

Title: Assessing Asthma Risk Among NYC Housekeepers

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A. Study Purpose and Rationale

Asthma is a chronic inflammatory disorder of the airways characterized by airway hyperresponsiveness and variable airflow obstruction. The most recent Morbidity and Mortality World Report by the WHO found that almost 7% of adults have asthma, and female adults have a significantly higher prevalence (8.4%) compared to males (5.4%)¹. Asthma prevention has been a key public health goal, as signified by the *Healthy People 2010* objectives to reduce asthma deaths, hospitalizations, emergency room visits, and activity limitations¹.

Work-related asthma is the association between asthma symptoms—cough, shortness of breath, wheezing, and/or chest tightness—and work. It includes *work aggravated asthma* or pre-existing or coincidental new onset asthma that is worsened by workplace exposure. Another type of work-related asthma is *occupational asthma*, which is new in onset and that to be caused by work-related exposure. Occupational asthma (OA) includes *hypersensitivity induced OA* which characteristically has a latency period between exposure and symptoms, or *irritant induced OA* which occurs soon after exposure to an irritant fume, vapor, or gas at work. The former type, hypersensitivity induced OA, encompasses 90% of OA².

Several studies have identified cleaning workers as a group at high risk for asthma^{3,4,5,6,7,8}. However, to this writer's knowledge, no studies of cleaning staff have been performed in New York City (NYC). NYC stands as a unique setting for asthma. In addition, the self-reported

¹ Moorman JE et al. National Surveillance for Asthma—United States, 1980-2004. CDC MMWR. Accessed at <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5608a1.htm> on 14 May 2011.

² Nicholson PJ et al. Evidence based guidelines for the prevention, identification, and management of occupational asthma. *Occup Environ Med* 2005; 62: 290-299.

³ Ng TP et al. Risks of asthma associated with occupations in a community-based case-control study. *Am J Ind Med* 1994; 25:709–718.

⁴ Karjalainen A et al. Excess incidence of asthma among Finnish cleaners employed in different industries. *Eur Respir* 2002; 19:90-95.

⁵ Reinisch F et al. Physician reports of work-related asthma in California, 1993-1996. *Am J Ind Med* 2001; 39: 72-83.

⁶ Arif AA et al. Occupational exposures associated with work-related asthma and work-related wheezing among US workers. *Am J Ind Med* 2003; 44:368-376.

⁷ Medina-Ramon M et al. Asthma, chronic bronchitis, and exposure to irritant agents in occupational domestic cleaning: a nested case-control study. *Occup Environ Med* 2005; 62: 598-606.

⁸ Le Moual N et al. Occupational exposure and asthma in 14,000 adults from the general population. *Am J Epidemiol* 2004; 160: 1108-16.

lifetime prevalence of asthma is 12% (significantly higher than the 9.3% cited for the US in the same study)⁹. Among other urban factors, exposure to mouse, cat, cockroach, and dust mite allergens are important predictors of asthma morbidity, and exposures vary by NYC neighborhood¹⁰. Not only are housekeepers exposed to the vapors of cleaning supplies, but they are also potentially exposed disproportionately to household triggers. Prior studies have been performed in more homogenous populations, and it is likely that NYC housekeepers are a more ethnically diverse group, providing more external validity for clinical application.

If NYC housekeepers are found to be at greater risk for asthma, there will be evidence for interventions and policies to work to protect them from further occupational exposures.

B. Study Design and Statistical Analysis

Design

The study will be a retrospective case control study comparing those ‘exposed’--NYC housekeepers—to those ‘not exposed’—NYC home-based childcare givers. A validated survey questionnaire (see appendix) will be administered to obtain demographics and assess asthma symptoms. The survey has been validated against both a methacholine challenge and a physician diagnosis of asthma. The survey will be available in multiple languages to address the diverse population of NYC housekeepers.

Statistical Analysis

Prior studies have an asthma prevalence 1.5 to 4.9 times higher among home cleaners compared to controls^{11,12,13}. To demonstrate an odds ratio of approximately 1.5, using a Chi-squared test, 852 subjects will be required in each study group.

C. Study Procedures

The identified subjects will be given a survey in their primary language. They will be consented and informed that their data they provide will be kept private.

D. Study Drugs

N/A

E. Medical Devices

⁹ New York City Department of Health and Mental Hygiene. Asthma Facts, 2nd Edition. Accessed online on 14 May 2011

¹⁰ Olmedo O, et al. Neighborhood differences in exposure and sensitization to cockroach, mouse, dust mite, cat, and dog allergens in New York City. *J Allergy Clin Immunol* 2011 April 30.

¹¹ Karjalainen A et al. Excess incidence of asthma among Finnish cleaners employed in different industries. *Eur Respir J* 2002; 19:90-95.

¹² Zock et al. Asthma risk, cleaning activities and use of specific cleaning products among Spanish indoor cleaners.

¹³ Medina-Ramon M et al. Asthma, chronic bronchitis, and exposure to irritant agents in occupational domestic cleaning: a nested case-control study. *Occup Environ Med* 2005; 62: 598-606.

N/A

F. Study Questionnaire

The study questionnaire has been adapted from a validated survey of to identify occupational asthma¹⁴. The survey is validated against methacholine challenge and physician diagnosis. Test-retest reliability was 75-94%. Compared to methacholine challenge, the survey has a sensitivity of 71% and specificity of 70%. Compared to physician diagnosis, it has a sensitivity of 79% and specificity of 98%. Thus, the questionnaire has good validity and reliability. The questionnaire was developed for to study occupational exposure in healthcare setting, but can be applied to other occupational settings. The only questions changed were questions related to the type of industry in which the worker works and their title.

G. Study Subjects

Study subjects will be employees over 18 who have been employed at least part time for at least one year in a housekeeping job. Exclusion criteria will include age under 18, less than part time employment, and less than one year working as a housekeeper.

H. Recruitment of Subjects

Subjects will be recruited through NYC workers unions and alliances such as the Latino Worker's Center, Chinese Staff and Worker's Center, Latino Worker's Center, Mexican American Worker's Association, and Workers Awaaz. Subjects will also be recruited at through housekeeping and childcare organizations in NYC, such as New York Domestics Inc, Maid in New York, NY Maids, and Child Care Inc. Leadership of these organizations will be presented with the plans and goals for the study. Study staff will go on site to these organization's offices to deliver surveys in multiple languages.

I. Confidentiality of Study Data

Completed questionnaires will be kept in a locked file cabinet in the study office. Data will be de-identified prior to statistical analysis.

J. Potential Conflict of Interest

N/A

K. Location of Study

The five boroughs of New York City

L. Potential Risks

None

M. Potential Benefits

Data from this study may help towards creating policies that will protect housekeeping employees from occupational exposures.

¹⁴ Delclos GL et al. Validation of an asthma questionnaire for use in healthcare workers. *Occup Environ Med* 2006 Mar; 63(3): 173-9.

N. Alternative Therapies

N/A

O. Compensation to Subjects

None

P. Costs to Subjects

None

Q. Minors as Research Subjects

N/A

R. Radiation or Radioactive Substances

N/A

Appendix:

Survey Questionnaire:

Section I: Trouble Breathing:

1. Have you ever had trouble breathing? (Yes, No, Don't know)
 - a. If yes, what kind of trouble did you have?
 - i. Continuously, as if breathing is not quite right
 - ii. Repeatedly, however gets completely better
 - iii. Only rarely
 - b. If yes, was this trouble with your breathing brought on by your work environment?
(Yes, No, Don't Know)
2. Have you ever had asthma? (Yes, No, Don't know)
 - a. If yes, has your asthma been confirmed by a doctor? (Yes, No, Don't Know)
 - b. If yes, at what age was your asthma confirmed by a doctor?

Section II: Asthma

3. Have you had an attack/episode of asthma in the last 12 months? (Yes, No, Don't know)
 - a. If yes, how many attacks of asthma have you had in the last 12 months?
 - b. Have you had an attack/episode while you were at work in the last 12 months?
 - i. If yes, do you know what triggered the last attack/episode of asthma while you were at work?
 - ii. If yes, what was the trigger?
 - c. Have you had to miss any days of work due to asthma in the last 12 months? (Yes, No, Don't know)
 - i. If Yes, how many days of work did you have to miss due to asthma?

4. Are you currently taking any medications for asthma, including inhalers, aerosols, or tablets? (Yes, No)

Section III: Wheezing, Whistling or Shortness of Breath

5. Have you had wheezing or whistling in your chest at any time in the last 12 months? (Yes, No, Don't know)
- If yes, have you had wheezing or whistling you chest when you did not have a cold in the last 12 months? (Yes, No)
 - Have you had wheezing or whistling in your chest while you were at home (indoors or outdoors) at any time in the last 12 months? (Yes, No)
 - Have you had wheezing or whistling in your chest while you are at work at any time in the last 12 months? (Yes, No)
 - While you were away from work at any time in the last 12 months, was your wheezing or whistling: worse, better, or unchanged? (Worse, Better, Unchanged)
 - After returning to your work at any time in the last 12 months, was your wheezing or whistling: worse, better, or unchanged? (Worse, Better, Unchanged)
 - If you were away from work for 5 or more consecutive days of absence at any time in the last 12 months, was your wheezing or whistling: worse, better, or unchanged? (Worse, Better, Unchanged, Not applicable)
 - When you returned to your work after 5 or more consecutive days of absence at any time in the last 12 months, was your wheezing or whistling: worse, better, or unchanged? (Worse, Better, Unchanged, Not applicable)
 - Have you had to miss days of work due to wheezing or whistling at any time in the last 12 months? (Yes, No)
 - If yes, how many days of work did you miss in the last 12 months?
6. Have you had an attack/episode of shortness of breath at any time in the last 12 months? (Yes, No)
- If yes, have you had an attack/episode of shortness of breath that came on following strenuous activity at any time in the last 12 months?
 - Have you had an attack/episode of shortness of breath at home (indoors or outdoors) at any time in the last 12 months?
 - Have you had an attack/episode of shortness of breath while you are at work at any time in the last 12 months? (Yes, No)
 - While you were away from work at any time in the last 12 months, was your shortness of breath: worse, better, or unchanged? (Worse, Better, Unchanged)
 - After returning to your work at any time in the last 12 months, was your shortness of breath: worse, better, or unchanged? (Worse, Better, Unchanged)
 - If you were away from work for 5 or more consecutive days of absence at any time in the last 12 months, was your shortness of breath: worse, better, or unchanged? (Worse, Better, Unchanged, Not applicable)
 - When you returned to your work after 5 or more consecutive days of absence at any time in the last 12 months, was your shortness of breath: worse, better, or unchanged? (Worse, Better, Unchanged, Not applicable)

- h. Have you had to miss days of work due to shortness of breath at any time in the last 12 months? (Yes, No)
 - i. If yes, how many days of work did you miss in the last 12 months?
- 7. Have you been awakened during the night by an attack/episode of any of the following symptoms in the last 12 months (Indicate Yes or No for each symptom): cough, shortness of breath, chest tightness.

Section IV: Pets, Animals, Allergies

- 8. Do you currently have any of the following pets in your home? (Indicate Yes or No for each): Dog, Cat, Other Pet
- 9. Have you ever lived with the following pets in your home? (Indicate Yes or No for each): Dog, Cat, Other pet.
- 10. Have you ever had any of the following medical conditions? (Indicate Yes or No for each): Nasal or sinus allergies (including hay fever), eczema or any kind of skin allergy, frequent heartburn, more than 6 respiratory infections in one year, allergies to chemicals, allergies to medicines, allergies to animals, allergies to dust or dust mite, allergies to latex or latex-containing products (ace bandages/adhesive tape/condoms/gloves)
- 11. When you are near animals (cats/dogs/horses), feathers (pillows/quilts/duvets), or in a dusty part of the house do you have: get itchy or watery eyes? Get a feeling of tightness in your chest?
- 12. When you are near trees, grass, or flowers, or when there is a lot of pollen around, do you ever get itchy or watery eyes?
- 13. Have any of your immediate family members (parents/siblings/children) had any of the following medical conditions? (Indicate Yes, No, or don't know for each condition): Asthma; hay fever, eczema, or skin allergies.

Section V: House or Apartment

- 14. In your house or apartment, do you use any of the following? (Indicate Yes or No for each item): Gas for cooking or heating? Fireplace? Air-conditioning (central or window unit)?
- 15. Does your house or apartment have any of the following characteristics? (Yes, No Don't know)
 - a. Are there drapes or curtains in any room?
 - b. Is there wall-to-wall carpeting in any room?
 - c. Is your home sprayed for pest control at least every 3 months?
 - d. Are there large visible areas of mold, mildew, or recent water damage?
 - e. Was your house or apartment originally built before 1973?

Section VI: Occupational History

- 16. In which month and year did you begin your current or most recent job?
- 17. In which month or year did you stop working at this job? (or N/A)

18. How many hours per week did/do you usually work on this job, including overtime?
19. During this time, were/are you a student in this job?
20. What kind of business or industry is/was this?
 - a. Commercial cleaning
 - b. Residential cleaning
21. While working at this job, how often, on average, you handled or were exposed to any of the following products? March a X for the single best answer. For each category below, have the choice of "More than once a day", "Every day", "At least once a week", "At least once a month", "Never"
 - a. Disinfectants/Sterilants
 - b. Cleaning agents
 - c. Latex gloves/products
 - d. Aerosolized medications
 - e. Adhesives/removers/glues
 - f. Gases/vapors
22. Is your current or most recent job also your longest held job?
 - a. Yes/No
23. In which month and year did you begin your longest held job?
24. In which month and year did you stop working at this job?
25. How many hours per week did you usually work on this job, including overtime?
26. During this time, were you a student in this job?
27. What kind of business or industry is/was this?
 - a. Commercial cleaning
 - b. Residential cleaning
28. While working at this job, how often, on average, you handled or were exposed to any of the following products? March a X for the single best answer. For each category below, have the choice of "More than once a day", "Every day", "At least once a week", "At least once a month", "Never"
 - a. Disinfectants/Sterilants
 - b. Cleaning agents
 - c. Latex gloves/products
 - d. Aerosolized medications
 - e. Adhesives/removers/glues
 - f. Gases/vapors

Section VII: Accidental Chemical Spill or Gas Release

29. Were you ever involved in an accidental chemical spill or gas release?
 - a. Did this accidental chemical spill or gas release occur at work?
 - b. When did this accidental chemical spill or gas release occur?
 - c. What were you exposed to (please be as specific as possible)?
 - d. How were you exposed (Y/N for each)?
 - i. Breathing
 - ii. Through direct contact with skin
 - iii. Swallowing/ingestion

- e. During this accidental chemical spill or gas release, how long were you exposed?
 - i. Less than 1 hour
 - ii. 1 to 8 hours
 - iii. 9 to 24 hours
 - iv. More than 24 hours
 - v. Don't know / Don't remember
- f. Did you have to receive medical attention because of this accident /exposure?
 - i. Y/N
 - ii. Don't know / Don't remember
- g. In the first 24 hours following this accident/exposure, did you experience any of the following symptoms (Y/N for each)
 - i. Shortness of breath?
 - ii. Wheezing?
 - iii. Cough?
 - iv. Tightness in your chest?

If you answer YES to any of the symptoms above, continue answer the following two questions below, otherwise skip the next two questions and continue

- h. How soon after the accident/exposure did these symptoms occur?
 - i. Less than 1 hour
 - ii. 1 to 24 hours
 - iii. 25 hours to 1 week
 - iv. More than 1 week
 - v. Don't know / Don't remember
- i. How long did these symptoms last?
 - i. Less than 1 week
 - ii. 1 week to 1 month
 - iii. More than 1 month to 3 months
 - iv. More than 3 months
 - v. Don't know / Don't remember

Section VIII: Jobs

30. Think about all of the jobs you have ever had. TO the best of your knowledge have you ever been in contact with any of the following materials at least once a month for a period of 6 months or longer (Y/N for each)

- a. Bleach
- b. Cleaners for room and counter tops
- c. Cleaners/abraisives
- d. Cleaners for restrooms and toikets
- e. Detergents
- f. Disinfectants
- g. Anesthetics
- h. Antibiotics

- i. Antiseptics
- j. Bronchodilators
- k. Iodine (povidone iodine, Betadine *TM*)
- l. Nebulized drugs (like pentamedine or ribavirin)
- m. Talc
- n. Cidex
- o. Cidex OPA
- p. Chloramines
- q. Adhesives or glues
- r. Acetaldehyde
- s. Alkalis
- t. Ethylene oxide
- u. Formalin/formaldehyde
- v. Nitric oxide
- w. Ammonia
- x. Pesticides
- y. Paints (acrylics, stains/varnishes)
- z. Tobacco smoke (including passive)
- aa. Solvents like toluene, xylene, benzene, hexane, mineral spirits, paint thinners
- bb. Toner for copiers or printers

Section IX: Hobbies

31. Have you ever been regularly involved in any of the following hobbies or activities for a period of 3 months or longer (Yes/No):
- a. Refurnishing furniture
 - b. Auto Repair
 - c. Building radios or other electronic equipment
 - d. Metal work including soldering metal (such as jewelry making)
 - e. Painting with acrylics or oil paints
 - f. Gardening/Farming
 - g. Sculpting
 - h. Woodworking
 - i. Hobbies involving the use of glues or adhesives
 - j. Other hobbies/activities (specify)

Section X: Demographics

32. What is your date of birth?
33. What is your gender?
34. Do you consider yourself Spanish/Hispanic/Latino? (Mark the best answer)
- a. No, not Spanish/Hispanic/Latino
 - b. Yes, Mexican, Mexican American, Chicano
 - c. Yes, Puerto Rican
 - d. Yes, Cuban
 - e. Yes, other Spanish/Hispanic/Latino: (specify)

35. What is your race? (mark the best answer)
- a. White
 - b. Black
 - c. Asian, Asian American, Pacific Islander
 - d. American Indian or Alaska Native
 - e. Another race: (specify)
36. What is your standing height?
37. How much do you weigh? (circle: pounds or kilograms)
38. What is the highest grade or level of education that you have completed?
- a. High school graduate or GED
 - b. Some college or vocational/technical training
 - c. 4-year college (bachelor's degree)
 - d. Graduate/medical/law school
39. How many years have you worked as a housekeeper?
40. Have you smoked at least 100 cigarettes during your life (Yes/No)
41. Do you smoke now? (Y/N)
- a. If yes, how many cigarettes do you smoke per day?
 - i. Less than ½ pack
 - ii. ½ to 1 pack
 - iii. >1 pack to 2 packs
 - iv. >2 packs to 3 packs
 - v. More than 3 packs a day?