

**Supplementary material for
Establishing a baseline of published air pollution and health research studies in the Waterberg-Bojanala Priority Area**

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Table S1. An overview of the identified studies (Green and red indicate whether the study 1) Considered air quality data (green = yes; red = no); 2) Considered health outcomes (green = yes; red = no); 3) Took place in the WBPA (green = yes; red = no)

No	Title of the Study and authors	Study location	How was air quality included in the study?	Which health outcome was considered in this study and how?	WBPA Priority Area?	Main study findings
North West Province – Studies looking at air quality only						
1	Air quality management in the North West province of South Africa – a successful partnership with industry (Bryszewski and Visser 2004)	Brits, North West Province (Also mention Rustenburg Region, Lichtenburg, Potchefstroom and other regions in the North West Province)	Industrial, ambient air pollution dispersion modelling of Hexavalent chromium (Cr (VI))	No health outcome was measured	Yes	This study introduces a new air quality management tool to industry in North West Province. The approach links industry and government working together and places an emphasis on air pollution prevention. This co-operative management approach is successfully applied to a chrome smelter in Brits by means of a case study, where new technologies were applied to reduce CR(VI) emissions at source.
2	Sources of atmospheric pollutants in the North West province of South Africa: a case of the	A school in the Rustenburg Municipality (Boshoek Primary School), North West Province	Ambient PM ₁₀ sampling was conducted at a school (school)	No health outcome was measured	Yes	Kgabi et al. (2006) conducted an elemental analysis of PM ₁₀ samples from a school in the Rustenburg Municipality. Correlation and regression analysis, together with Principal Component Analysis (PCA) identified the sources, in order of decreasing abundance, as: soil dust, industry, biomass burning, and traffic.

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	Rustenburg municipality (Kgabi et al., 2006)					
3	The management of aerial particulate pollution: the case of platinum industry smelters in the Rustenburg region of North West Province, South Africa (Steyn 2006)	Rustenburg region, North West Province	No direct air quality measurements were taken, but air pollution data for SO ₂ , NO _x and suspended particulates is sourced from selected industries (mainly smelters)	No health outcome was measured	Yes	This study used existing data (e.g., industry emission inventories) to develop a detailed Air Quality Management Plan for Rustenburg (Rustenburg Regional Air Quality Management Plan (RAQMP)).
4	Health issues in a mining community in South Africa (In HIV/AIDS, Illness, and African Well-Being) (Cronje and Chenga 2007)	Rustenburg, North West Province	No air quality measurements were taken	No health research was conducted	Yes	This qualitative study focused on the diseases and illnesses associated with the physical mining environment. Emphasis was placed on tuberculosis, hearing loss, silicosis, obstructive airway disease as well as asbestosis and pneumoconiosis.
5	Trace metal composition of atmospheric aerosols in the North West province of South Africa (Kgabi et al., 2005)	Two sites in the Rustenburg Municipality, North West Province (one site located close to a mine, and one site located close to a central business district).	Ambient PM ₁₀ was sampled in both study sites	No health outcome was measured	Yes	In this study, the composition of atmospheric particulate matter was determined. The main elements identified were Fe, Ca, Al, Mg, Si, Na, K, Zn, Cr, Ni, Cu, Ti, Mn, Pb and V. The concentration levels of the trace metals Cr, Ni, Pb and V were found in range from 20 to 5200 ng/m ³ , 30 to 2800 ng/m ³ , 20 to 500 ng/m ³ and 10 to 400 ng/m ³ respectively. Understanding the chemical constituents of particulates can help better understand the health impacts of air pollution exposure.
6	Basic characteristics of atmospheric particles, trace gases and meteorology in a relatively clean Southern African Savannah environment (Laakso et al., 2008)	Welgegund	Eurowagon 4500u measurement trailer	No health outcome was measured	Yes	In this study, atmospheric particles were measured at a clean background site in the savannah. Industrial sources, especially SO ₂ and NO _x concentrations, were carried by easterly winds. NO _x and CO had a distinct annual cycle, while SO ₂ , NO _x , and O ₃ had a distinct diurnal cycle. Cloudy or rainy days exhibited no new particle formation. Due to the high formation and growth rates observed, the formation of new particles contributes significantly to the total number of cloud condensation nuclei, which has the potential to influence local climate-forcing patterns (Laakso et al., 2008).
7	The Environmental Effects of Population Growth: A Case Study of the Rustenburg Core Area (Bojanala Region) in North West Province (South Africa)	Bojanala Region (Rustenburg Core Area), North West Province	No air quality was measured	No health outcome was measured	Yes	Air pollution is mentioned as an environmental health risk to the general population in the Rustenburg Core Area.

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8	(Mokgoetsi 2008) The impact of health behaviour change intervention on indoor air pollution indicators in the rural North West Province, South Africa	The villages of Madibe-Makgabane and Tsunyane, in the North West Province of South Africa (Tsunynane was selected as the control group)	Indoor PM ₁₀ and CO concentrations were measured and personal CO was measured on children younger than five	No health outcome was measured	Yes	Barnes et al. (2011) implemented a behavioural change intervention to reduce indoor PM ₁₀ and CO levels. A year after the intervention was implemented, the intervention group performed significantly better than the control group when stratified by burning location. Amongst households that burned indoor fires, the net median reductions associated with the intervention were: PM ₁₀ =57%, CO=31% and CO (child)=33%.
9	(Barnes et al., 2011) An Evaluation of Atmospheric Aerosols in Kanana, Klerksdorp Gold Mining Town, in the North-West Province of South Africa	Kanana and Phokeng area in Klerksdorp, North West Province	Ambient PM ₁₀ concentrations were measured at a clinic	No health outcome was measured	Yes	PM ₁₀ concentrations as measured at a gold mine and as measured at a platinum mine were compared. Higher particulate matter concentrations were measured at the gold mining site. Daily PM ₁₀ concentrations exceeded the 2005 World Health Organization Guideline value, indicating health risks.
10	(Kaonga and Ebenso 2011) Comparison of air pollution hotspots in the Highveld using airborne data	Rustenburg, Kanana, Photsaneng and Phokeng, North West Province	Airborne data for O ₃ , SO ₂ , and NOx and PM _{2.5} aerosol loading	No health outcome was measured	Yes	Pollutant concentration distribution of various criteria pollutants were compared between Rustenburg, Witbank, Vaal Triangle and Secunda, each identified as air pollution hotspots.
11	(Nciphra 2011) New particle formation events in semi-clean South African savannah (Vakkari et al., 2011)	Welgegend	Measurements using a differential mobility particle sizer	No health outcome was measured	Yes	The highest formation and growth rates, rather than the highest estimated SO ₄ concentrations, were found to be associated with the region of highest VOC emissions resulting from biological activity, according to the air mass history analysis. However, the frequency of new particle formation increased nearly monotonously, suggesting that formation and growth are independent of one another, with the estimated sulphuric acid reaching 100% at an H ₂ SO ₄ concentration of 6×10 ⁷ cm ³ (Vakkari et al., 2011).
12	Characterisation of sub-micron particle number concentrations and formation events in the western Bushveld Igneous Complex, South Africa (Hirsikko et al., 2012)	Welgegend	Air Ion Spectrometry O ₃ , SO ₂ , NOx and H ₂ S, BC, PM ₁ , PM _{2.5} , PM ₁₀	No health outcome was measured	Yes	Due to the background concentration of PM ₁₀ and O ₃ , the region had a very high condensation sink. The results showed that domestic burning for heating and cooking in the morning and evening was the primary source of high concentrations of Aitken and accumulation mode particles, while during the day SO ₂ -based nucleation followed by the growth by condensation of vapours from industrial, residential, and natural sources was the most likely source of high concentrations of nucleation and Aitken mode particles. The number of days with a nucleation event was very frequent, occurring on 86% of the days, the highest frequency ever recorded. The secondary particle formation was shown to be influenced by local and regional pollution and vapour sources by air mass back trajectory and wind direction analyses. As a result, the annual cycle observed and the size of the particle formation and growth rates during nucleation events were consistent with

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						findings from a semi-clean savannah site in South Africa (Hirsikko et al., 2012).
13	South African EUCAARI measurements: seasonal variation of trace gases and aerosol optical properties (Laakso et al., 2012)	Welgegund	Aerosol absorption and scattering coefficients O ₃ , SO ₂ , NO _x and H ₂ S	No health outcome was measured	Yes	The seasonal variation of sources and local meteorological factors, particularly the anticyclonic recirculation and strong wintertime inversions, are responsible for the large concentration range that was observed. Globally speaking, the concentrations of gases and particulates were typical for continental sites with significant anthropogenic influence, but they were unmistakably lower than those found in the most polluted regions of south-eastern Asia. Ozone is the pollutant at the site that is most likely to have an adverse impact on the environment because its concentrations were high even during the growing season. Since there is a dearth of long-term data of this kind for southern Africa, the measurements presented here will aid in filling in existing gaps in the ground-based global atmosphere observation system (Laakso et al., 2012).
14	Temporal assessment of volatile organic compounds at a site with high atmospheric variability in the North–West Province (Jaars et al., 2012)	Welgegund, North West Province	Ambient biogenic and anthropogenic VOCs were measured in this study	No health outcome was measured	No	A total of 40 VOCs were characterised and quantified in samples collected at the Welgegund monitoring station. These species included 20 biogenic VOCs, as well as 13 aromatic hydrocarbons and seven alkanes that are usually associated with anthropogenic emissions (Jaars et al., 2011).
15	An air quality assessment in the industrialised western Bushveld Igneous Complex, South Africa (Venter et al., 2012)	Bushveld Igneous Complex around Rustenburg, North West Province	A comprehensive ambient air quality monitoring station was operated for more than two years in this area (PM ₁₀ , SO ₂ , NO ₂ , CO, O ₃)	No health outcome was measured	Yes	High-stack industry emissions, combustion from semi-formal and informal settlements and the influx of regional air masses were quoted as main sources of the measured ambient air pollutants. Ozone and PM ₁₀ were identified as the pollutants of the most concern due to multiple exceedances of relevant ambient standards.
16	Multiple daytime nucleation events in semi-clean savannah and industrial environments in South Africa: analysis based on observations (Hirsikko et al., 2013)	Welgegund	Measurements using a differential mobility particle sizer	No health outcome was measured	Yes	This study was a detailed characterisation of particle formation and growth by study of the events over a period of time. The mixing of a residual air layer rich in SO ₂ into the shallow surface-coupled layer was associated with the first nucleation and growth event of the day. The second nucleation and growth event of the day was occasionally connected to new industrial SO ₂ emissions. However, it was also clear that during both events, particle growth required vapors other than sulfuric acid. Depending on anthropogenic and natural emissions as well as atmospheric conditions, the estimated H ₂ SO ₄ and other vapour contributions to the first and second nucleation and growth events of the day varied from day to day (Hirsikko et al., 2013).
17	Boundary layer nucleation as a source of new CCN	Welgegund	Measurements using a differential mobility particle sizer	No health outcome was measured	Yes	This study sought to understand the annual cycle of cloud condensation nuclei (CCN). The study confirms earlier studies in that the concentration of CCN-sized particles is consistently high throughout the year, peaking in the dry winter and declining in the

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	in savannah environment (Laakso et al., 2013)		Counted with a TSI Condensation Particle Counter			wet summer. This pool of CCN is partially filled by boundary layer nucleation during the wet season with reduced anthropogenic and biomass burning primary emissions, and subsequent growth (Laakso et al., 2013).
18	Warming-induced increase in aerosol number concentration likely to moderate climate change (Paasonen et al., 2013)	Welgegund	Measurements using a differential mobility particle sizer	No health outcome was measured	Yes	This study shows that there exists a negative feedback loop between the continental biosphere, aerosols, and climate. It is evidence that when there is aerosol cooling supported by organic vapour emissions from warming, it enhances condensation on particles, facilitating their growth to the size of cloud condensation nuclei. Aerosol emission controls can have a significant impact on the effects of aerosol emissions on climate and air quality (Paasonen et al., 2013).
19	Long-term observations of aerosol size distributions in semi-clean and polluted savannah in South Africa (Vakkari et al., 2013)	Botsalano	Long-term measurement data: aerosol particle size distributions, CO, SO ₂ , PM ₁₀ , PM _{2.5}	No health outcome was measured	Yes	The analysis of the air mass history for Botsalano revealed four regional scale source areas in southern Africa and allowed for the separation of young and old rural background aerosol coming from the clean sector, or the western sector with a small number of significant anthropogenic sources. The southern African savannah exhibits a distinctive combination of sources and meteorological parameters when compared to size distributions previously published for other comparable environments in the Northern Hemisphere. Only the Amazon basin can be used to compare the observed strong link between combustion and seasonal variation, and a quantitative comparison is not possible due to the absence of long-term observations in the Amazon (Vakkari et al., 2013).
20	Differences in aerosol absorption Ångström exponents between correction algorithms for a particle soot absorption photometer measured on the South African Highveld (Backman et al., 2014)	Elandsfontein	Absorption Ångström exponents (AAEs) Multi-Angle Absorption Photometer (MAAP) and the dilution-corrected particle soot absorption photometer (PSAP)	No health outcome was measured	Yes	The AAEs derived from these corrections differ significantly from one another. The AAEs were calculated over a 23-month period at Elandsfontein. To increase the time between filter changes, the PSAP sample air was 15 times diluted. The study demonstrates that remote locations with high pollution levels or infrequently visited sites can also benefit from the PSAP's applicability (Backman et al., 2014).
21	Modelling new particle formation events in the South African savannah (Gierens et al., 2014)	Welgegund	Long term measurements of trace gas concentrations	No health outcome was measured	Yes	This study is the start of a more thorough new particle formation model tailored to Southern Africa. The growth and formation of two particle models were investigated. The dependence of the formation rates on sulfuric acid was overestimated by both particle formation mechanisms. The approach that did not incorporate low VOCs into the particle formation process was less accurate in describing the nucleation events. Organic compounds need to be included in the nucleation mechanisms to estimate aerosol concentration for larger scales. The model will help to better understand and predict the formation of new particles, which will help to reduce the effects of climate change and air quality (Gierens et al., 2014).

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22	Ambient aromatic hydrocarbon measurements at Welgegend, South Africa (Jaars et al., 2014)	Welgegend	Aromatic hydrocarbons (benzene, toluene, styrene, xylene) were measured for a year	No health outcome was measured	Yes	The health of people is directly impacted by aromatic hydrocarbons. Air masses that passed over regions with landscapes encroached by humans had significantly higher concentrations of aromatic hydrocarbons. The possible sources of the various aromatic hydrocarbons in the source regions identified in the paper were suggested by inter-compound correlations and ratios. Additionally, plumes passed over by human activities were found to have the highest contribution of aromatic hydrocarbon concentrations to the potential for ozone formation (Jaars et al., 2014).
23	Atmospheric boundary layer top height in South Africa: measurements with lidar and radiosonde compared to three atmospheric models (Korhonen et al., 2014)	Welgegend	Lidar and radiosonde	No health outcome was measured	Yes	Atmospheric lidar measurements were carried out at Elandsfontein measurement station throughout 2010. The height of the planetary boundary layer (PBL) top was continuously measured using a Raman lidar, PollyXT (PORTable Lidar sYstem eXTended) (Korhonen et al., 2014). Comparison between ground-based and satellite lidar showed good agreement (correlation coefficient of 0.88). On average, the daily maximum PBL top height in October (spring) and June (winter) was 2260 m and 1480 m, respectively (Korhonen et al., 2014)
24	Chemical composition, main sources and temporal variability of PM ₁ aerosols in southern African grassland (Tiitta et al., 2014)	Welgegend	Positive Matrix Factorization (PMF) Analysis Organic Aerosols	No health outcome was measured	Yes	To describe the properties of organic aerosols (OA), positive matrix factorization (PMF) analysis of aerosol mass spectra was used. In the dry season, oxidized organic aerosols (OOA) and biomass burning organic aerosols (BBOA) were the identified factors. The wet season was characterized by low-volatile-OOA and semi-volatile-OOA organic aerosols. The findings emphasize the significance of primary BBOA during the dry season, which accounted for 33% of all OA (Tiitta et al., 2014).
25	Rapid changes in biomass burning aerosols by atmospheric oxidation (Vakkari et al., 2014)	Welgegend	Aerosol number size, aerosol absorption, black carbon, aerosol scattering, aerosol chemical composition, CO, O ₃	No health outcome was measured	Yes	This study highlights a significant gap in our knowledge of the climatic effects of biomass burning aerosols because the observed changes occur over spatial and temporal scales that are neither covered by emission inventories nor captured by large-scale model simulations (Vakkari et al., 2014).
26	The spatial distribution of haze over the Bojanala District (Barnes 2015)	The Bojanala Platinum District, North West Province	Aerosol optical thickness and Ångström exponent were derived using data retrieved from direct solar radiation measurements using hazemeters	No health outcome was measured	Yes	The increase in mining and other industrial activities in the Bojanala Platinum District were shown to have a significant impact on the environment in the Bojanala Platinum District. Foreign air masses from the Mpumalanga Highveld and the Atlantic Ocean had a significant impact on the aerosol loadings over the Bojanala District and were associated with extremes in aerosol optical thickness levels. The highest concentrations of aerosols were identified toward the eastern side of the district except during late winter.
27	Size-resolved characterisation of organic compounds in atmospheric aerosols collected at	Welgegend	Two-dimensional gas chromatography with a time-of-flight mass spectrometer (GCxGC-TOFMS) Twenty-four-	No health outcome was measured	Yes	Carboxylic acids and esters had the highest number of tentatively characterized oxygenated species, whereas ether compounds had the highest normalized response factors (NRFs). The chlorinated species with the highest NRFs in the two size fractions made up the majority of the halogenated compounds that were tentatively

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	Welgegund, South Africa (Booyens et al., 2015)		hour samples were collected for 1 year for three different size ranges			identified. The NRF in the PM _{2.5-1} size fraction was significantly higher for iodate species. Amines comprised the largest proportion of N-containing species tentatively characterized with the highest NRFs. We made some tentative identifications of a small number of S-containing compounds with low NRFs. Welgegund measurements of organic compounds were attributed primarily to air masses passing over anthropogenically impacted source regions and biomass burning (Booyens et al., 2015).
28	The anthropogenic contribution to atmospheric black carbon concentrations in southern Africa: a WRF-Chem modeling study (Kuik et al., 2015)	Welgegund	Forecasting model including chemistry and aerosols (WRF-Chem) contribution of anthropogenic emissions to the total black carbon (BC) concentrations	No health outcome was measured	Yes	Measured BC concentrations and modelled BC concentrations are compared. The meteorology is generally well modelled. However, precipitation is greatly overestimated and the start of the wet season is modelled about 1 month too early. Although the total BC concentration is up to 50% underestimated in the model, daily mean BC concentrations show a temporal correlation of 0.66 with measurements. Anthropogenic BC and co-emitted species together can contribute up to 60% to PM ₁ levels (Kuik et al., 2015).
29	Re-evaluating the contribution of sulfuric acid and the origin of organic compounds in atmospheric nanoparticle growth (Vakkari et al., 2015)	Welgegund	Detailed aerosol measurements with a theoretical framework	No health outcome was measured	Yes	Depending on the gaseous precursors and size of the newly formed particles, the growth of aerosol particles was either dominated by sulfuric acid with the addition of ammonium or organic compounds originating from either biogenic emissions or savannah fires. Although organic compounds predominated the growth from 1.5 nm up to climatically relevant sizes in clean conditions, sulfuric acid's contribution to the growth was greater in the early stages. Additionally, our analysis shows that the contribution of sulfuric acid to the growth in polluted environments may have been underestimated by up to a factor of 10 (Vakkari et al., 2015).
30	Plume characterisation of a typical South African braai (Venter et al., 2015)	Welgegund	Aerosol components of braai plumes: SO ₂ , NO _x , CO, O ₃ , PM _{2.5} , PM ₁₀ , BC, SO ₄ ²⁻ , Ca, Mg, Pb, aromatic and alkane VOCs and benzene	No health outcome was measured	Yes	The aerosol components of atmospheric gases within a plumes from braais were characterised. SO ₂ , NO _x and CO increased significantly, while O ₃ did not increase notably. Other components were PM _{2.5} , PM ₁₀ , BC, SO ₄ ²⁻ , Ca, Mg, and Pb. Aromatic and alkane VOCs and benzene were noted to be high. However, there were no significant health risks associated with having a recreational braai. Vendors that are exposed for longer periods of time are at higher risk for negative health outcomes (Venter et al., 2015).
31	The composition of ambient and fresh biomass burning aerosols at a savannah site, South Africa (Aurela et al., 2016)	Botsalano	chemical composition of ambient particles and the particles in fresh biomass burning plumes savannah environment in	No health outcome was measured	Yes	Our research on biomass burning revealed that K was most likely present as KCl in the fresh smoke from burning savannah grass. The ratios of K and levoglucosan in the smouldering and flaming phases showed distinct differences. To confirm the ratio of significant biomass burning tracer species to be used in source apportionment studies in the future, the study highlight the need for more thorough chamber experiments on the various fuel types used in Sub-Saharan Africa (Aurela et al., 2016).
32	Measurements of biogenic volatile organic compounds at a grazed savannah grassland	Welgegund	Biogenic volatile organic compounds conducted at the Welgegund measurement station	No health outcome was measured	Yes	Savannah grasslands generally had significantly lower BVOC concentrations than other landscapes in Southern Africa and the rest of the world that have more woody vegetation. Additionally, in comparison to the total aromatic concentrations found at Welgegund, BVOC concentrations were much lower. Isoprene

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	agricultural landscape in South Africa (Jaars et al., 2016)					concentrations were higher from the western sector, which is thought to have a relatively clean regional background without significant human sources, according to an analysis of concentrations by wind direction. However, wind direction did not indicate any significant differences in the concentrations of the other BVOC species (Jaars et al., 2016).
33	Sub-micrometer aerosols and excess CO as tracers for biomass burning air mass transport over southern Africa (Mafusire et al., 2016)	North West Province	Long-term atmospheric monitoring record: excess CO above average tropospheric levels, particulate matter concentrations in the 10 to 840 nm size range	No health outcome was measured	Yes	This study demonstrates that biomass burning is a significant contributor to Aitken-mode aerosols. It is demonstrated that elevated CO concentrations, along with Aitken- and accumulation-mode particle number size distributions can be used to identify plumes coming from localized biomass combustion events (Mafusire et al., 2016).
34	Regional atmospheric Cr(VI) pollution from the Bushveld Complex, South Africa (Venter et al., 2016)	Western Bushveld Complex (wBC)	Particulate matter (PM), in two size fractions, i.e. PM _{2.5} ($\leq 2.5 \mu\text{m}$) and PM _{2.5-10} (2.5–10 μm), was sampled for a full calendar year	No health outcome was measured	Yes	While Cr(VI) concentrations in air masses had passed over the regional background below the analytical technique's detection limit, they were elevated concentrations in air masses that had passed over the wBC. The fact that most of the Cr(VI) was found to be PM _{2.5} and that different size fractions of PM have different atmospheric lifetimes may help to explain why sources in the wBC emit Cr(VI)-containing PM. The findings also suggested that other combustion sources outside the wBC may have contributed to the atmospheric Cr(VI) concentrations observed, in addition to pyrometallurgical sources in the wBC (Venter et al., 2016).
35	Spatial, temporal and source contribution assessments of black carbon over the northern interior of South Africa (Chiloane et al., 2017)	Welgegund, Louis Trichardt, Skukuza, Botsalano Elandsfontein, Marikana, Vaal Triangle and Amersfoort	Carbon dioxide (CO ₂), aerosol black carbon (BC)	No health outcome was measured	Yes	NO _x emissions from industries and vehicle emissions from the Johannesburg-Pretoria megacity and industries on the Mpumalanga Highveld are frequently held responsible for all types of pollution. The most significant sources of eBC, particularly in the winter and spring, were found to be household combustion, savannah, and grassland fires, while coal-fired power plants, pyrometallurgical smelters, and traffic all year round contribute to eBC mass concentration levels. Coal-fired power plants, pyrometallurgical smelters, traffic, home combustion, as well as savannah and grassland fires were identified as contributing factors in Elandsfontein (Chiloane et al., 2017).
36	Receptor modelling and risk assessment of volatile organic compounds measured at a regional background site in South Africa (Jaars et al., 2018)	Welgegund	Positive matrix factorisation analysis on VOC data	Modelling of lifetime cancer risk- (LCR) and non-cancer hazard ratio (HR) assessment study conducted for human exposure levels of VOCs. No participants were part of this study.	Yes	This study compared the lifetime cancer risk and non-cancer hazard ratio for VOCs measured in relation to three source regions found that lower VOC levels were associated with a "non-cancerous influence" on human health and higher levels of VOCs associated with lower "cancerous influence", which is cause for concern. LCR readings were within acceptable bounds. Incomplete combustion sources and coal combustion can reduce benzene-related cancers, minimizing VOC-related LCRs and HRs (Jaars et al., 2018).
37	Seasonal influences on surface ozone variability in continental South Africa and	Four sites in continental South Africa including Welgegund	Comprehensive continuous surface O ₃ measurements	No health outcome was measured	Yes	According to the O ₃ production rate at Welgegund, about ~40% of O ₃ was produced under VOC restriction. Due to high human NO _x emissions, the relationship between O ₃ and precursor species suggests that South Africa can be considered VOC limited. Reducing CO and VOC emissions, primarily from household

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	implications for air quality (Laban et al., 2018)					combustion and local open biomass burning should be the most effective emission control strategy to lower O ₃ levels in South Africa (Laban et al., 2018).
38	Characterising Particulate Organic Nitrogen at A Savannah-Grassland Region in South Africa (Booyens et al., 2019)	Welgegend	Two-dimensional gas chromatography coupled with a time-of-flight mass spectrometer in aerosol samples: amines, nitriles, amides, urea, pyridine derivatives, amino acids, nitro-and nitroso compounds, imines, cyanates and isocyanates, and azo compounds	No health outcome was measured	Yes	The main sources of amines were thought to be anthropogenic sources influencing air masses measured at Welgegend as well as local agricultural activities, whereas the main source of nitriles, amides, and pyridine derivatives was local household combustion. The presence of additional organic N species was likely due to the impact of nearby and regional agricultural activities (Booyens et al., 2019).
39	Assessment of polar organic aerosols at a regional background site in southern Africa (Booyens et al., 2019)	Welgegend	Characterise and semi-quantify ~1000 organic compounds in aerosols Ambient polar organic aerosols	No health outcome was measured	Yes	There were less polar organic compounds during wet removal in late spring and early autumn. Fresh open biomass burning plumes consisted of VOC compounds and non-polar hydrocarbons and lower levels of polar organic compounds. The results of multiple linear regression supported the hypothesis that the factors examined in this study together were responsible for the temporal variations in polar organic compounds (Booyens et al., 2019).
40	Statistical analysis of factors driving surface ozone variability over continental South Africa, (Laban et al., 2020)	Welgegend Botsalano Marikana	Multivariate statistical variability of O ₃	No health outcome was measured	Yes	The daily maximum of the eight-hour average O ₃ concentration is related to respiratory symptoms. Therefore, this metric serves as the foundation for both the South African National Ambient Air Quality Standards and other global standards intended to safeguard human health. Relative humidity significantly affected O ₃ variability. Higher relative humidity was associated with lower O ₃ levels. This study demonstrated the value of statistical techniques for evaluating O ₃ at the regional level (Laban et al., 2020).
41	Observations of ozone formation in southern African savanna and grassland fire plumes (Vakkari et al., 2020)	Welgegend	In-situ measurements: SO ₄ , NO _x , CO and VOCs of 13 smoke episodes totalling 17.5 hours of in-plume measurements	No health outcome was measured	Yes	This study reported ozone production as a result of build-up of NO _x , CO and VOCs emitted from biomass burning in the savanna and grassland ecosystem. The average SO ₂ emission factor for savanna and grassland was 1.1 g kg ⁻¹ , which is two to three times higher than previous studies whilst the average NO emission factor (2.6 g kg ⁻¹) agrees with previous datasets (Vakkari et al., 2020).
42	Six-year observations of aerosol optical properties at a southern African grassland savannah site (Venter et al., 2020)	Welgegend	~6 year, in situ, ground level aerosol scattering and absorption dataset	No health outcome was measured	Yes	When aerosol scattering from biomass burning in Welgegend was compared to non-industrial areas such as the Karoo and the Kalahari. The absorption factors were higher, showing the higher pollution levels from human industrial activity (Venter et al., 2020).
43	Using Microsoft® Power BI® to visualise Rustenburg Local Municipality's Air Quality Data	Thlabane, Marikana and Boiketlong towns in the Rustenburg Local Municipality,	Ambient PM ₁₀ was measured at ambient air quality monitoring stations	No health outcome was measured	Yes	At times, ambient PM ₁₀ concentrations exceeded the daily and the annual NAAQS at each study site.

No	Title of the Study and authors	Study location	How was air quality included in the study?	Which health outcome was considered in this study and how?	WBPA Priority Area?	Main study findings
	(Wright and Wernecke 2020)	North West Province				
44	Chemical composition of rain at a regional site on the South African Highveld (Kok et al, 2021)	Welgegund South African Highveld	The chemical composition of wet deposition was analysed to assess atmospheric pollutants (SO ₄ and NO ₃)	No health outcome was measured	Yes	This study demonstrated the elemental composition of wet deposition. The pollutants came from industrial sources, marine and crustal sources, biomass burning and agricultural activities (Kok et al, 2021).
45	Assessing SO ₂ , NO ₂ and O ₃ in rural areas of the North West Province (Ngoasheng et al., 2021)	Tosca, Morokweng, Ganyesa, Vryburg, Sannieshof, Taung, Christiana, Schweizer-Reneke, Marikana, Bapong and Otoshoop in North West Province	Ambient NO ₂ , SO ₂ , O ₃ monitored (passive sampling) at 25 sites	No health outcome was measured	Yes	SO ₂ and NO ₂ problems were not generally observed, but O ₃ exceedances of the 8-hrs moving standard limit were measured. Sources of the gaseous pollutants were local and regional, even coming from neighbouring provinces.
46	North West Province – Studies looking at air quality and health					
47	Local communities and health disaster management in the mining sector (Cronje et al., 2013)	Rustenburg (around mines), North West Province	Talk broadly about air pollutants related to mining activities, but do not measure pollution levels	Speak broadly about the health risks of air pollution stemming from mining practices. They do conduct social surveys and focus group meetings, but it is not clear if health data are collected. Health outcomes quoted in relation to air pollution exposure are based on references	Yes	The environmental (natural) threats to health that were discussed in the study were dust and other harmful particles in the air and water, excessive noise from blasting and other mining operations, and overcrowded and unhygienic living conditions. The most common illnesses and diseases associated with these environmental threats included TB, silicosis, airborne and water-associated illnesses (such as asthma, other chronic chest infections, sinusitis, eye problems, diarrhoea and cancer) and hearing problems (Cronje et al., 2013).
48	Platinum and Gold Mining in South Africa: The Context of the Marikana Massacre (Cairncross and Kisting 2016)	Wonderkop, Marikana, North West Province and Tudor Shaft, Mogale City, Gauteng Province	Toxic wind-blown dust from tailings dams from the gold and platinum mining sectors is the focus. Images are shown of the dust blowing off these dams towards residential areas. Self-reports of wind-blown dust	Self-reported results outlining the nuisance of dust and air pollution exposure near the mines, as well as self-reported health impacts (reported in interviews and observations), which include asthma, sinusitis and eye problems	Yes	This paper documented the impact of mining on communities and workers using two case studies of platinum and gold mining in South Africa. These testimonials captured the extreme poverty as well as multiple co-morbidities caused by mining activities and the social conditions surrounding mines.
49	Expert Report: The Psychological and Mental Health Consequences of Climate Change in South Africa (Barnwell 2021)	South Africa as a whole, with specific mention of Rustenburg and the Bojanala Platinum District	Air pollution is not measured, it is mentioned as an environmental health risk factor, based on previous studies and their findings	No health data are collected, but mental health and psychological responses associated with air pollution exposure are considered in this study, as referenced by personal experience and previous studies	Yes	This expert report focuses on the considerable health and mental health consequences of climate change due to its impacts on (among others) environmental and planetary health. Climate change will have insurmountable negative repercussions for South Africa. Air pollution is quoted to have a severe burden on health and psychological wellbeing. Poor people living in highly polluted communities are stressed, as they are, for example, unable to reduce their exposure to air pollution by moving, due to their socio-economic status.

No	Title of the Study and authors	Study location	How was air quality included in the study?	Which health outcome was considered in this study and how?	WBPA Priority Area?	Main study findings
50	Indoor and outdoor PM ₁₀ levels at schools located near mine dumps in Gauteng and North West Provinces, South Africa (Nkosi et al., 2017)	Schools close to Orkney, North West Province	This study compared ambient PM ₁₀ and SO ₂ exposure levels in exposed (1–2 km from gold mine dumps) and unexposed schools (5 km or more from gold mine dumps). Personal PM ₁₀ was also measured	Asthma in school children (13–14-year-old asthmatic learners)	No	Average ambient PM ₁₀ and SO ₂ concentrations for both exposed and unexposed schools did not exceed relevant NAAQS. PM ₁₀ , SO ₂ and respirable dust levels in exposed schools (schools near mines) were significantly higher than levels in unexposed schools. This indicates that the health of children attending schools in communities located near mine dumps is compromised, and this may affect their academic performance negatively.
51	Asymptomatic transmission and high community burden of seasonal influenza in an urban and a rural community in South Africa, 2017–18 (PHIRST): a population cohort study (Cohen et al., 2021)	Klerksdorp, North West Province; Agincourt, Mpumalanga Province	Indoor PM ₄ measurements were taken	The incidence/ community burden of influenza infection as well as transmission risk were the main health outcomes of interest in the study	No	The incidence of influenza infection was 43.6 (95% CI 39.8–47.7) per 100 person-seasons. Approximately half of influenza infections were asymptomatic, with asymptomatic individuals transmitting influenza to 6% of household contacts. Mean indoor and winter particulate matter concentrations were not found to be statistically significantly associated with influenza incidence or household cumulative infection risk.
Limpopo Province – Studies looking at air quality only						
52	Risk of exposure to silica dust at some dust-generating workplaces in the Limpopo Province a survey (Dambisya and Modipa 2007)	In silica dust-generating workplaces in Limpopo (e.g., brickworks, tombstone manufacturing, granite factory, coal manufacturing and animal feeds factory)	A checklist was administrated asking whether dust had been identified as a health hazard to which employees may be exposed in the workplace. It was also asked whether the industry in question employed services of an inspection authority to monitor air quality	A checklist was administrated asking whether the employees at the industry in question undergo medical examinations	Yes	Of the 67 places inspected, only 18 had completed hazard identification and risk assessments, with 10 using an approved inspection authority. Some employers said they did not know about silica and some employees were not aware of the dangers of dust exposure. Medical surveillance was done in 31 of the workplaces. Some employers complained of lack of cooperation from employees regarding use of personal protective equipment, and employees accused the employers of not providing such protective wear. Some employees viewed medical examinations as a ploy to get them dismissed from work. After this risk assessment, two provincial workshops were held to inform both employers and employees on silicosis risks.
53	Developing an Air Quality Management Plan: Lessons from Limpopo (Bird et al., 2012)	Limpopo Province as a whole	Estimated emissions of criteria pollutants based on standard emission rates from various sources (e.g., traffic and domestic fuel burning), and also using satellite imagery as well as emission inventories	No health outcome was measured	Yes	This study reports on the approach, initial findings and challenges faced during the baseline assessment of air quality in the Limpopo Province. The largest source of NO ₂ and SO ₂ was identified as power generation, and biomass burning was found to be the largest source of particulate matter and CO. A limitation of the study was listed to be the low response rate of mining and industrial activities, leading to a likely underestimation of emissions from those sources.
54	The Waterberg-Bojanala Priority Area Air Quality Management Plan:	Waterberg-Bojanala Priority Area	Primary pollutant emissions from point sources, ambient air quality measurements, as well as dispersion	No health outcome was measured	Yes	Measured and predicted non-compliances with various primary pollutants' NAAQS in the WBPA indicate that there are potential impacts on human health caused by mining, industrial activities, but also domestic burning.

No	Title of the Study and authors	Study location	How was air quality included in the study?	Which health outcome was considered in this study and how?	WBPA Priority Area?	Main study findings
	Baseline Characterisation (DEA 2014)		modelling and emission factors			Recognised gap: There is no health baseline with respect to air pollution in the WBPA and ecological impacts are not understood, i.e., with modelling and monitoring, efforts focus on industry, mining and residential fuel burning. Emissions from small boilers, biomass burning, waste management and transport were excluded.
55	Assessment of ambient air pollution in the Waterberg Priority Area 2012-2015 (Feig et al., 2016)	Lephalale, Mokopane, Thabazimbi	Ambient air quality was measured (PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , CO, O ₃ , BTEX)	No health outcome was measured	Yes	The recorded SO ₂ concentrations were generally low, with peak daytime industrial source influences being evident. The PM ₁₀ and PM _{2.5} concentrations show a strong seasonal pattern with the highest values occurring during the winter months. There has been a statistically significant decrease in the PM ₁₀ concentrations at Lephalale over the monitoring period. In addition to the temporal patterns in the PM ₁₀ and PM _{2.5} concentrations are indicative of local domestic combustion or traffic sources in that there are strong peaks in the early morning and evening, and a strong weekend effect. The concentrations of ozone are highest in the spring period.
56	Inclusion of climate change strategies in municipal Integrated Development Plans: A case from seven municipalities in Limpopo Province, South Africa (Lethoko 2016)	Seven vulnerable Municipalities in Limpopo Province	No air quality was measured, but air pollution was listed as an environmental challenge in the Integrated Development Plans (IDPs) of several municipalities	No health outcome was measured	Yes	The considered IDPs did not have a structured way of presenting their environmental plans. The problems in their various municipalities were listed, with very little discussion relating to the strategies to adapt to and mitigate the existing problems, especially linked to their vulnerability status in the face of a changing climate.
57	The impacts of commissioning coal-fired power stations on air quality in South Africa: insights from ambient monitoring stations (Morosele and Langerman 2020)	Medupi, Matimba Power Station and Marapong Town in Limpopo Province. Duvha, Hendrina, Komati, Camden and Grootvlei Power Stations, Mpumalanga Province, Lethabo Power Station, Free State Province	Ambient PM ₁₀ and SO ₂ were measured	No health outcome was measured	Yes	Overall, no strong correlation was found between the ambient air pollution concentrations detected by the ambient air quality monitoring stations and the increasing emissions from the considered power stations (The only potential observed instance where pollutant emissions, emitted from a power station had an impact on ambient pollutant levels was observed for SO ₂ emissions from Grootvlei Power Station, detected at the Grootvlei ambient monitoring station). NAAQS compliance assessments indicated that PM ₁₀ is a bigger problem than SO ₂ in the Highveld Priority Area and the Waterberg Bojanala Priority Area.
58	Potential implications of mine dusts on human health: A case study of Mukula Mine, Limpopo Province, South Africa (Momoh et al., 2013)	Mukula Mine, Limpopo Province	Ambient PM ₁₀ in and around the mine was measured	No health outcome was measured	No	Suspended particulate matter concentrations in the air ranged from 60 - 1 820 µg/m ³ . The further away the measurements taken away from the drilling site at the mine, the lower the particulate concentrations were. The lowest value of PM measured exceeded the World Health Organisation Guideline values, representing a health risk to mine workers and neighbouring communities.

No	Title of the Study and authors	Study location	How was air quality included in the study?	Which health outcome was considered in this study and how?	WBPA Priority Area?	Main study findings
59	Variation of Indoor Particulate Matter Concentrations and Association with Indoor/Outdoor Temperature: A Case Study in Rural Limpopo, South Africa (Kapwata et al., 2018)	Giyani, Limpopo Province	Indoor PM ₄ was measured	No health outcome was measured	No	Indoor household concentrations of PM ₄ exceeded the NAAQS and the WHO Air Quality Guidelines for PM _{2.5} and PM ₁₀ , especially in winter. Hourly indoor temperature was found to have a statistically significant positive effect on indoor PM concentrations.
60	Source profiling, source apportionment and cluster transport analysis to identify the sources of PM and the origin of air masses to an industrialised rural area in Limpopo (Tshehla and Djolov 2018)	A rural area of The Greater Tubatse Municipality, Limpopo Province	Ambient PM _{2.5} , PM ₁₀ concentrations were measured	No health outcome was measured	No	The PM _{2.5} and PM ₁₀ annual mean concentrations were below their respective annual NAAQS. Source categories that potentially contributed to ambient PM were identified as crustal/road dust, coal combustion fly ash, vehicle exhaust dust, agricultural/wood burning and industrial sources (Tshehla and Djolov 2018).
61	Indoor Particulate Matter Concentration Variations and Associations with Indoor/Outdoor Temperature in Rural Limpopo (Kapwata et al., 2019)	Giyani, Limpopo Province	Indoor PM ₄ concentrations were measured	No health outcome was measured	No	A strong seasonal variability in PM ₄ concentrations was found, with diurnal variability being highest in winter. During summer, indoor temperatures exceeded thresholds recommended by epidemiological studies, exposing residents to health risks related to high temperature exposure (e.g., the onset of heat-related illnesses as well exacerbation of existing chronic health conditions).
62	Spatial and Temporal Variation of PM ₁₀ from Industrial Point Sources in a Rural Area in Limpopo, South Africa (Tshehla and Wright 2019)	The Greater Tubatse Municipality of Limpopo Province	Dispersion modelling and spatial analysis of PM ₁₀	No health outcome was measured	No	Valley wind channelling were found to be responsible for the distribution of pollutants from point sources. The results revealed that PM ₁₀ concentrations were higher closer to the sources during the day and distributed over a wide area during the night. During the day, the communities impacted by pollution from the industrial point sources in the study area were those residing closer to the industrial facilities and during the night, the recirculation of pollution impacted a number of villages further away from the industries.
63	An Assessment of Indoor and Outdoor Air Quality in a University Environment: A Case of University of	University of Limpopo, in the Mankweng township, Polokwane, Limpopo Province	Indoor and ambient CO, CO ₂ , O ₃ , SO ₂ , NO ₂ , H ₂ S, NMHCs and VOC's were measured	No health outcome was measured	No	Ambient O ₃ , SO ₂ , CO and H ₂ S concentrations all complied with their respective standards. Similarly, indoor CO and CO ₂ were conformant to the ASHRAE guidelines. In stark contrast, outdoor NO ₂ concentrations were non-compliant to their respective standards. Non-methane hydrocarbons and VOCs had no comparative standards.

No	Title of the Study and authors	Study location	How was air quality included in the study?	Which health outcome was considered in this study and how?	WBPA Priority Area?	Main study findings
	Limpopo, South Africa (Mundackal 2020)					
64	Evaluation of indoor and outdoor air quality in university academic buildings and associated health risk (Mundackal and Ngole-Jeme 2020)	Inside natural science departments of a university, Limpopo Province	Priority air pollutants, hydrogen sulphide (H ₂ S), non-methane hydrocarbons (NMHCs), and volatile organic compounds (VOCs)	No health outcome was measured	No	High CO ₂ concentrations existed in all departments with highest levels of NMHC and VOC observed in the biochemistry, microbiology, and biotechnology department. Natural science departments contribute significant amounts of H ₂ S, NO ₂ , NMHCs and TVOCs on university campuses.
65	Determination of heavy metal composition of particulate matter in a typical chrome and platinum mine area in the Limpopo Province, South Africa (Tshehla 2020)	The Greater Tubatse Municipality of Limpopo Province	Ambient PM _{2.5} , PM ₁₀ concentrations were measured	No health outcome was measured	No	Annual average PM _{2.5} and PM ₁₀ concentrations were below their relevant NAAQS. The average source contribution in the study area were vehicles, chrome smelters, industrial coal combustion, wood combustion and crustal material. The seasonal distribution indicated that PM ₁₀ was high during winter and low in autumn.
Limpopo Province – Studies looking at air quality and health						
66	Respiratory Health Status of Children in the Eastern Transvaal Highveld (Zwi et al., 1991)	Numerous schools in today's Mpumalanga Province and Limpopo Province (including schools in the now WBPA). The schools which are in the now WBPA were the control schools for this study (as they were deemed to be areas unlikely to be polluted). The study sites were primarily in the now Highveld Priority Area.	Air pollution data from all available sources concerning the "Eastern Transvaal Highveld" were examined to try to define the geographical limits of the polluted area. Data were sourced from the likes of the CSIR, WITS University and the Johannesburg City Council Health Department. Exposure to community air pollution was defined based on area of residence. The study also correlated symptoms and lung function with smoke (S/m ³) and SO ₂ (µg/m ³)	Respiratory health status of school children was assessed and was defined in terms of 1) respiratory illness, past and present; 2) respiratory symptoms (questionnaire answered by mother) and 3) spirometry lung function tests	Yes	Respiratory symptoms (e.g., wheezing or cough) were significantly more common in exposed children, particularly in girls. This was also true for colds involving the chest, where cigarette smoking occurred in the home. There was an increased risk of chest illness in boys from homes where fuels other than electricity were used. 18% of homes in the control areas used gas, coal or other fuels. There was no significant difference between exposed and unexposed children when cooking at bronchitis, pneumonia and other chest illnesses. Earache and hay fever was more common in boys in the control areas (probably due to the more rural environment with more allergens). Asthma was slightly more common in exposed than unexposed children, particularly in boys. Of the risk factors tested, attendance at school in the exposed area was the most important risk factor for the development of respiratory symptoms.
67	Health in the Waterberg, Up in Smoke? (Itzkin 2015)	Schools and clinics and households in Lephale, Marapong and Steenbokpan towns in Limpopo Province	Ambient SO ₂ , NO ₂ , PM ₁₀ and PM _{2.5} were measured; A questionnaire asking about "perceived air quality" was also administered (What is air quality like in your area?)	Self-reported respiratory-related health outcomes	Yes	Air pollution perceptions and self-reported health outcomes were found to vary with socio-economic status. Qualification of respondents, subscription to medical aid and presence of a ceiling on the home came up as associated with 'air pollution understanding', as well as 'overall rating of household health over the last two years (Itzkin 2015). Annual average concentrations for all measured pollutants were within the respective NAAQS, except for PM ₁₀ in Marapong, which exceeded the annual NAAQS. Hourly

No	Title of the Study and authors	Study location	How was air quality included in the study?	Which health outcome was considered in this study and how?	WBPA Priority Area?	Main study findings
						SO ₂ exceedances and daily PM _{2.5} and PM ₁₀ exceedances were measured in Marapong.
68	Health and Environmental Risks of Residents Living Close to a Landfill: A Case Study of Thohoyandou Landfill, Limpopo Province, South Africa (Njoku et al., 2019)	Thohoyandou, Limpopo Province	Proxy of air quality was used (no direct measurements) 1) "dust" and 2) "bad odour" of landfill gas	Health perceptions were collected via means of a questionnaire asking about the presence of breathing disorders, coughing and Tuberculosis, asthma, and other health issues	No	More than three quarters of participants living closer to the landfill site indicated serious contamination of air quality evident from bad odours linked to the landfill site (Njoku et al., 2019). Illnesses such as flu, eye irritation and weakness of the body were more frequently reported by participants living closer to the landfill than those living far from the landfill (Njoku et al., 2019). More than half of the participants living closer to the landfill indicated fear of their health in the future (Njoku et al., 2019).
69	Exploring rural hospital admissions for diarrhoeal disease, malaria, pneumonia, and asthma in relation to temperature, rainfall and air pollution using wavelet transform analysis (Kapwata et al., 2021)	Giyani, Limpopo Province (Nkhensani Hospital and Maphutha L. Malatjie Hospital, located in Mopani District Municipality)	Air pollution data were taken from the Copernicus Atmosphere Monitoring Service (CAMS) global reanalysis dataset. Surface daily mean values of PM _{2.5} and NO ₂ data were used	Admissions to hospitals for gastrointestinal illnesses including diarrhoea, pneumonia-related diagnoses, malaria, and asthma cases	No	An increase of pneumonia prevalence followed changes in air quality after a lag of 10 to 15 days. The increase of incidence of malaria followed the co-occurrence of high temperature and rainfall after a 30-day interval.
Air quality and health in North West and Limpopo Province						
70	A critical review of health risk assessments of exposure to emissions from coal-fired power stations in South Africa (Langerman and Pauw 2018)	The air quality priority areas of South Africa, including the WBPA	No primary air pollution data were collected. Previous studies considering PM _{2.5} concentrations from power stations were assessed/ reviewed	Exposure-response functions as listed by previous health risk assessment studies were reviewed. Population incidence of death/ health outcomes (per 100 000 people) as presented in reviewed health risk assessments were listed	Yes	Four health risk assessments of emissions from coal fired power stations in South Africa were analysed and classified as over-or underestimating health effects of coal fired power stations. Suggestions are made for improved health risk assessments.
71	Improving health risk assessments of PM _{2.5} from coal-fired power stations (Simelane and Langerman 2020)	The air quality priority areas of South Africa, including the WBPA	Ambient PM _{2.5} concentrations were estimated using a land use regression model. Black carbon emissions from coal-fired power stations for fuel oil and coal burnt using EPA	Estimations of premature deaths attributable to PM _{2.5} considering the following illnesses: ischemic heart disease, stroke, chronic obstructive pulmonary disease and lung cancer	Yes	Emissions from coal-fired power stations contribute between 1.8% and 5.6% of all deaths attributable to PM _{2.5} exposure in the study area (Simelane and Langerman 2020). Coal-fired power station emissions contribute a relatively higher proportion of premature deaths where power stations have the highest contribution to ambient PM _{2.5} concentrations.

No	Title of the Study and authors	Study location	How was air quality included in the study?	Which health outcome was considered in this study and how?	WBPA Priority Area?	Main study findings
72	Health and wellbeing needs and priorities in mining host communities in South Africa: a mixed-methods approach for identifying key SDG3 targets (Rice et al., 2022)	Rustenburg, Thabazimbi and Mogalakwena Local Municipality/ Waterberg and Bojanala District Municipalities	emission factors were taken into account too No air quality data were collected, but air pollution was mentioned as a priority for action by community members (especially by community members in Mogalakwena and Rustenburg)	Health data were based on district-level health plans and health barometers, supplemented by data from Arrive Alive for road traffic accidents (RTAs) and the National Statistics Service, including the latest national mortality report for South Africa	Yes	Poor housing, air quality, and ventilation in clinics, transport, and homes were put forward as key factors in relation to TB (by community members) and air pollution was mentioned as a priority for action by community members living in mining host communities.