Respiratory morbidity in office workers in a water-damaged building

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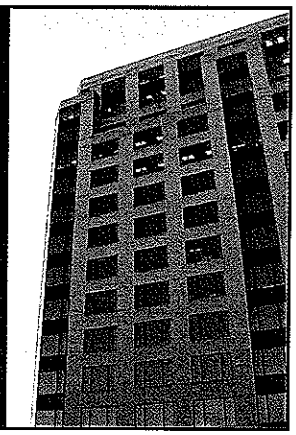
Office Study

15 occupied floors

Water damage
- Greater on upper floors

Health concerns
- Work-related symptoms
- Asthma
- Hypersensitivity pneumonitis
- Sarcoidosis



September 2001 questionnaire

- Questionnaire offered to all 1327 employees working in the building
- Participation was 67% (888/1327)

Comparison of health outcomes prevalences with NHANES III

	Building Prevalence	PR	95% CI
Asthma ever	18%	2.2	1.9–2.6
Asthma current	13%	2.4	2.0–3.0
Wheezing	36%	2.5	2.2–2.8
Stuffy, itchy or runny nose	79%	1.5	1.4–1.6
Watery, itchy eyes	63%	1.6	1.4–1.7
Wheezing, nose, or eye Sx better on days off work	72%	3.4	3.1–3.7

Prevalence of work-related lower respiratory symptoms compared to U.S. office workers.

Work-Related Symptoms *	Building Prevalence	Prevalence Ratio	95% CI
Wheezing	7%	2.9	2.2–3.7
Coughing attacks	15%	2.7	2.3–3.2
Chest tightness	11%	4.7	3.8–5.7
Shortness of breath	10%	4.6	3.7–5.7

* compared with results from 41 non-problem buildings (Apte, et al. 2000)

Comparisons to State Population (BRFSS 2001)

- Prevalence ratio was 1.4 (95% CI 1.2–1.6) for lifetime asthma
- Prevalence ratio was 1.5 (95% CI 1.3–1.9) for current asthma

Post-occupancy onset asthma and asthma incidence

- Two-thirds (66/103) of the adult-onset asthma arose after building occupancy
- 7.5-fold increase in asthma incidence density since building occupancy
  - 1.9 per 1,000 person-years in the period before building occupancy
  - 14.5 per 1,000 person-years in the period after building occupancy.

HP and Sarcoidosis

- 8 participants reported HP
  - 5 post-occupancy onset
  - 1 pre-occupancy onset
  - 2 people no diagnosis dates
- 6 participants reported sarcoidosis
  - 3 with post-occupancy onset
  - 2 with pre-occupancy onset
  - 1 person no diagnosis date

Case and Comparison Definitions

- Respiratory case group (N=202):
  - Three or more current respiratory symptoms
    or
  - Two or more current symptoms consistent with HP
    or
  - Physician diagnosis of HP, sarcoidosis, or post-occupancy asthma
- Comparison group (N=154)
  - None of the above

Groups in June 2002 survey

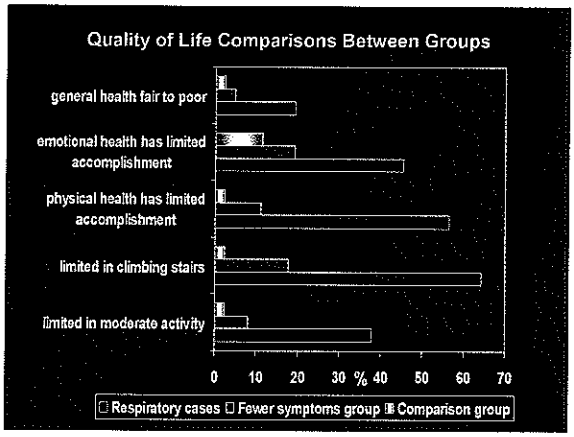
- 56% of those asymptomatic in September 2001 reported symptoms 9 months later
  - 17% into respiratory case group
  - 38% into fewer symptoms group
- 81% of respiratory cases in September 2001 still met this definition 9 months later
  - 17% into fewer symptoms group
  - 2% became asymptomatic

Groups in June 2002 survey

- 247 participants:
  - 140 in the respiratory case group
  - 63 in the fewer symptoms group
  - 44 in the comparison group

Lung Test Results and Medication Usage by Group

Variable	Respiratory Cases	Fewer Sx group	Comparison Group
Abnormal spirometry	24%	13%	7%
% Predicted FEV1	92%	96%	103%
Abnormal MCT or BD	19%	20%	6%
Medication usage	46%	13%	2%
Medication usage or abnormal lung test	67%	38%	11%



Job stress/satisfaction

- Very or somewhat satisfied with their job
  - 87% of respiratory cases,
  - 90% of fewer symptoms group
  - 93% of comparison group
- Being required to work hard frequently or very often
  - 51% of respiratory cases
  - 62% of fewer symptoms group
  - 45% of comparison group

Comparison of Sick Leave in the Last Year by Group

Variable	Respiratory Cases	Comparison
Mean non-respiratory sick days	4.5	4.1
Mean respiratory sick days	6.9	2.0
= 6 respiratory sick days	34%	4.7%

Respiratory Sick Leave Days by Work-Related Pattern

Group	Respiratory Cases
Work-related pattern	9.4
No pattern	2.4

Economic Implications

- One-third of sick leave due to respiratory health problems
- Respiratory cases (25% of occupants) took 56% of respiratory sick leave

Office Study Summary

- Excess lung disease prevalence and incidence density
- 67% of respiratory cases with pulmonary function abnormalities or medication use
- Substantial productivity loss