

FLOUR DUST EXPOSURE AND RESPIRATORY SYMPTOMS AMONG WORKERS IN AN INDUSTRIAL BAKERY

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Relevance of Occupational flour dust

Disease :

1. Asthma : 20 – 44.5% of bakers⁽²⁾
2. Hypersensitivity pneumonitis
3. Chronic Obstructive Lung disease
4. Grain fever⁽³⁾

Symptoms:

Lower respiratory tract symptoms in 19% of U.K. Bakers⁽⁴⁾

1. Fritschi et. al., 2014. 2. Stobnicka & Gorny, 2015. 3. Chan- Yeung, Bernstein, von Essan & Poole, 2013. 4. Harris-Roberts et al 2009, Fishwick et al 2011).

Background to the study

American College of Government Occupational Hygienists:

Stopping sensitization = key to preventing occupational flour dust respiratory disease

OEL

ACGIH: $0.5\text{mg}/\text{m}^3$ (8 hour TWA)(flour dust)

Safework Australia $4\text{mg}/\text{m}^3$ (grain dust) , no “S”

Objectives of study

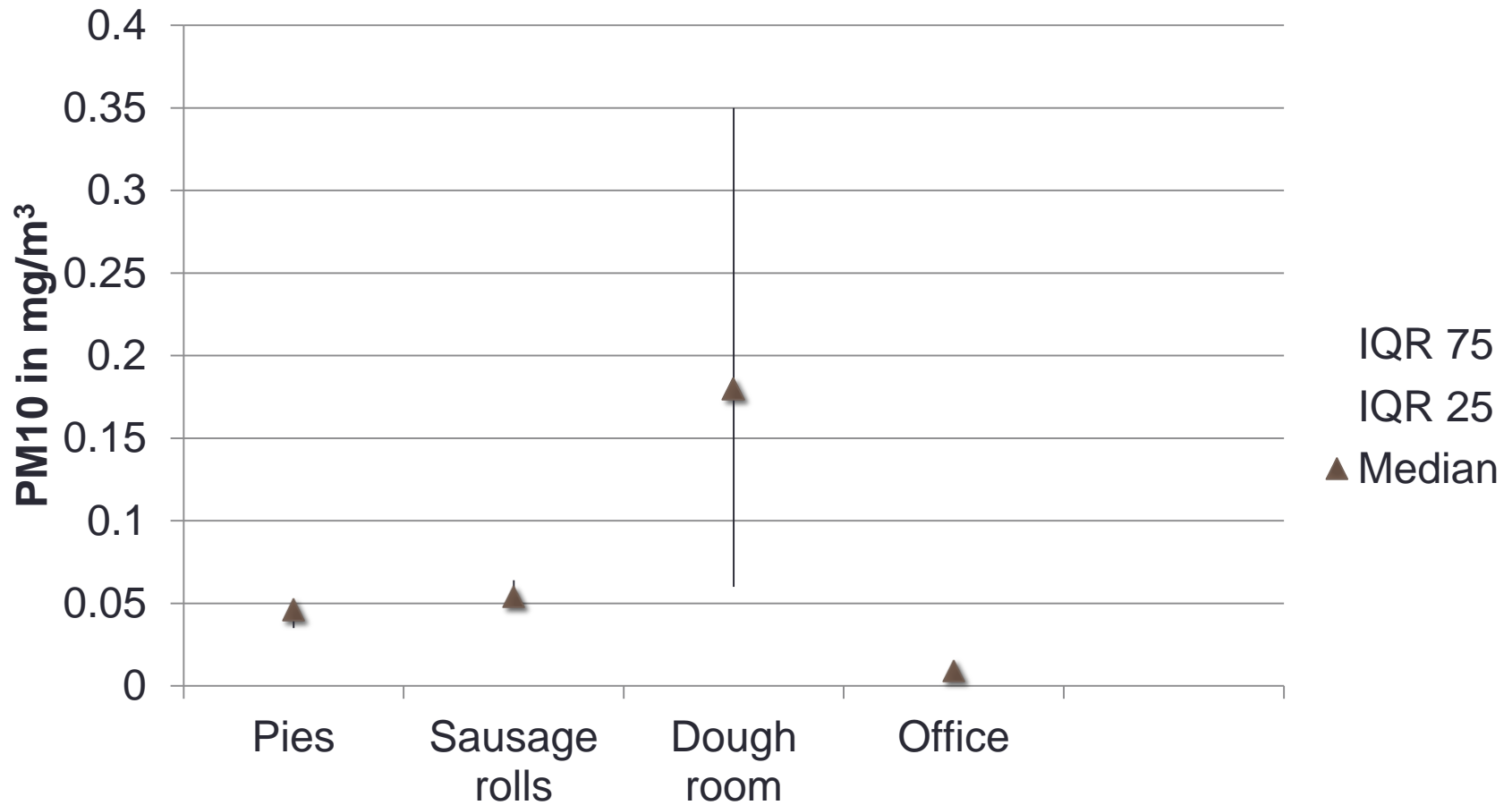
1. Measure levels of airborne contaminants
2. Measure the prevalence of respiratory disease and symptoms in workers.
3. Statistical analysis to test for an association between the levels of airborne contaminants and the presence of respiratory symptoms in the workers.

Measures of Flour dust exposure



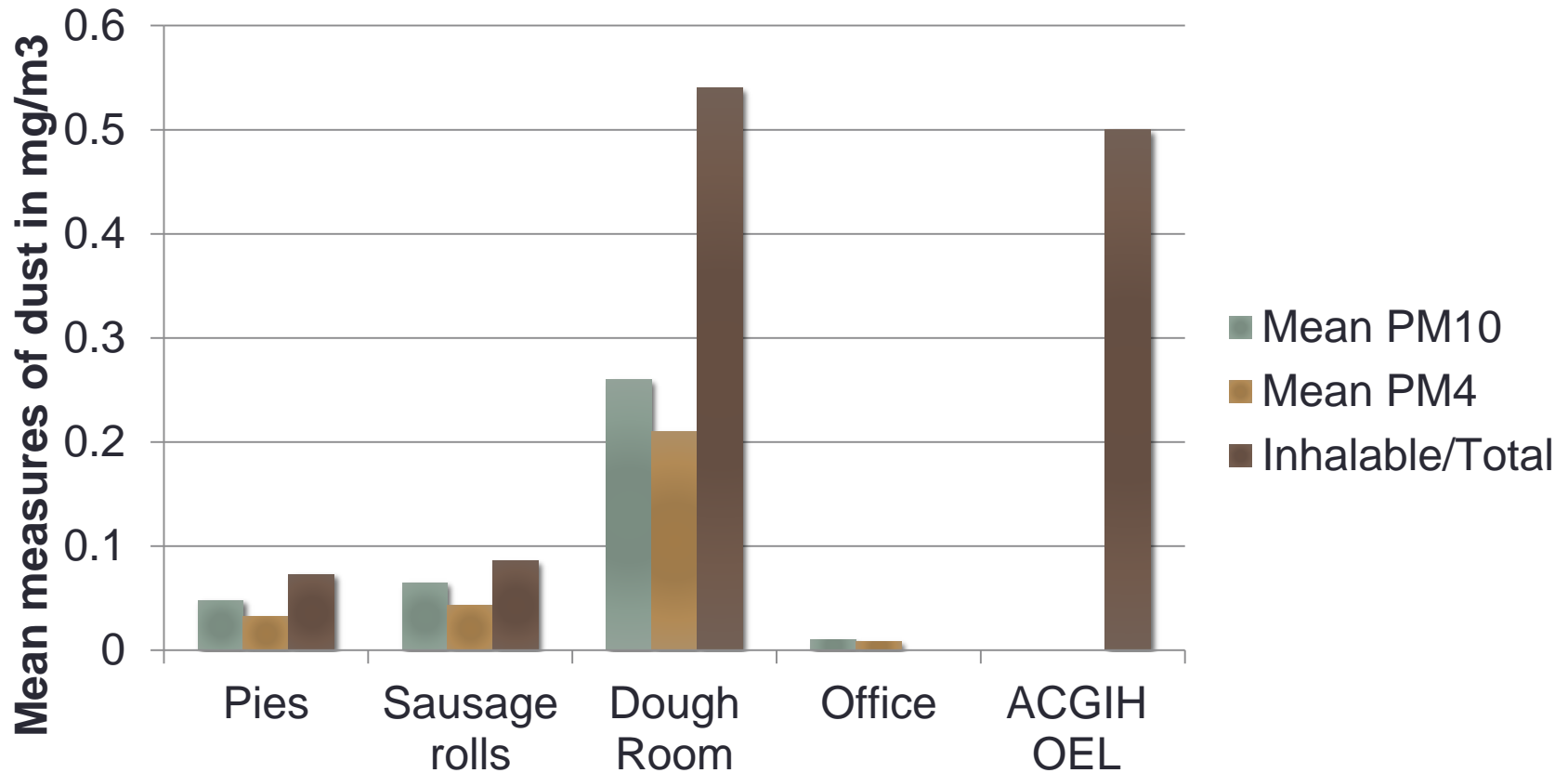
Results: PM10 median and IQR range

Chart 1: Measures of PM10



Results: Mean Dust concentrations in mg/m³

Chart 2: Mean dust concentrations over an 8 hour Time Weighted average in mg/m³



Respiratory symptoms & asthma

Medical Research Council. (1986).

Approved by Medical Research Council's
Committee on Environmental and Occupational
Health

Before the questionnaire is used the instruction sheet must be read

Cough

1. Do you usually cough first thing in the morning in winter?
2. Do you usually cough during the day – or at night – in winter?

If yes to 1 or 2

3. Do you cough like this on most days for as much as three months each year?

Phlegm.....

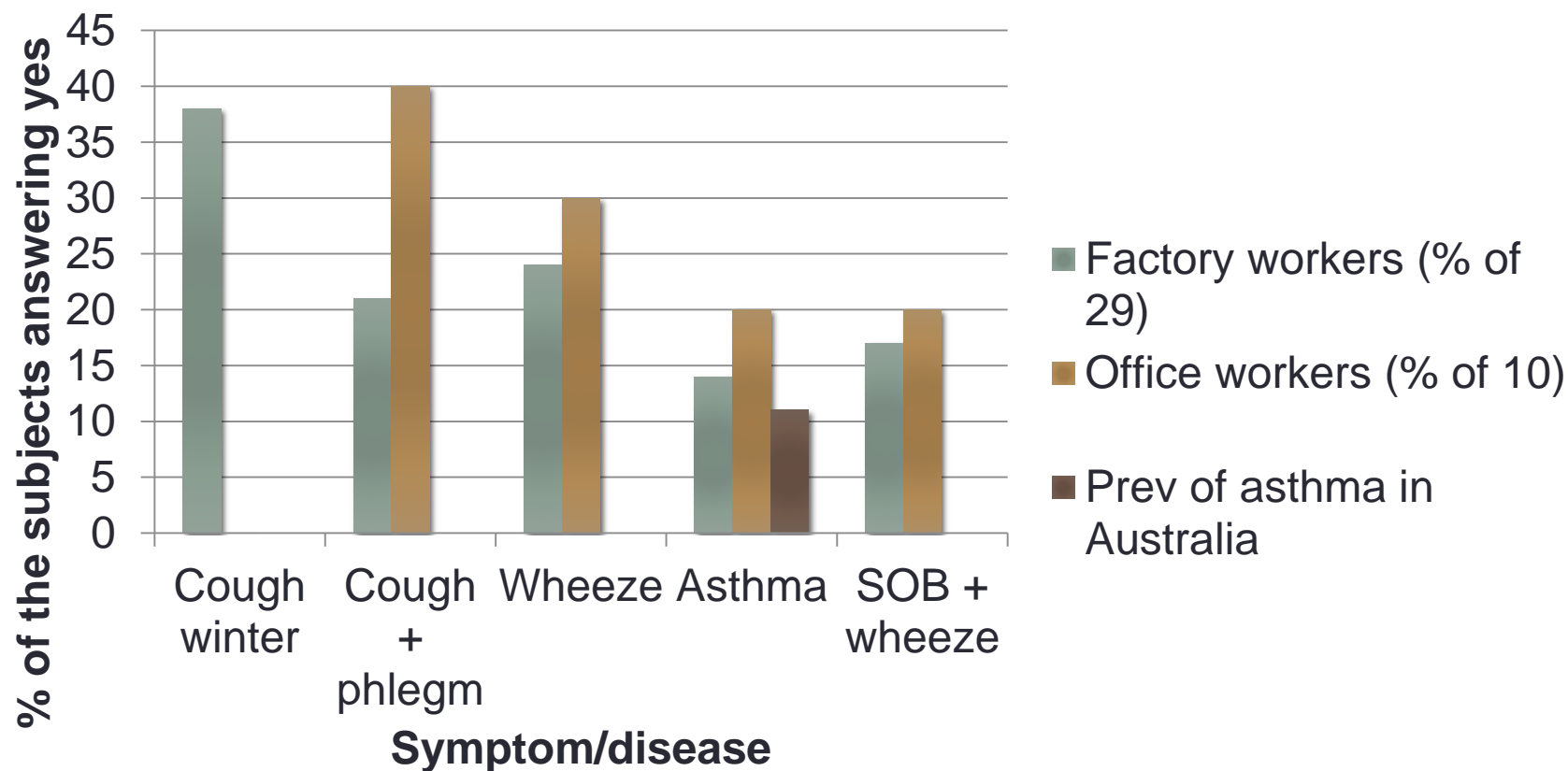
Results: Subject demographics

Table 1: Demographic data on subjects of the study

	Factory workers N (%/29)	Office Workers N (%/10)
Male	72%	50%
Age 20 - 45	59%	80%
Age 46+	41%	20%
Current/previous regular smoker	15 (52%)	2 (20%)
Never smoked	14 (48%)	8 (80%)
Duration of employment > 2 years	20 (69%)	6 (60%)

Results: Most prevalent symptoms

Chart 3: Prevalence of Respiratory Symptoms and Disease



Tests of Association

Symptom or disease	PM ₄ concentration in mg/m ³		P value
	Present - Yes	Not present	
Cough first thing in the morning in winter	0.08 mg/m ³	0.03 mg/m ³	0.001
SOB with wheeze	0.07	0.03	0.043
A chest illness that prevented usual activities for more than 1 week in the past 3 years	0.11	0.03	0.001
More than one chest illness that prevented usual activities for more than 1 week in the past 3 years	0.12	0.03	0.014

Table 3: Mean PM4 concentrations (mg/m³): relationship to respiratory symptoms

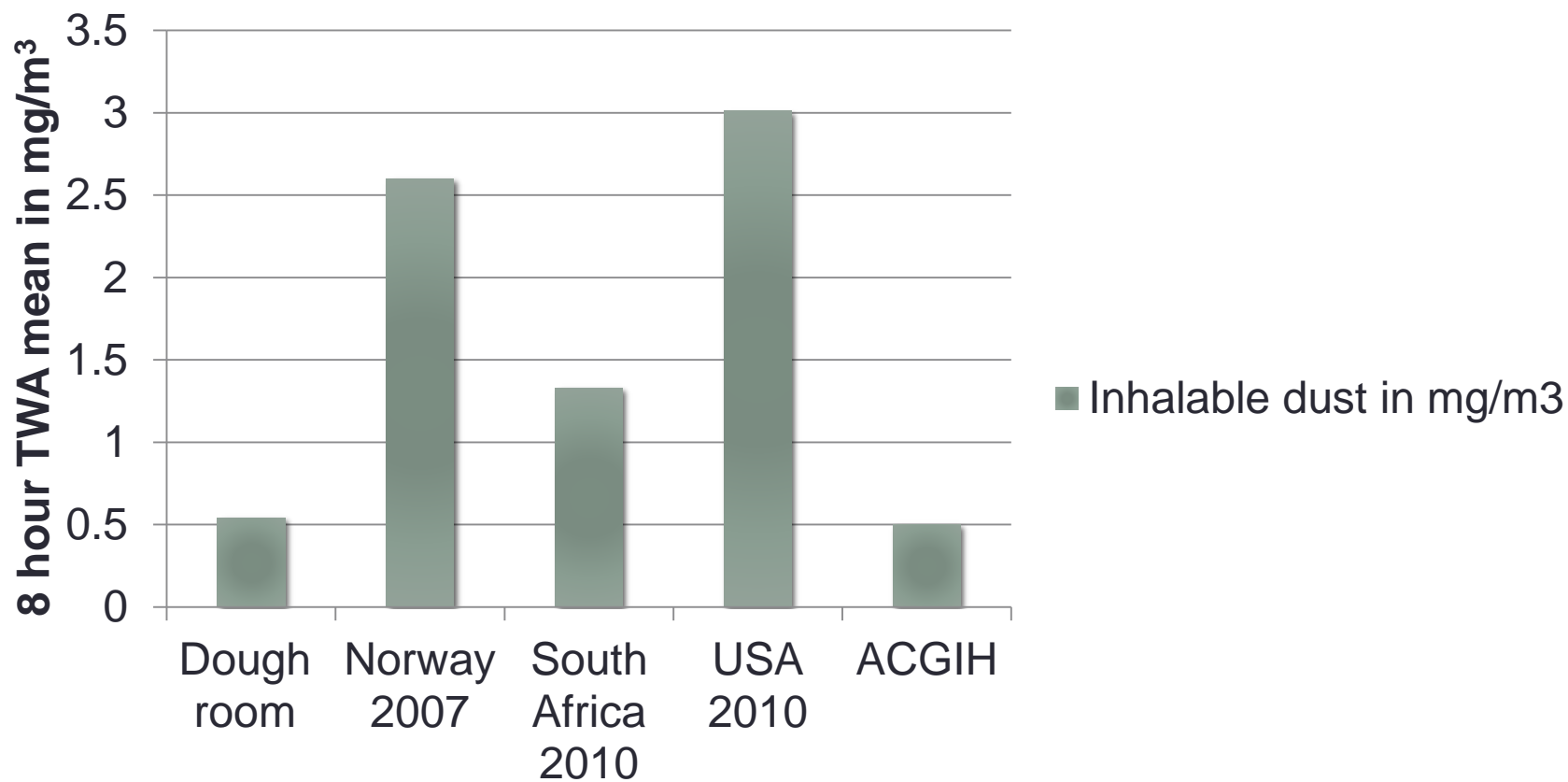
No Significant Association

Symptom or disease	PM ₄ Concentration in mg/m ³		
	Present - yes	Not present	p value
Asthma diagnosis	0.05	0.04	0.505
Wheeze in the past 12 months	0.06	0.03	0.15

Table 4: Mean PM₄ concentrations (mg/m³): relationship to respiratory symptoms (no significant association)

Discussion on Flour Dust Exposure

Chart 4: Comparison of Inhalable dust from recent studies



Discussion: Respiratory health

Why would office workers in a bakery have a higher prevalence of respiratory symptoms than bakery workers?

1. Valid result for this study population
2. Valid result for occupational flour dust exposure levels
3. Not a valid result –
 - Confounders
 - Information bias

Conclusion



Acknowledgments

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FAFOEM

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Dr Steve Clarke

Tests for association

Table 2 : Cross Tabulation of of cough first thing in the morning in winter with Mean Respirable dust concentration in mg/m³

Mean PM4 (8hr TWA)	Presence of a cough first thing in the morning		
	N = Yes	N = No	Yes as a % of 39 subjects
Office = 0.008	0	10	0
WZ1 = 0.032	4	12	10
WZ2 = 0.43	4	7	10
DR = 0.21	3	0	8
Mean PM4 Concentration in mg/m ³	0.08	0.03	

Associations with smoking

- Winter cough*
- Cough most days for as much as 3 months of the year
- Phlegm production in winter
- Phlegm production 3 months of the year
- Attacks of wheezing in past 12 months
- Attacks of significant illness lasting > 1 week in the past 3 years*
- More than 1 illness that has kept away from usual activities for more than 1 week in the past 3 years*