

## INTRODUCTION

Several occupational research studies have shown some association of excess risk for asthma among cleaning workers (Zock et al., 2002), which has been linked to exposure to chemical cleaning agents (Ramon et al., 2005 and Wolkoff et al., 1998). Further studies also show that exposure may lead to asthma depending on the conditions under which cleaning is performed, such as enclosed areas with less ventilation (Karjalainen et al., 2002 and Zock et al., 2001). Other case studies also show that chemical agents related to asthma are chlorine (bleach) and ammonia (Quirce et al., 2000 and McDonald et al., 2002). It has been noted that, the frequency of exposure to chemical cleaning sprays increases the risk for adult asthma (Zock, 2007). Furthermore, numerous epidemiological studies have identified associations between spray cleaning products and asthma among cleaning workers (Zock et al., 2001 and Nielsen, 1999). In 2006, an international study that was done in Lebanon also associated exposures to household detergents with respiratory and skin health problems (Habib, 2006).

The National Institutes of Health report that sodium hypochlorite (bleach) can affect the nervous system depending on the concentration and length of exposure (NIH, 2010a). Another hazardous chemical commonly used for cleaning is ammonia; through inhalation, ingestion or dermal contact, ammonia has been noted to cause rapid weak pulse, restlessness, and/or bluish color of the lips and fingernails (NIH, 2010b). However, there are safe ways to apply most of these chemicals. These health problems are linked to the application method of the cleaning products. Spraying is noted to cause the chemical to become airborne thereby increasing the likelihood of exposure via inhalation.

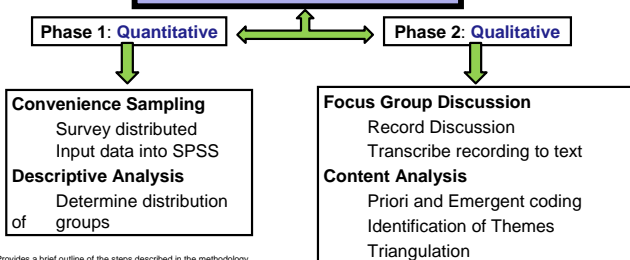
## PURPOSE

Determine which household cleaning application Bulloch county (BC) residents and other campus members may be using and whether they have any concerns related to potential health effects.

## METHOD

According to the Census Bureau, the population of BC in 2009 was 69,213, and the number of households in 2000 was 20,743 (US Census, 2011). Out of that number 360 residents were sampled using Convenience Sampling (Cottrell, 2005 & Amedeo, 2008) where survey questionnaires were distributed to BC residents at Statesboro Church of God, Save-A-Lot, The Spirit & Truth Worship Center, and GSU. The first 20 questionnaires received were used to validate survey questions and the other 340 were used for the main study. The goal was to measure the *quantitative* views of BC residents on cleaning product preferences. Descriptive Analysis was conducted using SPSS in analyzing the of males to female, age groups, educational status, cleaning frequencies, spray-users to that of non-spray-users, powder or liquid-no-spray users participants who read label before buying, participants who wear gloves or/and mask when cleaning, just to name few. In addition, two focus group discussions were held in JPHCOPH to measure the *qualitative* views of BC residents on cleaning product preference and concerns related to cleaning method. Face to face focus group discussions were conducted with five GSU students and five residents. Participation was voluntary, and included six participants who had completed the survey and four participants accepted an invitation letter and volunteered to join. Content analysis of qualitative data was conducted using both a priori and emergent coding (Patton, 2001). Summaries and matrices were used to identify and expand upon themes, which are presented in Tables 1 and 2.

### TWO PHASES OF DATA COLLECTION



## RESULTS

### Quantitative Analysis

From the 340 residents that were sampled, 203(59.7%) were female and 137(40.3%) were male; they fall within the age range of 18 to 41 years and up. The distribution of race and ethnicity was primarily African American 167(49.1%) and White 127(37%). Primary areas of interest ask in the survey questionnaire were spray-liquid usage; cleaning frequency and the use of mask or gloves when cleaning. See below for details.

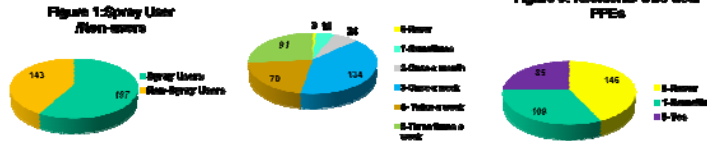


Figure 1: Spray user were 197(57.9%) and non-spray user were 143(42.1%). Figure 2: never clean 3(0.9%), sometimes 165(3%), once a month 247(72.1%), once a week 134(39.4%), twice a week 70(20.6%) and lastly, those who clean three times a week 91(26.8%), Figure 3: Never wear glove/and mask 146(42.9), sometimes 109(32.1%), and those who said the wear were 85(25%)

### Qualitative Analysis

Table 1: Potential Health Risks As Described by Focus Group (FG) Participants

THEME	DESCRIPTION	EXAMPLE
Mixing Cleaners	Exposure to cleaning chemicals and their mixtures causes health effect such as drowsiness and dizziness.	According R1 "I mixed (CLR) accidentally once with Clorox and it kind of did the same thing. I got extremely dizzy". (FG Transcript, p.5)
Not Using PPE	Non-use of PPE increases the risk of exposure effects from cleaning chemical.	S4 stated "I always use face mask and gloves (when cleaning) because I am highly allergic, (causing constant) sneezing". (FG Transcript, p.2)
Exposure to Aerosols from Spray Cleaners	Spraying cleaning products can result in an increase in airborne exposure via inhalation or in the skin.	"I have been using Comet or Vim the powder....throughout my life. It is not the best but it is better than the rest .... because I react so easily to the sprays; like the Clorox and the Oxi-clean have been affecting me a lot so I stop using that completely" (R2). (FG Transcript, p.4)
Acute Exposure Effects	Exposure to cleaning chemicals may cause acute effects such as rash, eye irritation, dizziness, sneezing.	"The smell that got to me made me felt dizzy and drowsy" (R4), R2, after spraying a cleaner I (felt) "pains in my eyes, turn red, I got rashes on my skin". (FG Transcript, p.5&6)

Table 2: Focus Group Participants' Perceptions of Cleaners and Their Use

THEME	DESCRIPTION	EXAMPLE
Eco-products are Safer	Participant view on "Green" cleaning products is that they are safer to use than traditional products.	"I feel like when you are using the eco-friendly products I guess I feel a little bit safer". (S5). (FG Transcript, p.2)
All Spray Cleaners are Similarly Applied	Application of knowledge from previous cleaning products to similar cleaning product types because it is assumed the process is similar.	"I guess I have read the information, and I think I know, when I see a liquid (cleaner) I apply the same knowledge that I have". (R2). (FG Transcript, p.5)
Not Reading Label	Participants do not bother reading label because they believe their choice of cleaners will still work. Others feel the ingredients listed are words they are not familiar with so do not bother to read.	"I don't have time to read nothing because I know it will do the job" (R3). "I mean all those big words how do you know" (S3). (FG Transcript, p.5 & 3).

## PUBLIC HEALTH SIGNIFICANCE

### Public Health Implications from this research:

◆ This research provides a snap-shot view of household cleaner usage in BC including application methods and concern related to potential health effects due to exposure.

◆ This research shows the importance of reading cleaning products and the potential of developing educational materials and presentations for the community on ways to reduce chemical exposure in their homes.

### Implications For Other Public Health Disciplines:

**Community Health** – Aid in the development of educational resources on potential health effects to cleaning chemical exposure, and ways on to reduce exposure.

**Epidemiology**– Initial analysis of household cleaner usage and exposure effects in BC. Explore further research based on previous study results that high asthma risk in present in private home cleaners (Zock, 2001).

**Biostatistics** – This study provides insight on household cleaner usage and exposure effects in BC for further research to be conducted in a more formal study.

**Health Policy and Management** – There are no residential indoor air policies, since it infringes on home privacy act; however there was evidence of exposure effects, which could potentially lead to chronic health effects; students in this concentration could propose a policy where industries would engineer cleaning products that reduces cleaning chemical exposure.

## STRENGTHS & LIMITATIONS

### Strengths

□ Survey questionnaires were validated using KAPPA, since the questions were formulated by the student researcher. The first 20 questionnaires were used for the measure of agreement between participants

□ Researcher was able to sample diverse participants from BC.

□ Using a qualitative data analysis helped to further describe the residents' and students' perceptions of household cleaners and potential risks associated with their use.

### Limitations

□ Lack of random sampling from BC population was due to time and cost constraint.

□ Lack of sampling from the eight additional cities and towns located in BC affects the representativeness of the sample population.

## CONCLUSIONS

□ Among 340 the BC residents that were sampled, 197(57.9%) use only spray liquid, non-spray users were 143(42.1%). Thus a large amount of our sample population uses spray cleaners, supporting the need to educate BC residents on ways to apply spray cleaners with less exposure risks.

□ The sample population did not have any direct concerns with regard health effects associated with the use of cleaners, but other related concerns were lack of windows in bathrooms, non-effectiveness of ventilation systems, and cleaning products that said they are safe to use around children.

□ The method of sampling is probably not the best approach for this study, a random sampling approach would have been ideal. However, haphazard sampling helped in describing and characterizing what the 340 participants from BC thought about their choice of household cleaning products and other related concerns. The next step is to seek funding to obtain equipment to measure spray and powder aerosols before, during and after cleaning in an enclosed space, such as the bathroom. Doing this would help to determine the exact concentration of all chemical compounds and likely exposure routes.

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