



# **AIR QUALITY AND HUMAN HEALTH IN SOUTH AFRICA: TRANSLATING THE RESEARCH FOR POLICY AND PRACTICE**

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# BACKGROUND

- In 2015, 6.4 million deaths (and 167.2 DALYs) were attributed to air pollution globally
- Household air pollution accounted for 2.8 million of these deaths
- Household air pollution ranked 7<sup>th</sup> leading risk factor attributing DALYs globally in 2013



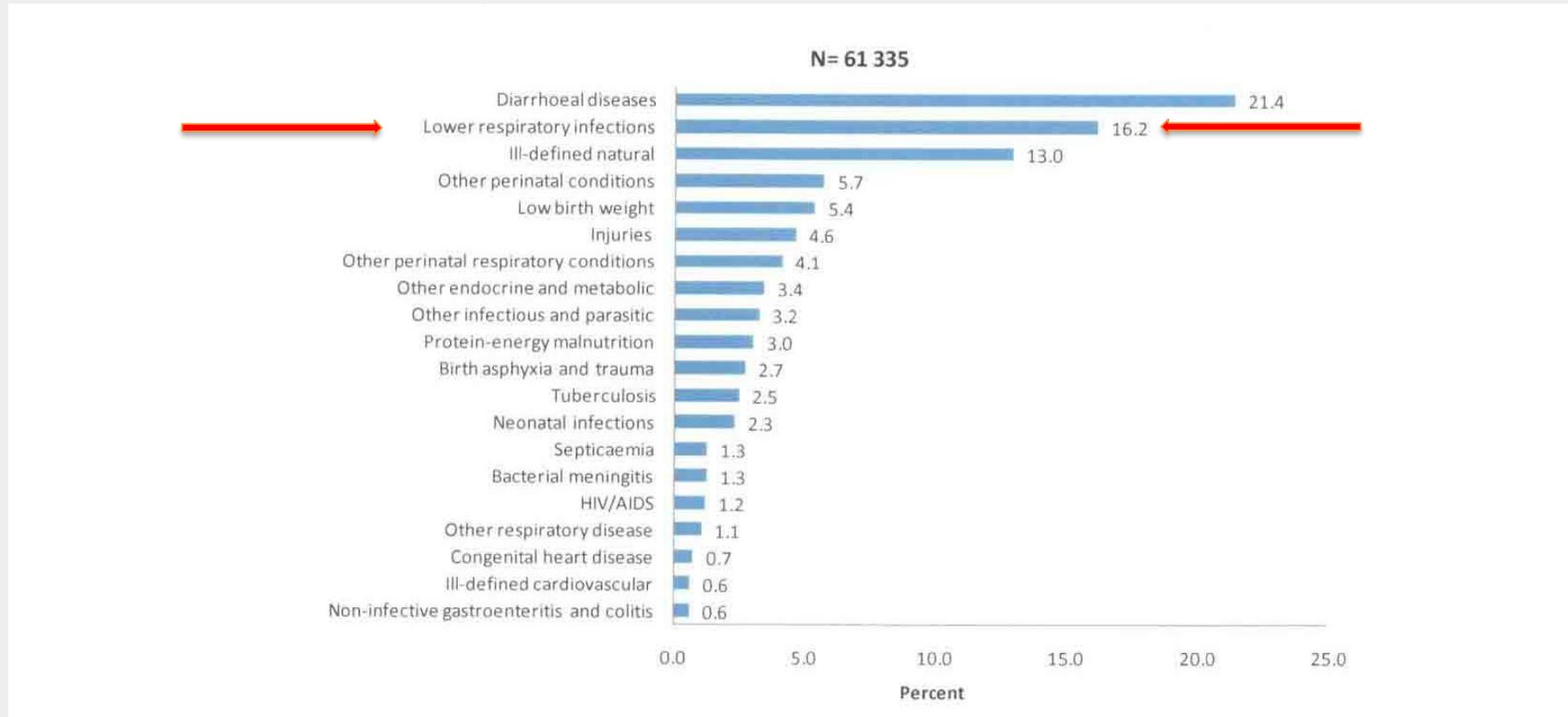
# OUR CONTEXT



South Africa is a country in transformation

- High levels of poverty
- Limited use of electricity, even where provided (rising cost of electricity)
- Coal-fired power generation
- Rapid industrialization
- Ageing vehicle fleet
- Road dust
- Cottage industries

# PROPORTION OF DEATHS UNDER 5 YEARS OF AGE BY SINGLE CAUSE



# SETTINGS FOR AIR POLLUTION EXPOSURE

## Homes

*Use of polluting fuels, cottage industries, proximity to point sources, smoking/environmental tobacco smoke*

## Schools

*Industry in close proximity, close to busy roads, use of polluting fuels for preparing meals*

## Play areas

*Located in close proximity to industry or busy highways*

## Vehicles

*Second hand smoke, polluting vehicles.*



# LOCAL RESEARCH EVIDENCE

- Several studies on ambient and indoor air pollution concentrations and exposure published in:
  - Clean Air Journal
  - South African Journal of Science
  - South African Medical Journal
  - Journal of the Southern African Institute of Mining and Metallurgy



# EXAMPLES OF RECENT STUDIES, FINDINGS, POLICY/PRACTICE

## 1 OF 3

- Shirinde et al. (2014)
  - Children living in a priority area have an increased risk of wheezing due to exposure to indoor and outdoor air pollution
  - ❖ Smoking exposure at school was higher than at home and needs better control
  - ❖ Children living in homes where trucks passed frequently had more severe symptoms – trucks engine exhaust emissions need control / elimination



# EXAMPLES OF RECENT STUDIES, FINDINGS, POLICY/PRACTICE

## 2 OF 3

- Wright et al. (2011)
  - Families living in air pollution priority area
    - ❖ 42% of households had one case of sinusitis; 10% had someone with asthma
    - ❖ Air pollution levels were highly variable – monitoring is important
- Albers et al. (2015)
  - Children attending school in priority area
    - ❖ Overall prevalence of respiratory ill-health symptoms was 34.1%.
    - ❖ The prevalence of respiratory ill-health conditions was significantly elevated among children from households using non-electrical fuels v. electricity for cooking (43.9% v. 31.6%; adjusted *p*-value 0.005).
    - ❖ The same was noted among those using non-electrical fuels for heating (37.8% v. 29.0%)
    - ❖ Indoor air quality guidelines are needed

# EXAMPLES OF RECENT STUDIES, FINDINGS, POLICY/PRACTICE

## 3 OF 3

- Nkosi et al. (2017)
  - Children attending schools near mine dumps
  - ❖ Significant differences between exposed and unexposed schools could reveal a serious potential health hazard for school children, although they were within the South African Air Quality Standards' set by the Department of Environmental Affairs
  - ❖ The indoor respirable dust levels in exposed schools could have an impact on children with asthma, as they were significantly higher than the unexposed schools
  - ❖ Mine dump rehabilitation is critical – multiple stakeholders needed





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SAMJ RESEARCH

# Bibliometric trends of South African environmental health articles between 1998 and 2015: Making local research visible and retrievable

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Table 2. Classification subcategories for SA-focused environmental health research articles\*

No.	Categories	Brief subcategory description†	Number of articles (N=230), n (%)
7	Environmental pollution control	Ensuring hygienic working, living and recreational environments Identifying the polluting agents and sources of water, air and soil pollution Taking the required preventive measures to ensure that the general environment is free from health risks	76 (33.0)
15	Lifestyle, behaviour	Environmental factors influencing lifestyle diseases, e.g. tobacco, alcohol, physical activity, sun exposure	42 (18.2)
1	Water monitoring	Monitoring and sampling of water intended for use for human consumption and for recreational and commercial use Monitoring of surface waters for waterborne diseases Ensuring the monitoring of effective waste water treatment and water pollution control, including the collection, treatment and safe disposal of sewage and other water-borne waste, and surveillance of the quality of surface water and ground water	26 (11.3)
2	Food control	Informal and formal sectors are monitored to ensure the safe handling of foodstuffs during their production, storage and delivery Licensing of food premises, condemnation of unsafe foods and ensuring the sale and supply of safe meat and milk	21 (9.0)
4	Health surveillance of premises	Residential, business and public premises are regularly monitored to identify, monitor and evaluate health risks and hazards and institute remedial and preventative measures Ensuring the abatement and prevention of any condition on any premises that is likely to constitute a nuisance or health hazard	17 (7.3)

Ref: Wright at al., 2017 (in press)

# OPTIONS FOR CROSS-SECTORAL AIR QUALITY PROGRAMMES AT COMMUNITY LEVEL

- Work with non-health sectors and NGOs to increase cycling and walking infrastructure, provide [public transport](#), greening programmes (especially food trees), traffic management, solar power, waste management, smoking prevention & cessation
- [Scale-up education](#) programmes (links between air pollution and disease, harm from burning waste at home, risks of playing on mine dumps)
- Review human [settlement planning](#) (location and design), sustainable integrated planning for air quality (commercial activity, green lungs, open space & recreation, housing design & orientation)
- [Enforcement](#) of regulations / guidelines
- [Entrepreneurship](#) for reduced air quality (solar power, recycling, chimney installation)



# CONCLUSIONS

- Air pollution from multiple sources is associated with a large burden of respiratory ill health
- Respiratory ill health is among the top five killers of children under 5 years
- High risk for worsening air pollution scenario with climate change
- Death and disease from air pollution occurring among the poorest and most vulnerable
- Need for much greater prevention efforts to reduce human exposure to air pollution
- Achieved in part by much closer relationships between key sectors:
  - Health, Environmental Management, Trade & Industry, Human Settlements



