Brabin B, Smith M, Milligan P, Benjamin C, Dunne E, Pearson M. Respiratory morbidity in Merseyside schoolchildren exposed to coal dust and air pollution. Archives of disease in childhood. 70(4). 305-312. 1994.

Code: B062 · PRIMARY

Territory	United Kingdom	Group	RES: children aged 5–11
Activity	PORT; storage; MIXED	Period	Questionnaires October–December 1991; separate dust-monitoring series in 1990–1992
Design / type	Cross-sectional survey of 15 primary schools, parent questionnaires and PEF; logistic models	Coverage	1872 children aged 5–11; 92% return from 2035 questionnaires; school-absence model n=1391, asthma n=1409, wheeze n=1272
Exposure	Five Bootle schools 0.5–2 km from the coal terminal; control schools in South Sefton and Wallasey; deposited dust, without reliable separation of all port sources	Adjustments	For school absence: allergy, passive smoking, other health problems, mother’s employment. For asthma/wheeze—different Table 7 covariate sets, including family history, sex, housing/employment.

Outcome. Symptoms, school absence, PEF

Result / data used. Table 7: >1 school day missed because of cough/wheeze/breathlessness over 12 months—OR 1.59 (95% CI 1.23–2.04). Abstract differs: 1.55 (1.17–2.06). Adjusted asthma OR 1.25 (0.88–1.76), wheeze 1.37 (0.98–1.91). PEF and hospital admissions did not differ significantly between areas.

Comparison. Two control areas, five schools each; resident children, not port workers

Limitations. Survey followed public complaints; residual social confounding; damaged dust collectors and few samples. Other port cargoes/traffic nearby. Pollution sources not separated in the model; the abstract/full-result discrepancy was not resolved by guesswork.

Exact location. Methods, pp. 306–307; results and regression, pp. 307–310; Table 7, p. 310 (PDF p. 6); Discussion, pp. 310–312.

Availability. Full text

<https://doi.org/10.1136/adc.70.4.305>
In the package: sources/B062-v04-facsimile.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [Contents](#)

[12] Obsan. Atemwegserkrankungen [Respiratory diseases]. Official dataset downloaded in 2026; observations before 2022 used.

Code: K114 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2017
Design / type	Swiss Health Survey (SGB)	Coverage	See the original source table

Outcome. Self-reported physician diagnosis of respiratory disease

Result / data used. data: kanton_nr=15/0; sex_id=0; year=2017; category_id=1 (asthma), 2 (chronic bronchitis / COPD / emphysema). Field: value; percentages, not standardised; residents aged 15+ in private households reporting a physician diagnosis.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. data: kanton_nr=15/0; sex_id=0; year=2017; category_id=1 (asthma), 2 (chronic bronchitis / COPD / emphysema). Field: value; percentages, not standardised; residents aged 15+ in private households reporting a physician diagnosis.

Availability. Saved original document / dataset; the sections used were checked

https://ind.obsan.admin.ch/api/_131/kg/json
In the package: sources/K114-S30-respiratory-data-kg.json

Back to citations: [1 ↑](#) · [2 ↑](#) · [Contents](#)

[13] Torres Rey CH, Ibañez Pinilla M, Briceño Ayala L, Checa Guerrero DM, Morgan Torres G, Groot de Restrepo H, Varona Uribe M. Underground Coal Mining: Relationship between Coal Dust Levels and Pneumoconiosis, in Two Regions of Colombia, 2014. BioMed research international. 2015. 647878. 2015.

Code: B022 · PRIMARY

Territory	Colombia	Group	WORK
Activity	UG	Period	2013–2014
Design / type	Cross-sectional survey with company sampling	Coverage	447 workers with ≥ 10 years of service; 29 companies
Exposure	Personal coal-dust and silica measurements; employment duration	Adjustments	Logistic model including employment duration, company, smoking and dust

Outcome. Radiographic pneumoconiosis

Result / data used. Prevalence 35.9%; ≥ 30 versus < 25 years of service: OR 3.222 (95% CI 1.806–5.748). Medium dust category OR 2.901 (0.937–8.982)

Comparison. Employment-duration and company-size categories

Limitations. Only insured current workers with long service; TB excluded; not national prevalence; some estimates include the null value

Exact location. Methods; Table 5

Availability. Full text

<https://doi.org/10.1155/2015/647878>

In the package: sources/B022-colombia-cwp.xml.txt

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [Contents](#)

[14] Kimura K, Ohtsuka Y, Kaji H, Nakano I, Sakai I, Itabashi K, Igarashi T, Okamoto K. Progression of pneumoconiosis in coal miners after cessation of dust exposure: a longitudinal study based on periodic chest X-ray examinations in Hokkaido, Japan. Internal medicine (Tokyo, Japan). 49(18). 1949-1956. 2010.

Code: B043 · PRIMARY

Territory	Japan	Group	WORK: former workers
Activity	UG; LEGACY	Period	Follow-up 1985–2005; comparisons at 10 and 20 years
Design / type	Retrospective radiographic follow-up of former miners with established CWP	Coverage	1091 men in categories 1–B at baseline; 207 (19%) available at 10 years and 85 (8%) at 20 years. Categories 0 and C excluded at baseline.

Exposure	Previous coal mine employment; exposure duration, cessation of work and initial radiographic category	Adjustments	Group comparisons of age, service, smoking and lung function; no multivariable causal model.
<p>Outcome. Radiographic progression after leaving employment</p> <p>Result / data used. The authors report progression in 62% of those followed during the first decade and 29% during the second. These are different retained groups, not the cumulative 20-year risk of the entire original cohort. CIs not reported.</p> <p>Comparison. Initial category and successive radiographs of the same followed participants; not a non-worker control</p> <p>Limitations. Extensive loss to follow-up, selection of people already ill and influence of medical-examination rules. Table 4 gives 63+145=208, although Table 2 lists 207 at year 10; the disputed denominator was not corrected. Not incidence among all miners.</p> <p>Exact location. Methods, pp. 1949–1950; Table 2 and Figures 1–2, pp. 1951–1952; Discussion, pp. 1954–1955. PDF pp. 1–7.</p> <p>Availability. Full text</p> <p>https://doi.org/10.2169/internalmedicine.49.2990 In the package: sources/B043-v04-jstage.pdf</p>			
Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · Contents			

[15] Graber JM, Stayner LT, Cohen RA, Conroy LM, Attfield MD.. Respiratory disease mortality among US coal miners; results after 37 years of follow-up.. Occupational and environmental medicine. 71(1). 30-39. 2014.

Code: B060 · PRIMARY

Territory	United States	Group	WORK
Activity	UG	Period	Enrolment 1969–1971, follow-up through 31 December 2007
Design / type	37-year cohort extension; life-table SMRs and Cox exposure–response analysis	Coverage	8829 in the final analysis after excluding 137 ineligible and 67 lost participants from the previous cohort of 9033; 5907 deaths. The 9033 in the abstract is not the final analytical N.
Exposure	31 underground mines; reconstructed cumulative coal-dust and respirable-silica exposure; work history	Adjustments	SMR: age, race, calendar time; Cox: age at entry, birth year, region, race and smoking/pack-years in the relevant models. Time-since-leaving analysis for the healthy worker effect.

Outcome. Mortality: CWP, COPD, lung cancer

Result / data used. SMRs: COPD 1.11 (95% CI 0.99–1.24), lung cancer 1.08 (1.00–1.18); pneumoconiosis 79.70 (72.10–87.67), although comparison with the general population inflates this specific-cause ratio. At 64.6 mg-years/m³ of coal dust in the dual-exposure model: COPD in never-smokers HR 1.84 (1.05–3.22), in former smokers 1.52 (0.98–2.34). For silica at the mean dose of 2.6 mg-years/m³ in the logarithmic model adjusted for coal dust: pneumoconiosis 1.33 (0.94–1.90), COPD 1.04 (0.96–1.14).

Comparison. US male population for SMR (base 1); internal Cox dose contrasts

Limitations. Survivors at enrolment, incomplete later job histories, retrospective silica estimation, baseline smoking, cause-of-death errors. The former-smoker CI includes 1. Publisher corrections incorporated: DOI 10.1136/oemed-2013-101597corr1; the old abstract contains incorrect CIs.

Exact location. Methods, Results, Tables 1–4 and the note to Table 2; CDC author manuscript, 23 PDF pages. Corrigendum: Occup Environ Med 2014;71:738, <https://oem.bmj.com/content/71/10/738>.

<https://doi.org/10.1136/oemed-2013-101597>
In the package: sources/B060-v04-cdc.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [6 ↑](#) · [7 ↑](#) · [8 ↑](#) · [Contents](#)

[16] Obsan. Akuter Myokardinfarkt [Acute myocardial infarction]. Official dataset downloaded in 2026; observations before 2022 used.

Code: K112 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2017–2021
Design / type	Official cantonal and national indicator	Coverage	See the original source table

Outcome. Myocardial infarction episodes

Result / data used. data: kanton_nr=15/0; sex_id=0; category_id=1; year=2017-21. standardised_rate and 95% CI limits. Hospital admissions minus in-hospital deaths, plus all myocardial infarction deaths; ESP2010 (Eurostat 2013).

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. data: kanton_nr=15/0; sex_id=0; category_id=1; year=2017-21. value (standardised rate) and 95% CI limits. Hospital admissions minus in-hospital deaths, plus all myocardial infarction deaths; ESP2010 (Eurostat 2013).

Availability. Saved original document / dataset; the sections used were checked

https://ind.obsan.admin.ch/api/_011/kg/json
In the package: sources/K112-S19-mi-data-kg.json

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [Contents](#)

[17] Obsan. Hirnschlag [Stroke]. Official dataset downloaded in 2026; observations before 2022 used.

Code: K113 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2017–2021

Design / type	Official cantonal and national indicator	Coverage	See the original source table
Outcome. Stroke episodes Result / data used. data: kanton_nr=15/0; sex_id=0; category_id=1; year=2017-21. standardised_rate and 95% CI limits. Hospital admissions minus in-hospital deaths, plus all stroke deaths; ESP2010 (Eurostat 2013). Comparison. See the original source table Limitations. Saved original document / dataset; the sections used were checked Exact location. data: kanton_nr=15/0; sex_id=0; category_id=1; year=2017-21. value (standardised rate) and 95% CI limits. Hospital admissions minus in-hospital deaths, plus all stroke deaths; ESP2010 (Eurostat 2013). Availability. Saved original document / dataset; the sections used were checked			
https://ind.obsan.admin.ch/api/_013/kg/json In the package: sources/K113-S20-stroke-data-kg.json			

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · Contents

[18] Bertrand JP, Chau N, Patris A, Mur JM, Pham QT, Moulin JJ, Morviller P, Auburtin G, Figueredo A, Martin J.. Mortality due to respiratory cancers in the coke oven plants of the Lorraine coalmining industry (Houillères du Bassin de Lorraine).. British journal of industrial medicine. 44(8). 559-565. 1987.

Code: B059 · PRIMARY

Territory	France	Group	WORK: retirees
Activity	COKE; LEGACY	Period	Retirees of two coke plants, 1 January 1963–31 December 1982
Design / type	Retrospective mortality cohort with a nested case–control comparison	Coverage	534 male retirees; 104 deaths, including 17 from lung cancer
Exposure	Work on/near ovens and periodic maintenance; duration of contact with dust, gases and fumes; not measured personal PAH dose	Adjustments	Age and calendar year for SMR. Nested comparison by birth year, age at death and smoking; smoking known for 77 of 104 deceased participants.

Outcome. Lung cancer mortality

Result / data used. SMR on a base-1 scale: all causes 1.10, all tumours 1.15 (both NS); lung cancer 2.51 (p<0.01). ≥5 years of exposure: 2.78 versus 2.35 for <5 years/no exposure; difference between these groups not significant. Numerical CIs absent from Tables 4–6.

Comparison. French male population with age/calendar standardisation; separate exposure groups and matched deceased participants

Limitations. Selected survivors to retirement; earlier deaths/leavers excluded. National control differs from the Moselle regional background; 11% of causes unknown. Authors found no direct duration relationship; other occupational mixtures possible.

Exact location. Methods, pp. 560–561; Tables 4–6, p. 562; case-control analysis and Discussion, pp. 563–564. Saved scan, PDF pp. 1–7.

<https://doi.org/10.1136/oem.44.8.559>

In the package: sources/B059-v04-facsimile.pdf

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · Contents

[19] Krebsregister Ostschweiz. Jahresbericht 2022 [Annual report 2022]. Cantonal tables for Appenzell Ausserrhoden.

Code: K115 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	Incidence 2017–2021; mortality 2016–2020
Design / type	Population-based cancer registry	Coverage	See the original source table

Outcome. Cancer incidence and mortality by sex and site

Result / data used. PDF p. 111: incidence, 2017–2021; p. 112: mortality, 2016–2020. C33–C34—lung/trachea; all sites excluding C44. P. 25: European standard population, Waterhouse et al., 1976.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. PDF p. 111: incidence, 2017–2021; p. 112: mortality, 2016–2020. C33–C34—lung/trachea; all sites excluding C44. P. 25: European standard population, Waterhouse et al., 1976.

Availability. Saved original document / dataset; the sections used were checked

https://ostschweiz.krebsliga.ch/krebsregister-ostschweiz-forschung/publikationen/jahresberichte/-dl-/fileadmin/krebsliga_ostschweiz/downloads/jahresberichte/kr_JB_KROCH_2022_OCHFL.pdf

In the package: sources/K115-AR02-cancer-2022.pdf

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · Contents

[20] Ahern MM, Hendryx M, Conley J, Fedorko E, Ducatman A, Zullig KJ.. The association between mountaintop mining and birth defects among live births in central Appalachia, 1996-2003.. Environmental research. 111(6). 838-846. 2011.

Code: B054 · PRIMARY

Territory	United States	Group	RES: live births
------------------	---------------	--------------	------------------

Activity	OC: MTR	Period	Live births, 1996–2003
Design / type	Registry study of live births with ecological county classification and Poisson models	Coverage	1,889,071 live births with completed anomaly information; 109,315 in 37 MTM counties, 112,771 in 49 other mining counties, 1,666,985 in 318 non-mining counties
Exposure	Mother’s county of residence: mountaintop mining from satellite/energy data; other mining counties; no individual dose	Adjustments	Maternal age ≥35, education, smoking/alcohol during pregnancy, race/ethnicity, infant sex, prenatal care, diabetes, metropolitan residence.

Outcome. Congenital anomalies

Result / data used. MTM versus non-mining: any registered anomaly PRR 1.26 (95% CI 1.21–1.32); circulatory/respiratory 1.93 (1.73–2.15); chromosomal 0.92 (0.72–1.18). Other mining counties: any anomaly 1.10 (1.05–1.16). Not every anomaly group shows an increase.

Comparison. Counties without coal mining; other mining counties listed separately

Limitations. Live births and early recording only; incomplete certificates, pregnancy losses excluded. No adjustment for delivery hospital, individual exposures or parental occupational contacts. Area/period partly overlap with B055; these are not independent confirmations.

Exact location. Methods, PDF pp. 2–4; Tables 2–4, PDF p. 5; limitations, §4.2, PDF p. 7. The saved publisher’s proof has its own pagination, pp. 1–9.

<https://doi.org/10.1016/j.envres.2011.05.019>
In the package: sources/B054-v04-article.pdf

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · 6 ↑ · Contents

[21] Lamm SH, Li J, Robbins SA, Dissen E, Chen R, Feinleib M.. Are residents of mountain-top mining counties more likely to have infants with birth defects? The West Virginia experience.. Birth defects research. Part A, Clinical and molecular teratology. 103(2). 76-84. 2015.

Code: B055 · PRIMARY

Territory	United States	Group	RES: live births
Activity	OC: MTR	Period	1990–2009, West Virginia live-birth certificates
Design / type	Registry reanalysis, Poisson and Mantel–Haenszel methods stratified by delivery hospital	Coverage	418,385 live births in the original registry; MTM/non-coal comparison 294,985. For 44 hospitals—285,272 births; for six—160,976.
Exposure	MTM status of mother’s county of residence; no individual dust/water dose	Adjustments	Delivery hospital; this model lacks the full individual adjustment set used in B054. Examines recording heterogeneity and the distribution of deliveries.

Outcome. Congenital anomalies

Result / data used. 44 hospitals: hospital-adjusted PRR 1.08 (95% CI 0.97–1.20), p=0.16. Six hospitals: adjusted PRR 1.01 (0.89–1.14), p=0.87; unadjusted 2.39 (2.15–2.65). The association weakened after accounting for delivery location.

Comparison. Births to residents of non-mining counties in the same hospitals

Limitations. Certificates incomplete and filled in inconsistently; restricted hospital sample and instability of the full model. After adjustment, intervals cover both lower and higher rates. Overlap with B054. ARIES funding, subaward 441693-19A81; authors report no sponsor involvement in analysis/publication.

Exact location. Pp. 76–81 (PDF pp. 1–6): Methods, Table 1, Results and Discussion. P. 76 notes the version correction dated 15 December 2014.

<https://doi.org/10.1002/bdra.23322>
In the package: sources/B055-v04-vt.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [6 ↑](#) · [7 ↑](#) · [Contents](#)

[22] BFS. Säuglingssterblichkeit nach Kanton [Infant mortality by canton]. Historical annual rates.

Code: K118 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2019–2021
Design / type	Official demographic statistics	Coverage	See the original source table

Outcome. Infant mortality

Result / data used. Table: Schweiz row (4) and Appenzell Ausserrhoden row (19), columns 2019, 2020, 2021. Deaths before age one per 1,000 live births; calculation based on small numbers.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. Table: Schweiz row (4) and Appenzell Ausserrhoden row (19), columns 2019, 2020, 2021. Deaths before age one per 1,000 live births; calculation based on small numbers.

Availability. Saved original document / dataset; the sections used were checked

<https://dam-api.bfs.admin.ch/hub/api/dam/assets/36837706/master>
In the package: sources/K118-S29-infant-table.xlsx

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [Contents](#)

[23] Rospotrebnadzor Directorate for Kemerovo Region — Kuzbass. On the state of sanitary and epidemiological well-being of the population in Kemerovo Region — Kuzbass in 2024. 2024 (year on the title page). [In Russian.]

Code: K003R, K003W · OFFICIAL

Territory	Russia	Group	WORK and RES: different tables used; kept separate
Activity	UG; OC; PREP not separated within sector B05	Period	Observations used: 2019–2021; report for 2024
Design / type	Official occupational disease registration	Coverage	B05 coal mining: 524, 421 and 425 newly registered occupational diseases in 2019, 2020 and 2021.
Exposure	Region of residence; no individual exposure	Adjustments	No age standardisation claimed for crude rates

Outcome. Registered occupational diseases; separate demographic series.

Result / data used. B05: 56.25, 50.63, 50.30 per 10,000 workers in 2019–2021; diagnoses, not unique people. Infant mortality 6.2, 5.6, 5.5 per 1000 live births; life expectancy—Table 75.

Comparison. Years and sectors; Russia for the overall indicator

Limitations. Registration statistics; diagnosis and recognition affect case counts. B05 does not separate occupations or doses; the table used contains no linked former-worker mortality.

Exact location. PDF p. 91 / printed p. 90, Table 72: infant mortality, 2019–2021—6.2, 5.6, 5.5 per 1,000 live births. PDF p. 97 / printed p. 96, Table 75: life expectancy in Russia and Kuzbass, 2019–2021. | PDF p. 164 / printed p. 163, Table 108: occupational disease, B05 coal mining, 2019–2021—56.25, 50.63, 50.30 per 10,000 workers. PDF p. 165 / printed p. 164, Table 109: 524, 421, 425 new occupational diseases.

Availability. Official document

<https://42.rospotrebnadzor.ru/content/813/>
In the package: sources/K003-kuzbass-official-2024.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [6 ↑](#) · [7 ↑](#) · [8 ↑](#) · [9 ↑](#) · [10 ↑](#) · [11 ↑](#) · [12 ↑](#) · [13 ↑](#) · [14 ↑](#) · [Contents](#)

[24] Yu W, Thurston GD. Reductions in Respiratory Hospital Visits after a Coal Coking Plant Closure: A Natural Experiment. American journal of respiratory and critical care medicine. 211(11). 2072-2085. 2025.

Code: B029 · PRIMARY

Territory	United States	Group	RES: including children
Activity	COKE	Period	2013–2018; closure in January 2016
Design / type	Controlled interrupted time series	Coverage	Aggregate visits; N of unique residents not extracted

Exposure	Coke plant closure; air monitoring	Adjustments	Time trends/seasonality and control series
Outcome. Respiratory visits/hospital admissions; childhood asthma			
Result / data used. Immediate change in paediatric asthma visits: IRR 0.59 (95% CI 0.40–0.86)			
Comparison. Control areas and time trends			
Limitations. Aggregate data, imputation of small suppressed counts; residual confounding; same closure as B039			
Exact location. Results; Table 4; Figure 5			
Availability. Full text			
https://doi.org/10.1164/rccm.202410-2005oc In the package: sources/B029-coke-closure-respiratory.xml.txt			

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · 6 ↑ · 7 ↑ · 8 ↑ · Contents

[25] Yu W, Thurston GD. An interrupted time series analysis of the cardiovascular health benefits of a coal coking operation closure. Environmental Research: Health. 1. 045002. 2023.			
Code: B039 · PRIMARY			
Territory	United States	Group	RES
Activity	COKE	Period	2013–2018; closure on 7 January 2016
Design / type	Controlled interrupted time series	Coverage	Aggregate visits/hospital admissions; not an individual cohort
Exposure	Closure and measured pollution reduction	Adjustments	Seasonality, time trend, control sites/outcome
Outcome. Cardiovascular visits and hospital admissions			
Result / data used. Immediate 42% reduction in cardiovascular visits (95% CI 33–51%) relative to the pre-closure average			
Comparison. Positive/negative control sites; control outcome—injuries			
Limitations. Aggregate data; individual factors not adjusted for; autocorrelation and imputations; not independent of B029			
Exact location. PDF p. 2, Abstract; Methods 2; Results and limitations.			
Availability. Full text			
https://doi.org/10.1088/2752-5309/ace4ea In the package: sources/B039-coke-closure-cardiovascular.pdf			

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · 6 ↑ · 7 ↑ · 8 ↑ · Contents

[26] Chakrabarti A, Saha I, Kalita M, Bhattacharya D, Haque B, Nagraj A, Mukherjee S, Benegal V. High prevalence of alcohol use disorder & psychiatric comorbidity among coal mine workers: Observations from a cross-sectional study in West Bengal. The Indian journal of medical research. 160(1). 95-101. 2024.

Code: B033 · PRIMARY

Territory	India	Group	WORK
Activity	UG	Period	December 2016–March 2019
Design / type	Cross-sectional survey of permanent workers	Coverage	202 men; HADS: 132 for anxiety, 131 for depression
Exposure	Work in two mines; alcohol and tobacco use	Adjustments	Age and income

Outcome. Screening symptoms of anxiety/depression

Result / data used. Concurrent moderate/high-risk use: anxiety aOR 4.896 (95% CI 1.355–17.687); depression 5.335 (1.442–19.731)

Comparison. Substance-use categories, not an unexposed population

Limitations. Substance users selected; HADS sample smaller than 202. Not a coal-dust effect; proportions cannot be extrapolated to all workers

Exact location. Methods, inclusion criteria; Table I and Table II.

Availability. Full text

https://doi.org/10.25259/ijmr_2407_23
In the package: sources/B033-india-workers-mental.xml.txt

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · Contents

[27] Obsan. Gesundheit im Kanton Appenzell Ausserrhoden. Ergebnisse aus der Schweizerischen Gesundheitsbefragung 2017. Bericht 02/2019.

Code: K116 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2017
Design / type	Population survey, PHQ-9	Coverage	See the original source table

Outcome. Depressive symptoms

Result / data used. PDF p. 38 / printed p. 36, Table 2.19: moderate and severe PHQ-9 symptoms; AR 7.8% (95% CI 5.2–10.3), n=601; CH 8.6% (8.1–9.1), n=18,230. Residents aged 15+ in private households.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. PDF p. 38 / printed p. 36, Table 2.19: moderate and severe PHQ-9 symptoms; AR 7.8% (95% CI 5.2–10.3), n=601; CH 8.6% (8.1–9.1), n=18,230. Residents aged 15+ in private households.

Availability. Saved original document / dataset; the sections used were checked

https://www.obsan.admin.ch/sites/default/files/obsan_bericht_02-2019-appenzell_ausserrhodan.pdf
In the package: sources/K116-S04-health-2019.pdf

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · Contents

[28] Glass DC, Gwini SM, Del Monaco A, Fritschi L, Abramson MJ, Sim MR, Walker-Bone K. Mortality and cancer incidence among Queensland coal mine workers: a retrospective cohort. Occupational and environmental medicine. 82(3). 120-127. 2025.

Code: B032 · PRIMARY

Territory	Australia	Group	WORK
Activity	UG; OC; PREP	Period	Enrolment from 1982; mortality through November 2020; cancer through December 2016
Design / type	Retrospective registry cohort	Coverage	189,011 workers (164,622 men; 24,389 women)
Exposure	Industry medical examinations and facility category	Adjustments	Age/sex/calendar period in expected counts

Outcome. All-cause mortality, cancer, causes of death

Result / data used. SMR (base=100): men 81 (95% CI 78–83), women 75 (65–86). Men at CHPPs: 78 deaths/2929, SMR 52 (42–65); cancer SIR 87 (73–104)

Comparison. Population of Australia/Queensland

Limitations. Young cohort, healthy worker effect, no individual smoking in external SMRs; incomplete early occupation/facility data

Exact location. Methods; Tables 2–3. Suicide: Table 2; Results: 2016–2020 and comparison with Queensland.

Availability. Full text

<https://doi.org/10.1136/oemed-2024-109549>
In the package: sources/B032-queensland-worker-cohort.xml.txt

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · 6 ↑ · 7 ↑ · 8 ↑ · 9 ↑ · 10 ↑ · 11 ↑ · Contents

[29] Appalachian Regional Commission / NORC / East Tennessee State University. Appalachian Diseases of Despair. Update 2025. July 2025.

Code: K126 · OFFICIAL

Territory	United States	Group	Population
Activity	Appalachian region, mixed areas	Period	2021
Design / type	Official regional statistical report	Coverage	See the original source table

Outcome. Suicide mortality**Result / data used.** PDF p. 14 / printed p. 10, Exhibit 6: 2021, ages 15–64, standardised suicide mortality of 21.0 in Appalachia and 17.4 outside Appalachia per 100,000. Only 2021 used; the large region contains different area types.**Comparison.** See the original source table**Limitations.** Saved original document / dataset; the sections used were checked**Exact location.** PDF p. 14 / printed p. 10, Exhibit 6: 2021, ages 15–64, standardised suicide mortality of 21.0 in Appalachia and 17.4 outside Appalachia per 100,000. Only 2021 used; the large region contains different area types.**Availability.** Saved original document / dataset; the sections used were checked<https://www.arc.gov/wp-content/uploads/2025/07/Appalachian-Diseases-of-Despair-Update-2025.pdf>

In the package: sources/K126-arc-despair-2025.pdf

Back to citations: 1 ↑ · 2 ↑ · Contents

[30] Rosstat / EMISS. Population mortality by cause of death, indicator No. 31270. Saved download from the open NSED mirror. [In Russian.]

Code: K119 · OFFICIAL

Territory	Russia	Group	Population
Activity	Comparison territory	Period	2017–2021
Design / type	Official death registration; crude rates	Coverage	See the original source table

Outcome. All-cause mortality, causes of death and suicide**Result / data used.** Mirror https://repository.nsedc.ru/dataset/emiss_31270; area code, cause of death, ‘whole population’, columns 2017–2021. Suicide X60–X84; other rows follow table codes. Unit: per 100,000 population. Direct EMISS download returned 403 when checked; provenance and version retained in metadata.**Comparison.** See the original source table**Limitations.** Saved original document / dataset; the sections used were checked

Exact location. Mirror https://repository.nsedc.ru/dataset/emiss_31270; area code, cause of death, ‘whole population’, columns 2017–2021. Suicide X60–X84; other rows follow table codes. Unit: per 100,000 population. Direct EMISS download returned 403 when checked; provenance and version retained in metadata.

Availability. Saved original document / dataset; the sections used were checked

<https://www.fedstat.ru/indicator/31270>
In the package: sources/K119-fedstat-31270.csv

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [6 ↑](#) · [7 ↑](#) · [8 ↑](#) · [9 ↑](#) · [10 ↑](#) · [11 ↑](#) · [Contents](#)

[31] Obsan. Suizid [Suicide]. Official cantonal dataset.

Code: K117 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2017–2021
Design / type	BFS / Obsan cause-of-death statistics	Coverage	See the original source table

Outcome. Suicide deaths; assisted suicide as a separate category

Result / data used. API https://ind.obsan.admin.ch/api/_010/kg/json; data: year=2017-21; kanton_nr=15/0; sex_id=0; category_id=1—suicide excluding assisted suicide, 2—assisted suicide. n—average annual count; crude_rate and standardised_rate—per 100,000. Full period: five years.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. API https://ind.obsan.admin.ch/api/_010/kg/json; data: year=2017-21; kanton_nr=15/0; sex_id=0; category_id=1—suicide excluding assisted suicide, 2—assisted suicide. n—average annual count; crude_rate and value (standardised rate)—per 100,000. Full period: five years.

Availability. Saved original document / dataset; the sections used were checked

https://ind.obsan.admin.ch/indicator/obsan/_010
In the package: sources/K117-AR01-suicide.json

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [6 ↑](#) · [7 ↑](#) · [Contents](#)

[32] Shaikh M.. The health legacy of coal mining: Analysis of mortality rates over time in England and Wales (1981-2019).. SSM - population health. 27. 101706. 2024.

Code: B028 · PRIMARY

Territory	United Kingdom	Group	RES, including former workers
Activity	LEGACY; UG	Period	1981–2019

Design / type	District panel; propensity-score matching	Coverage	329 districts; 57 identified as coalfield areas; 54 in the main matched analysis
Exposure	Historical coal-mining employment	Adjustments	Income, deprivation, fragmentation, density, air-quality proxies, former industry; ESP2013

Outcome. Age-standardised mortality by sex
Result / data used. 1981 difference: men +122.6/100,000 (SE 22.10), women +66.49 (SE 16.02). Reduction in gap by 2019: 91% and 70%; CIs not given here
Comparison. Socioeconomically matched non-coalfield districts
Limitations. Ecological exposure, imputations, migration; occupational and social contributions not separated; not an individual causal dust effect
Exact location. Methods 2; Table 3, models 1 and 7.

<https://doi.org/10.1016/j.ssmph.2024.101706>
In the package: sources/B028-uk-legacy-mortality.xml.txt

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [6 ↑](#) · [Contents](#)

[33] Obsan. Lebenserwartung [Life expectancy]. Official dataset downloaded in 2026; observations before 2022 used.

Code: K110 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2019–2021
Design / type	Official cantonal and national indicator	Coverage	See the original source table

Outcome. Life expectancy
Result / data used. data: kanton_nr=15 (AR), 0 (CH); category_id=1; sex_id=0/1/2; year=2019–2021. Life expectancy at birth, years.
Comparison. See the original source table
Limitations. Saved original document / dataset; the sections used were checked
Exact location. data: kanton_nr=15 (AR), 0 (CH); category_id=1; sex_id=0/1/2; year=2019–2021. Life expectancy at birth, years.
Availability. Saved original document / dataset; the sections used were checked

https://ind.obsan.admin.ch/api/_001/kg/json
In the package: sources/K110-S09-life-observatory-data-kg.json

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [6 ↑](#) · [Contents](#)

[34] Obsan. Sterblichkeit [Mortality]. Official dataset downloaded in 2026; observations before 2022 used.

Code: K111 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2021
Design / type	Official cantonal and national indicator	Coverage	See the original source table

Outcome. All-cause mortality**Result / data used.** data: kanton_nr=15/0; sex_id=0; year=2021. crude_rate—crude rate; standardised_rate—European age standard ESP2010 (Eurostat 2013); n—deaths.**Comparison.** See the original source table**Limitations.** Saved original document / dataset; the sections used were checked**Exact location.** data: kanton_nr=15/0; sex_id=0; year=2021. crude_rate—crude rate; value (standardised rate)—European age standard ESP2010 (Eurostat 2013); n—deaths.**Availability.** Saved original document / dataset; the sections used were checkedhttps://ind.obsan.admin.ch/api/_007/kg/json

In the package: sources/K111-S17-mortality-data-kg.json

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [Contents](#)**[35] Rospotrebnadzor. State report: On the state of sanitary and epidemiological well-being of the population in the Russian Federation in 2020. Moscow, 2021. [In Russian.]**

Code: K122 · OFFICIAL

Territory	Russia	Group	Population
Activity	Comparison territory	Period	2020
Design / type	Official epidemiological report	Coverage	See the original source table

Outcome. HIV; also tuberculosis for 2020–2021**Result / data used.** P. 137, Table 48: tuberculosis, Kuzbass 72.28, Russia 32.07. P. 140, Table 50: HIV prevalence, Kuzbass 1998.6. All rates per 100,000.**Comparison.** See the original source table**Limitations.** Saved original document / dataset; the sections used were checked

Exact location. P. 137, Table 48: tuberculosis, Kuzbass 72.28, Russia 32.07. P. 140, Table 50: HIV prevalence, Kuzbass 1998.6. All rates per 100,000.

Availability. Saved original document / dataset; the sections used were checked

https://t-j.ru/media/gd-seb_0206-_s-podpisyu_.pdf
In the package: sources/K122-F2020.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [Contents](#)

[36] Rospotrebnadzor. State report: On the state of sanitary and epidemiological well-being of the population in the Russian Federation in 2021. Moscow, 2022. [In Russian.]

Code: K123 · OFFICIAL

Territory	Russia	Group	Population
Activity	Comparison territory	Period	2021
Design / type	Official epidemiological report	Coverage	See the original source table

Outcome. HIV; also tuberculosis for 2020–2021

Result / data used. Pp. 182–183, Table 1.50: tuberculosis, Kuzbass 70.0, Russia 30.71. P. 184, Table 1.52: new cases and HIV prevalence, Kuzbass / Khakassia / Russia. Prison coverage not separately specified in the tuberculosis table.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. Pp. 182–183, Table 1.50: tuberculosis, Kuzbass 70.0, Russia 30.71. P. 184, Table 1.52: new cases and HIV prevalence, Kuzbass / Khakassia / Russia. Prison coverage not separately specified in the tuberculosis table.

Availability. Saved original document / dataset; the sections used were checked

https://xn--80aaoiec5a4aa9czf.xn--p1ai/documents/280/%D0%93%D0%BE%D1%81_%D0%B4%D0%BE%D0%BA%D0%BB%D0%B0%D0%B4_%D0%9E_%D1%81%D0%BE%D1%81%D1%82%D0%BE%D1%8F%D0%BD%D0%B8%D0%B8_%D1%81%D0%B0%D0%BD%D0%B8%D1%82%D0%B0%D1%80%D0%BD%D0%BE-%D1%8D%D0%BF%D0%B8%D0%B4%D0%B5%D0%BC%D0%B8%D0%BE%D0%BB%D0%BE%D0%B3%D0%B8%D1%87%D0%B5%D1%81%D0%BA%D0%BE%D0%B3%D0%BE_%D0%B1%D0%BB%D0%B0%D0%B3_%D0%BD%D0%B0%D1%81%D0%B5%D0%BB%D0%B5%D0%BD%D0%B8%D1%8F_%D0%B2_%D0%A0%D0%A4_%D0%B2_2021_%D0%B3%D0%BE%D0%B4%D1%83.pdf
In the package: sources/K123-F2021.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [6 ↑](#) · [7 ↑](#) · [8 ↑](#) · [9 ↑](#) · [10 ↑](#) · [Contents](#)

[37] BAG. Informationsportal übertragbare Krankheiten [Communicable diseases information portal]: tuberculosis. Mandatory reporting, annual incidence.

Code: K125 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2019–2021
Design / type	Mandatory BAG notification	Coverage	See the original source table

Outcome. Newly registered tuberculosis cases per 100,000

Result / data used. The POST request and API response for /api/v1/data/tuberculosis/cases/incValue/year have been saved. country=CH, all sex and age groups. Years selected: 2019–2021; source: mandatory_reporting_system. Available breakdowns were checked using metadata/value-metadata: this API has no separate AR series.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. The POST request and API response for /api/v1/data/tuberculosis/cases/incValue/year have been saved. country=CH, all sex and age groups. Years selected: 2019–2021; source: mandatory_reporting_system. Available breakdowns were checked using metadata/value-metadata: this API has no separate AR series.

Availability. Saved original document / dataset; the sections used were checked

<https://www.idd.bag.admin.ch/en/diseases/tuberculosis/data>
In the package: sources/K125-bag-tuberculosis-ch-incidence.json

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · Contents

[38] Federal Scientific and Methodological Centre for AIDS Prevention and Control, Central Research Institute of Epidemiology, Rospotrebnadzor. HIV infection in the Russian Federation in 2019. [In Russian.]

Code: K121 · OFFICIAL

Territory	Russia	Group	Population
Activity	Comparison territory	Period	2019
Design / type	Official epidemiological report	Coverage	See the original source table

Outcome. HIV; also tuberculosis for 2020–2021

Result / data used. P. 1: new cases, Kuzbass 179.5, Russia 64.5; people living with HIV in Kuzbass, 1934.9 per 100,000; figures described as preliminary.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. P. 1: new cases, Kuzbass 179.5, Russia 64.5; people living with HIV in Kuzbass, 1934.9 per 100,000; figures described as preliminary.

Availability. Saved original document / dataset; the sections used were checked

<https://forum.hiv.plus/assets/uploads/files/1583139023176-vich-infektsiya-v-rossijskoj-federatsii-na-31.12.2019.pdf>

In the package: sources/K121-S2019.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [Contents](#)

[39] Obsan / Kanton Appenzell Ausserrhoden. Gesundheitsbericht Appenzell Ausserrhoden 2021. Obsan Bericht 02/2021.

Code: K104 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2016–2019
Design / type	Cantonal report, mandatory notification	Coverage	See the original source table

Outcome. New HIV cases; population

Result / data used. PDF p. 43, G12: 55,445 permanent residents at the end of 2019; PDF p. 102, section 7.6: one new HIV notification in each year from 2016 to 2019. $1 / 55,445 \times 100,000 = 1.8036$ —calculation in the article.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. PDF p. 43, G12: 55,445 permanent residents at the end of 2019; PDF p. 102, section 7.6: one new HIV notification in each year from 2016 to 2019. $1 / 55,445 \times 100,000 = 1.8036$ —calculation in the article.

Availability. Saved original document / dataset; the sections used were checked

https://www.obsan.admin.ch/sites/default/files/obsan_02_2021_bericht_ar_1.pdf

In the package: sources/K104-S03-health-2021.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [Contents](#)

[40] BAG. Informationsportal übertragbare Krankheiten [Communicable diseases information portal]: HIV. Mandatory reporting, annual incidence.

Code: K127 · OFFICIAL

Territory	Switzerland	Group	Population
Activity	Comparison territory	Period	2019–2021

Design / type	Mandatory BAG notification	Coverage	See the original source table
<p>Outcome. Newly registered HIV cases per 100,000</p> <p>Result / data used. The POST request and API response for /api/v1/data/hiv/cases/incValue/year have been saved. country=CH, all sex and age groups. Years selected: 2019–2021; source: mandatory_reporting_system. Available breakdowns were checked using metadata/value-metadata: this API has no separate AR series.</p> <p>Comparison. See the original source table</p> <p>Limitations. Saved original document / dataset; the sections used were checked</p> <p>Exact location. The POST request and API response for /api/v1/data/hiv/cases/incValue/year have been saved. country=CH, all sex and age groups. Years selected: 2019–2021; source: mandatory_reporting_system. Available breakdowns were checked using metadata/value-metadata: this API has no separate AR series.</p> <p>Availability. Saved original document / dataset; the sections used were checked</p> <p>https://www.idd.bag.admin.ch/en/diseases/hiv/data In the package: sources/K127-bag-hiv-ch-incidence.json</p>			

Back to citations: 1 ↑ · Contents

[41] Ministry of Health of the Republic of Tuva. Report on activities in 2017. [In Russian.]

Code: K120 · OFFICIAL

Territory	Russia	Group	Population
Activity	Comparison territory	Period	2017
Design / type	Official regional report	Coverage	See the original source table

Outcome. Classification of external causes of death

Result / data used. PDF p. 9 / printed p. 6: comment on classification of deaths of undetermined intent; PDF p. 10, Table 7. Suicide in 2017—5.6 per 100,000; injuries of undetermined intent—90.3.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. PDF p. 9 / printed p. 6: comment on classification of deaths of undetermined intent; PDF p. 10, Table 7. Suicide in 2017—5.6 per 100,000; injuries of undetermined intent—90.3.

Availability. Saved original document / dataset; the sections used were checked

<https://minzdravtuva.ru/images/2017%D0%B3pdf.pdf>
In the package: sources/K120-tuva-health-2017.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [Contents](#)

[42] Federal Scientific and Methodological Centre for AIDS Prevention and Control. HIV infection. Information Bulletin No. 47. Data for 2021. 2023. [In Russian.]

Code: K124 · OFFICIAL

Territory	Russia	Group	Population
Activity	Comparison territory	Period	2020–2021
Design / type	OFFICIAL	Coverage	See the original source table

Outcome. HIV prevalence—alternative published version

Result / data used. Table, PDF pp. 70–71 / printed pp. 69–70: alternative Kuzbass prevalence, 2003.6 (2020), 2027.3 (2021); 52,796 people and a population of 2,604,272. Does not replace figures published in the federal reports; retained to compare versions.

Comparison. See the original source table

Limitations. Saved original document / dataset; the sections used were checked

Exact location. Table, PDF pp. 70–71 / printed pp. 69–70: alternative Kuzbass prevalence, 2003.6 (2020), 2027.3 (2021); 52,796 people and a population of 2,604,272. Does not replace figures published in the federal reports; retained to compare versions.

Availability. Saved original document / dataset; the sections used were checked

<https://hivhub.ru/wp-content/uploads/2023/05/byulleten-47-vich-infektsiya-za-2021-g.pdf>
In the package: sources/K124-B47-2021.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [Contents](#)

[43] Cortes-Ramirez J, Naish S, Sly PD, Jagals P.. Mortality and morbidity in populations in the vicinity of coal mining: a systematic review.. BMC public health. 18(1). 721. 2018.

Code: B001 · REVIEW

Territory	Multicountry review	Group	RES
------------------	---------------------	--------------	-----

Activity	UG; OC; MIXED	Period	Publications from 1990 to October 2016
Design / type	Systematic review	Coverage	28 ecological studies: 22 United States, 3 China, 2 United Kingdom, 1 Spain
Exposure	Proximity/production/residence in a coal county	Adjustments	Different adjustments in primary studies

Outcome. Morbidity and mortality by category

Result / data used. Associations across several categories; no overall pooled RR

Comparison. Varies between studies

Limitations. English only; all studies ecological; comparison of ecological findings; limited geographical coverage

Exact location. Methods; Results; Tables 1–5

Availability. FULL_TEXT

<https://doi.org/10.1186/s12889-018-5505-7>

In the package: sources/B001-community-review.xml

Back to citations: [1 ↑](#) · [2 ↑](#) · [Contents](#)

[44] Boyles AL, Blain RB, Rochester JR, Avanası R, Goldhaber SB, McComb S, Holmgren SD, Masten SA, Thayer KA.. Systematic review of community health impacts of mountaintop removal mining.. Environment international. 107. 163-172. 2017.

Code: B002 · REVIEW

Territory	United States	Group	RES; WORK
Activity	OC; WASTE	Period	Search through 2016
Design / type	OHAT systematic review	Coverage	33 human studies (29 resident, 4 worker); 58 exposure studies
Exposure	Various mining and pollution indicators	Adjustments	OHAT risk-of-bias assessment

Outcome. Several health outcomes

Result / data used. The authors could not draw a conclusion about residents' health effects because of evidence limitations; this is not a finding that harm is absent

Comparison. Different control areas

Limitations. Social confounding, imprecise exposure; overlapping national mortality datasets

Exact location. Environ Int 107:163–172; local PDF pp. 119–128; Abstract, Discussion

Availability. FULL_TEXT

<https://doi.org/10.1016/j.envint.2017.07.002>
In the package: sources/B002-mtr-review.pdf

Back to citations: 1 ↑ · 2 ↑ · Contents

[45] Alif SM, Sim MR, Ho C, Glass DC.. Cancer and mortality in coal mine workers: a systematic review and meta-analysis.. Occupational and environmental medicine. 79(5). 347-357. 2022.

Code: B003 · REVIEW

Territory	Multicountry review	Group	WORK
Activity	UG; OC	Period	Primary observation years vary
Design / type	Systematic review and meta-analysis	Coverage	36 studies; 21 in the meta-analysis
Exposure	Coal industry employment; CWP status	Adjustments	Varies; Newcastle–Ottawa quality assessment

Outcome. All-cause, respiratory and cancer mortality

Result / data used. CWP: all-cause mortality SMR 1.14 (95% CI 1.00–1.30), non-malignant respiratory disease 3.59 (3.00–4.30); lung cancer 1.49 (0.70–3.18). Unknown CWP status: lung cancer 1.03 (0.91–1.18)

Comparison. General population/internal comparisons

Limitations. Abstract checked; heterogeneity, healthy worker effect; not a worldwide risk for every worker

Exact location. Abstract, Results

Availability. ABSTRACT_ONLY

<https://doi.org/10.1136/oemed-2021-107498>
In the package: sources/B003-workers-review-core.json

Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · Contents

[46] Lu C, Dasgupta P, Cameron J, Fritschi L, Baade P.. A systematic review and meta-analysis on international studies of prevalence, mortality and survival due to coal mine dust lung disease.. PloS one. 16(8). e0255617. 2021.

Code: B006 · REVIEW

Territory	Multicountry review	Group	WORK
------------------	---------------------	--------------	------

Activity	UG; OC	Period	Publications, 2000–2021
Design / type	Systematic review and meta-analysis	Coverage	40 studies; 15 in the CWP meta-analysis, including 12 from the United States
Exposure	Coal mine dust; different examination programmes	Adjustments	Quality and heterogeneity assessment

Outcome. CWP, mortality, survival
Result / data used. Pooled CWP prevalence among underground workers 3.7% (95% CI 3.0–4.5); mortality not pooled
Comparison. Different examined groups
Limitations. English-language search; high heterogeneity; screened and compensation samples do not represent all workers worldwide
Exact location. Methods; prevalence analysis; Table 7
Availability. FULL_TEXT

<https://doi.org/10.1371/journal.pone.0255617>
In the package: sources/B006-workers-international-review.xml

Back to citations: 1 ↑ · 2 ↑ · Contents

[47] Bachina A.V., Koskina E.V., Glebova L.A., Popkova L.V. Environmental and hygiene aspects of congenital malformations in Kuzbass. Mother and Child in Kuzbass. 1(60). 48–51. 2015. [In Russian.]

Code: K004 · PRIMARY

Territory	Russia	Group	RES: children in their first year of life
Activity	MIXED	Period	2005–2012
Design / type	Ecological analysis of medical statistics	Coverage	Form 31; 5593 notifications on Form 025-11/u-98
Exposure	Emissions from different industries by municipality	Adjustments	Rank correlation, nonparametric comparisons

Outcome. Congenital anomalies
Result / data used. Table 1: 65.8 (2005) and 134.2 (2012) per 1000 children in their first year of life; not 13.42% of unique newborns
Comparison. Years and areas of Kuzbass
Limitations. No individual coal exposure/maternal factors; heterogeneous recording systems; text says ‘newborns’, table says first year of life

Exact location. Printed pp. 48–51; Table 1, p. 49; local PDF pp. 1–4

Availability. FULL_TEXT

<https://cyberleninka.ru/article/n/ekologo-gigienicheskie-aspekty-formirovaniya-vrozhdennyh-porokov-razvitiya-v-kuzbasse>

In the package: sources/K004-kuzbass-congenital-2015.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [5 ↑](#) · [Contents](#)

[48] Glebova L.A., Bachina A.V., Koskina E.V., Obratsova O.A. Children's health in Prokopyevsk in relation to environmental problems. Medicine in Kuzbass. 12(3). 35–39. 2013. [In Russian.]

Code: K005 · PRIMARY

Territory	Russia	Group	RES: children aged 0–14
Activity	UG; WASTE; COMB; MIXED	Period	2003–2012
Design / type	Ecological time-series analysis	Coverage	Form 12 over 10 years; number of unique children unspecified
Exposure	Air emissions/concentrations, one-year lag	Adjustments	Spearman/Mann–Whitney; no multivariable individual adjustment

Outcome. Incidence by disease category

Result / data used. Suspended particles and congenital malformations: $r=0.87$, $p=0.0025$; most categories, including respiratory disease ($p=0.7$), did not differ statistically from the region

Comparison. Kemerovo Region; city trends

Limitations. Multiple comparisons, short series, mixed industries/heating plants; analysis at the level of annual city indicators. Calculated cancer risk is not a count of actual cases

Exact location. Printed/PDF pp. 35–39; table and correlations on p. 38

Availability. FULL_TEXT

<https://mednauki.ru/index.php/MK/en/issue/download/111/111>

In the package: sources/K005-prokopyevsk-children-2013.pdf

Back to citations: [1 ↑](#) · [2 ↑](#) · [3 ↑](#) · [4 ↑](#) · [Contents](#)

[49] NIOSH. Current Intelligence Bulletin 64: Coal Mine Dust Exposures and Associated Health Outcomes. DHHS (NIOSH) Publication No. 2011–172. April 2011.

Code: M001 · OFFICIAL_REVIEW

Group	WORK	Activity	UG; OC
--------------	------	-----------------	--------

Period	Review published in 2011
Result / data used. Dust-related lung diseases, COPD, silicosis; consequences include loss of function, disability and premature death.	
Limitations. NIOSH scientific review of workers; not legal recognition of disease in every country or a risk estimate for residents.	
Exact location. Executive Summary, printed p. iv / PDF p. 6; sections 2–3	
Availability. FULL_TEXT: Executive Summary and disease section read; complete document saved	
https://www.cdc.gov/niosh/docs/2011-172/pdfs/2011-172.pdf In the package: sources/NIOSH_2011_coal_mine_dust_CIB64.pdf	
Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · 6 ↑ · Contents	

[50] Correction. Respiratory disease mortality among US coal miners; results after 37 years of follow-up. Occupational and Environmental Medicine. 2014;71:738. DOI: 10.1136/oemed-2013-101597corr1.

Code: B060C · CORRECTION

Group	WORK	Activity	UG
Result / data used. The ‘never smokers’ label and silica intervals were corrected; Table 4 lung cancer death count is 568.			
Limitations. Correction to [15], not a separate study.			
Exact location. Correction, p. 738 / PDF p. 1			
Availability. FULL_TEXT: correction; publisher’s indexed text also checked			
https://oem.bmj.com/content/71/10/738 In the package: sources/B060-correction-2014.pdf			
Back to citations: 1 ↑ · 2 ↑ · 3 ↑ · 4 ↑ · 5 ↑ · 6 ↑ · Contents			