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**Development of an Educational Package Regarding Reproductive Environmental  
Health for Nurses and Patients**

**By**

**Donna Ammons MSN, RN**

**A SCHOLARLY PROJECT**

**Submitted in partial fulfillment of the requirements for the  
Degree of Doctor of Nursing Practice**

**to**

**The School of Graduate Studies**

**of**

**The University of Alabama in Huntsville**

**HUNTSVILLE, ALABAMA**

**2017**

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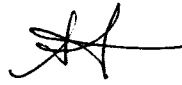
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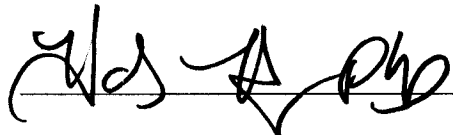
Submitted by Donna Ammons in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice and accepted on behalf of the Faculty of the School of Graduate Studies by the scholarly project committee.

We, the undersigned members of the Graduate Faculty of The University of Alabama in Huntsville, certify that we have advised and/or supervised the candidate on the work described in this scholarly project. We further certify that we have reviewed the scholarly project manuscript and approve it in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice.

4/4/2017 Anita Amur Committee Chair  
(Date)

for Darlene Showalter 

 Program Director

 College of Nursing Associate Dean

Margaret N. Adams College of Nursing Dean

 4/11/17 Graduate Dean

## ABSTRACT

The School of Graduate Studies  
The University of Alabama in Huntsville

Degree: Doctor of Nursing Practice \_\_\_\_\_ College: Nursing

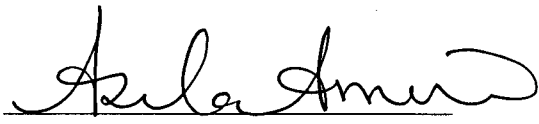
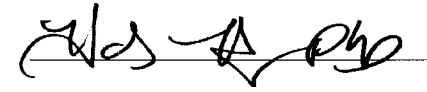
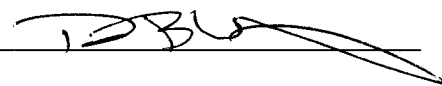
Name of Candidate: Donna Ammons

Title: Development of an Educational Package Regarding Reproductive Environmental  
Health for Nurses and Patients

**Objectives:** To identify common behaviors, attitudes, and practices that expose pregnant women to indoor air pollutants. **Design:** A mixed method study was conducted. **Setting:** Data was collected from the South Georgia Outpatient Obstetrical Practice. **Participants:** Prenatal low-risk OB antepartum/ postpartum patients. **Methods:** Participants were selected through convenience sampling method and from the preliminary study that had measured the level of indoor air pollutants in the home. The participants completed phone interview that asked 12 open ended questions, which addressed the patient's knowledge, practice and attitudes/behaviors about indoor air pollutants and their sources.

**Results:** Twenty pregnant women were interviewed. 70% had no knowledge of all the products used in the home that increases the indoor air pollutants. 50% of the patients stated that they did not know what chemicals are safe to use. 85% of the patients used some types of air fresheners or sprays in the home to prevent odors. 45% of the patient used candles and candle burners. The sources of pollutants were personal items, such as hair sprays, perfumes, nail polish and house cleaning supplies such as bleach detergents

and dryer sheets. 65% purchased baby furniture or painted and installed new carpet in the newborns nursery during pregnancy. **Conclusion:** Pregnant women have very little knowledge about the exposure to indoor air pollutants and how it may impact the pregnancy outcomes. They are also unaware of practices to reduce the level of pollutants in the home.

Abstract Approval: Committee Chair   
Program Director   
Graduate Dean 

## **ACKNOWLEDGMENTS**

I acknowledge the valuable contribution of UOG Obstetrical and Gynecology practice of Tifton Georgia, for supporting the efforts to provide an outstanding preceptor Linda Riffle CNM, and for the assistance and valuable input on the educational and assessment tool development. I would also like to acknowledge all the pregnant women for their participation.

**TABLE OF CONTENTS**

**SECTION I: SCHOLARY PROJECT**

I. Identification of Problem.....8

II. Clinical Question.....14

III. Conceptual Framework.....15

IV. Review of Literature.....17

**SECTION II: SCHOLARY PROJECT PRODUCT**

Journal of Obstetric, Gynecological & Neonatal Nursing.....22

I. Introduction.....26

II. Methocology.....30

VI. Data Analysis.....31

V. Results.....33

VI. Discussion.....37

References.....39

Tables 1.....32

Tables 2.....34

Tables 3.....35

Tables 4.....36

Figures 1.....16

Figures 2.....17



## Appendices

- IRB Approval
- Approval letter from agency
- Environmental Assessment Tool
- Environmental Educational Tool
- JOGNN Guidelines for Authors

## **Development of an Educational Package Regarding Reproductive Environmental Health for Nurses and Patients**

The average person is unknowingly exposed to many potentially harmful indoor air and outdoor pollutants. In the past 30 years, there has been a surge in exposure to toxic environmental chemicals (P. M. Sutton, Giudice, & Woodruff, 2016). The pregnant population and newborns are especially susceptible to the harmful effects of exposure to these toxins. Research continues to show a disproportionate exposure rate and adverse effects on the reproductive health of vulnerable populations and underserved women (A.C.O.G, 2013). Some of these adverse effects include infertility, an increase of stillbirths, congenital anomalies, low birth weights, and preterm births (A.C.O.G., 2013). According to one study, exposures during pregnancy and breastfeeding are a threat to healthy human development, especially if it occurs during vulnerable times in fetal development (Di Renzo et al., 2015). Exposures to pollutants, such as pesticides, toluene, lead ozone, nitrogen dioxide, phthalates, and cigarettes smoke are also pervasive in all aspects of the patient lives. These chemicals can cross the placenta and accumulate in the fetus resulting in a higher fetal exposure than maternal exposure. Some of these exposures can be linked to health conditions that can cross over to the next generation (ACOG, 2013).

Because prenatal fetal growth and preterm delivery have been a leading cause of infant mortality worldwide and there is increased amount literature leading to environmental indoor pollutants exposure having a significant impact on the health of the mother and the fetus, maintaining a healthy environment is central to improving the outcomes of the unborn fetus and the mother (Eskenazi et al., 2013). Pregnant women

spend most of their time at home, work, or school. In some of these environments, the expectant mother can be exposed to a number of different indoor air pollutants. Some of these elements come from household cleaning products, solid fuels used for heating and cooking, formaldehyde, personal care products like perfume and makeup, and the biggest pollutant; cigarette smoke. (Di Renzo et al., 2015) Indoor air contaminants are found to be much higher indoors than outdoors. Higher indoor air contaminants concentrations mean the patients have higher health risk.

Healthcare professionals should address health problems related to the environment to prevent problems that may affect the pregnancy outcomes. If clinicians lack awareness and knowledge regarding environmental air pollutants, the issue will not be discussed with obstetrical patients or with gynecology patients in the preconception period.

There are a number of indoor air pollutants that impact pregnant patients and their developing fetus. These pollutants can affect the unborn fetus immune development during the pregnancy and the early postpartum period, which could lead to a host of diseases that could impact the childhood into adult hood. Asthma ,allergies, and immune deficiency as well as some neurodevelopment could occur before birth (Hertz-Picciotto et al., 2008). In addition, certain exposure to these pollutants in the prenatal patient has been linked to increased risk of childhood cancer and can also cross the placenta and put the fetus at risk. (A.C.O.G, 2013) As the reproductive process involves the construction of new cells, these chemicals can disrupt processes involving low birth weight and neurocognitive development. (Vafeiadi et al., 2014).

Volatile Organic compounds (VOC's) are present in the form of organic solvents.

These compounds are emitted from certain solids and liquids into the air from a wide variety of products in the home. Concentration of VOC' is consistently higher indoors than outdoors (Ghosh, Wilhelm, & Ritz, 2013). VOCs are a prominent component of many products used in the kitchen, bedroom, and bathroom. VOCs are compounds which can change effortlessly into gas (Adgate et al., 2004). Hexane, ethylbenzene, *o*-xylene, D-Limonene, formaldehyde, acetone, propanol and hexanal are found in products created for household use, personal use and even office space (Kotzias, 2005). The National Institute of Environmental Health Sciences (NIEHS) reports that these compounds are small and able to disrupt the endocrine system by mimicry of the hormonal system thus disrupting biological processes, including male reproductive and immune system processes. (National Institute of Environmental Health Sciences, 2010).

Formaldehyde is another pollutant found in the homes of the patients (Amiri et al., 2015). This pollutant is a colorless strong smelling chemical that is vaporized from products in a room temperature, a process called off gassing. These chemicals were found in newly purchased furniture, materials used for house renovations, new carpets adhesives, flooring finishing, paints, and certain cosmetics and hair products (Ghosh et al., 2013). Exposure to formaldehyde may result in small biparietal diameter during the second trimester, which may lead to preterm birth, low birth weight, as well as possible congenital malformation (Amiri et al., 2015). This pollutant can also affect the fetus development. (Hertz-Picciotto et al., 2008)

One important source of indoor pollutants and the most widely studied is environmental tobacco smoke (ETS) (Kadir et al., 2010; Nieuwenhuijsen, Dadvand, Grellier, Martinez, & Vrijheid, 2013). Tobacco smoke is known to be composed of more

than three thousand different chemical compounds (Kadir et al., 2010). Exposure to ETS in the pregnant women has been associated with reduction in mean birth weights, increased risk of low birth weight, increased problems with the placenta, significant risk of stillbirth and increased congenital anomalies (Nieuwenhuijsen et al., 2013). Tobacco smoke has also been implicated in the cause of brain and central nervous system tumors.

Another source of indoor air pollutants are the household cleaning products, like window cleaner and bleach that if mixed with other cleaners like disinfectants, the combination produces a toxic gas that if inhaled puts the regular user at risk, much more so in the pregnant woman (Kay, 2012). Because these products frequently change packaging, and instructions for use vary from product to product, it makes it very difficult for users to determine how to safely use products. Most of these products contain formaldehyde, acetone, ethyl alcohol, butane, *p*-dichlorobenzene, and chloroform that are known to cause hormonal abnormalities, reproductive problems and birth defects (A.C.O.G, 2013; De Coster & van Larebeke, 2012). When used these items can be volatile and release chemicals in the environment. Through inhalation these chemicals get mixed into the bloodstream. Although, the mechanism of action is not clear, some studies show that the chemicals interfere with some physiological pathways, for example they may alter levels of hormones and cause birth defects (Kelly et al., 2012) or change the oxygenation process in the placenta, and result in low birthweight or premature birth (Kannan, Misra, Dvonch, & Krishnakumar, 2006).

Personal care products are another source of air pollutants found in the home, such as perfume and body sprays, nail polish, hair products and cosmetics, which contain VOC's (Wolff, Buckley, Engel, McConnell, & Barr, 2017). New furniture and carpets

can be another source of indoor pollutants. Many manufacturers use formaldehyde in the production of these products (Amiri et al., 2015). As a result, “off-gassing” occurs, exposing pregnant women to formaldehyde, which can cross into the placenta (Pope, Mishra, Thompson, Siddiqui, et al., 2010). In the sensitive pregnant populations, formaldehyde has been found to be associated with congenital malformation and premature births (Duong, Steinmaus, McHale, Vaughan, & Zhang, 2011).

The vulnerable population of women and children are exposed to indoor pollutants in the home, school, workplace, and neighborhood each year. Despite the U.S. having the most advanced technology for maternity and prenatal health, adverse outcomes do not seem to be improving; preterm deliveries, fetal growth retardation, low birth weights, and numerous congenital abnormalities are still occurring (A.C.O.G, 2013). Environmental and indoor pollutants have been identified as playing a significant role in the health and wellbeing of pregnant women, unborn fetuses and newborns (Nieuwenhuijsen et al., 2013). Because exposure to indoor air pollutants has a noteworthy effect on fetal development during early development, it is important to educate the patient on the dangers of such pollutants before pregnancy as the damage can already be done by the time a woman knows she is pregnant and seeks prenatal care (Sutton, Stotland, & Miller, 2012). Pregnant women and those planning to become pregnant may not be aware of potential adverse effects to the wellbeing of a fetus if exposed to indoor air pollutants or may be knowledgeable but not aware of how to reduce exposure.

Looking at some of the current practices and attitudes of pregnant women around chemical exposures, one common practice is that pregnant women think if their doctor or

nurse doesn't explicitly tell them to avoid something it's probably safe. Most expectant patients know about the problems with smoking during pregnancy or being around second hand smoke. Very few patients are aware of potential harm caused by certain chemicals from products in the environment, such as household cleaning products and personal care items. There are many pregnant women that don't have access to basic information on how to protect themselves and their unborn child from exposures to toxic chemicals. One practice that is very common among pregnant women is that all products are safe if they are on the shelf and sold to consumers. One practice that was very consistent with pregnant women is making sure some type of fragrance spray, candle, or fragrance burner was utilized to make the house smell good. Another common practice is remodeling, renovations, painting and purchasing new baby furniture. Pregnant patients are unaware of the health effects on the newborn and fetus when exposed to certain chemicals.

Providers could play a critical role in providing education to pregnant patients and identifying those who might be at increased risk for exposure to toxic chemicals. Some of the providers may lack knowledge about specific exposure risk and how to advise them on reducing exposures and obtaining an environmental assessment

### **PICO Question**

The last few years have seen an increased focus on environmental toxin exposure and reproductive health (A.C.O.G, 2013). The clinical question for this project was to determine how nurses can help pregnant women decrease exposure to indoor pollutants. This project assessed the educational needs, attitudes, and common practices of pregnant women and developed an indoor environmental assessment tool and educational tool for

use by reproductive professionals for use with pregnant patients.

Can I develop an educational package (intervention) to 1) encourage healthcare providers (population A) to assess indoor air exposure (clinical problem) in clinics AND 2) increase pregnant women's (population B) awareness toward household activities that escalate exposure to indoor air pollutants (outcome)?

### **Purpose**

The purpose of this project is to reduce pregnant and postpartum women's exposure to indoor air pollutants.

### **Objectives**

- To develop an assessment tool that identifies common behaviors, attitudes and practices that expose pregnant women to indoor air pollutants to be utilized by the healthcare providers.
- To develop an educational tool for pregnant women to influence changes in behaviors and reduce exposure to harmful indoor air chemicals.

### **Conceptual Framework**

The theory of planned behavior, proposed by Icek Ajzen in 1991, states that behavior can be determined by intentions which are influenced by attitudes toward a particular behavior, subjective norms, and perceived behavioral control (Figure 1). The theory of reasoned action serves as a useful model because it can assess whether "pregnant patients" behavior of intention to reduce indoor air pollutants' can be influenced by attitude, general knowledge, and specific practices. When making choices about certain products that expose the patient to pollutants, will the knowledge of what they know about the chemical influence the behavior change. Will they be influenced by



outside sources family or friends? If the patient determines that making the changes is in the best interest of her unborn fetus or infants well being the intention to change behavior is most likely to happen. The patient's belief will be influenced by what others think about making these needed changes. Together the patient will use their own beliefs and the opinions of others, "family", prior to changing behavior. By examining pregnant patient's attitudes and knowledge of indoor pollutants and the healthcare professionals are able to promote a change in the behavior of the patients. The information can then be used to develop an assessment tool and a educational tool for use by reproductive healthcare workers in identifying and educating pregnant patient about the effects of indoor air pollutants (Figurer 2).

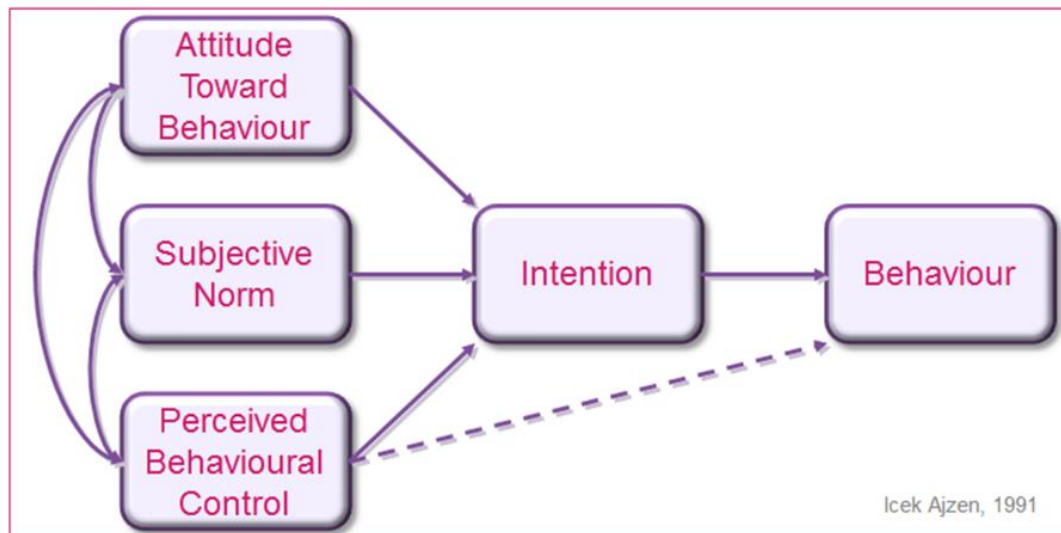


Fig1. Icek Ajzen Theory

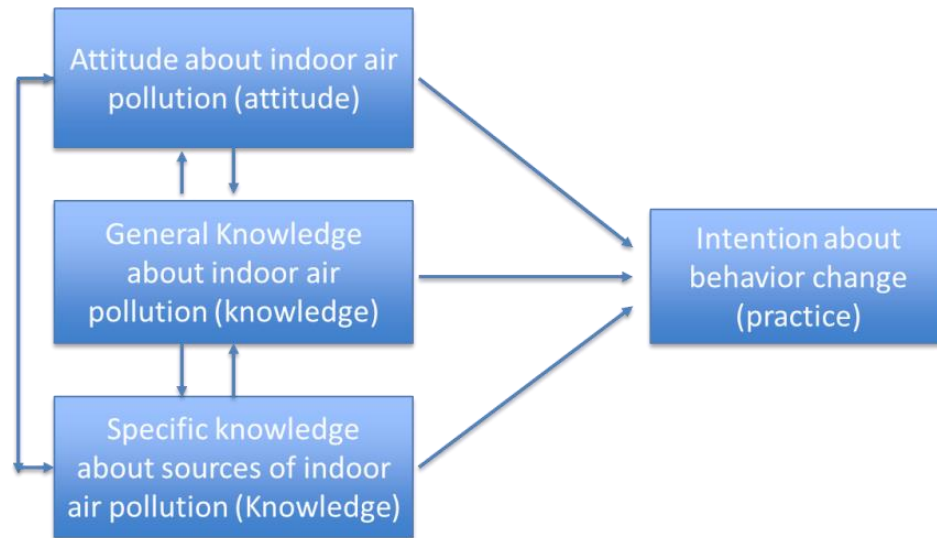


Fig2. Conceptual Framework

### Literature Review

A literature search was conducted using PubMed, Ebsco, CINHAL, and OVID databases. The search terms used were indoor air pollutants, environmental toxins, reproduction health, environmental exposure, congenital abnormalities, stillbirths, pregnancy, vulnerable population and birth weight. The types of studies included meta-analysis, cohort studies, and qualitative studies.

There are numerous studies that have examined the effects of outdoor air pollution on birth outcomes. There has been very little attention around environmental health and the effects of residential indoor air quality and its relationship to pregnancy outcomes. Indoor air quality is not only impacted by intrusion of outdoor pollutants but also by the indoor sources such as off gassing of chemicals from household cleaners, personal items, new furniture, and paints (Ghosh et al., 2013).

Woodruff (2010) found that nearly every woman in the United States was exposed to at least 43 different toxins during their pregnancy, and some of those included substances can cross the placenta, like methyl mercury, volatile organic compounds

(VOC's) compounds, (ETS) environmental second hand smoke which can accumulate in the fetus resulting in higher exposure. The exposure of these chemicals has been considered in relation to reproductive health and has had effects of developmental interruptions in fetuses. Neurodevelopment defects, lower birth weight, preterm birth; congenital malformations and kidney damage were among the assaults mentioned for the fetus that had been exposed to these chemicals (Vrijheid, Casas, Gascon, Valvi, & Nieuwenhuijsen, 2016).

A study done in India looked at the relationship between household use of cooking fuels such as liquid petroleum, gas, electricity, and, kerosene and the risk of stillbirth. The results of the study showed that women that cooked with firewood or kerosene were more likely to deliver a stillborn than the pregnant patients that cooked with electricity. Conclusion was that 12% of the stillbirths in India could be prevented if patients had access to clean cooking fuel such as electricity (Lakshmi et al., 2013).

Maternal asthma and air pollutants have been looked at independently when associated with preeclampsia. A comprehensive study looked at the relationship of air pollution exposure and preeclampsia among women with or without asthma in the United States. They found that preeclampsia is more common in women with asthma.(Mendola et al., 2016)

The increasing awareness of air pollutants has shown alarming contribution to adverse healthcare outcomes. Backes, Nelin, Gorr, and Wold (2013) in a mini review summary studied harmful effects of air pollution and its effects on the developing fetus and infant. The developing fetus is very vulnerable to toxic substances that disrupt the efficiency of placental functions. Placental dysfunctions and intrauterine growth

restrictions (IUGR) are associated with a higher incidence of low birth weights and premature delivery. The summary of the review of literature finding was consistent with the growing body of knowledge. When the fetus and or newborn is exposed to air pollutions even in small amounts, it can alter the placenta development and can dramatically influence fetal growth and development.

Barksdale et al. (2016) studied the exposure assessments tools for measuring volatile organic compounds (VOC). These different measuring techniques such as environmental sampling, biomarkers, questionnaires, and observations all have disadvantages and advantages. The study identified that exposure assessments studies can be challenging and they could also be done using a variety of methods. It was noted that only interview questions and observation data can identify the likely source of exposures to these chemicals (Boyle et al., 2016).

Dodson et al. (2012) discussed the need to raise concerns about endocrine disruption and asthma resulting from exposure to chemicals in consumer products. The need is for better labeling of chemicals that are in products and testing these products for chemicals that may be harmful. The objective to the study was to analytically quantify endocrine disruptors and asthma related chemicals in a range of cosmetics, personal care products, cleaners, sunscreens and vinyl products. The method utilized was to select 213 products that represented 50 product types. They then tested 42 composited samples of high-market-share products, and then they tested 43 alternative products that were identified as products that had limited chemical compounds and were selected because their labels indicated that they might be free of the chemicals of concern. They found fifty-five compounds in these products indicating a wide range of exposure from common

products. The chemicals came from vinyl products, fragranced products (e.g., perfume, air fresheners, and dryer sheets) and from sunscreens. Many chemicals that were detected were not in the product labels. There were 66 chemicals identified as endocrine disruptors and asthma associated chemicals. The highest number of compounds/chemicals detected was in fragranced products. Disclosure of product ingredients would enable researchers to identify exposures for study and risk evaluation and allow consumers to make decisions with their personal values (Dodson et al., 2012).

## **Section II**

## **I. The Journal of Obstetrical, Gynecologic, & Neonatal Nursing**

### **A. Journal Scope**

The Journal Of Obstetrical, Gynecologic, & Neonatal Nursing is a peer-reviewed journal, that reflects practice, research, policies , opinions, and trends in the care of women, childbearing families, and newborns.

### **B. Journal Aim**

The journal presents the scholarship that is the driving force behind nursing practice.

Title: Development of Assessment and Educational Tool on Indoor Air Pollutants for  
Use With Pregnant Women



## Abstract

**Objectives:** To identify common behaviors, attitudes, and practices that expose pregnant women to indoor air pollutants. **Design:** A mixed method study was conducted. **Setting:** Data was collected from the South Georgia Outpatient Obstetrical Practice. **Participants:** Prenatal low-risk OB antepartum/ postpartum patients. **Methods:** Participants were selected through convenience sampling method and from the preliminary study that had measured the level of indoor air pollutants in the home. The participants completed a phone interview that asked 12 open-ended questions, which addressed the patient's knowledge, practice and attitudes/behaviors about indoor air pollutants and their sources. **Results:** Twenty pregnant women were interviewed. 70% had no knowledge of all the products used in the home that increases the indoor air pollutants. 50% of the patients stated that they did not know what chemicals are safe to use. 85% of the patients used some types of air fresheners or sprays in the home to prevent odors. 45% of the patient used candles and candle burners. The sources of pollutants were personal items, such as hair sprays, perfumes, nail polish and house cleaning supplies such as bleach detergents and dryer sheets. 65% purchased baby furniture or painted and installed new carpet in the newborns nursery during pregnancy. **Conclusion:** Pregnant women have very little knowledge about the exposure to indoor air pollutants and how it may impact the pregnancy outcomes. They are also unaware of practices to reduce the level of pollutants in the home.

### Key Words

Indoor air pollutants, environmental toxins, reproduction health, environmental exposure, congenital abnormalities, stillbirths, pregnancy.

**Précis:** Pregnant women lack the knowledge pertaining to indoor air pollutants that could impact the pregnancy. Prenatal and postpartum patients need to be assessed for the type of chemical they are exposed to in the home and how to reduce their exposures.

**Callouts:**

- Exposure to indoor air pollutants has noteworthy effect on fetal development.
- The obstacles healthcare professionals encounter include the inability to find tools that can communicate ways to reduce or avoid exposures during the pregnancy.
- Development of an assessment and educational tool can be used by health care providers to assess and educate pregnant and postpartum patient on how to reduce to unsafe indoor air pollutants.

## **Introduction**

Identifying the source of these indoor air pollutants is an important first step in the fight to reduce the harmful effects of these exposures. Once the source has been identified, steps need to be taken to educate pregnant clients to remove or reduce their exposure to the pollutants (P. Sutton et al., 2012). It is very important for health care providers to become knowledgeable about toxic indoor air pollutants (American Lung Association, 1994). The obstacles healthcare professionals encounter include the inability to find tools with which to identify risks and exposures, tools that can communicate ways to reduce or avoid exposures and evidence based guidelines with which to counsel (Stotland et al., 2014). With the emergence of new chemicals entering the environment so frequently and lack of regulations to limit this process, it is important to educate the patient on how to assess what is safe to use and what is not safe (A.C.O.G, 2013; P. Sutton et al., 2012) . Additional time must be spent in office visits on addressing what should be done to reduce the exposures to indoor air pollutants and how to deal with the outcomes of exposure to these pollutants.

Healthcare professionals should address health problems related to the environment to prevent problems that may affect the pregnancy outcomes. If clinicians lack awareness and knowledge regarding environmental air pollutants, the issue will not be discussed with obstetrical patients or with gynecology patients in the preconception period.

There are a number of indoor air pollutants that impact pregnant clients and their developing fetus. These pollutants can cross the placenta and affect the unborn fetus immune development during the pregnancy and the early postpartum period, which could

lead to a host of diseases that could impact the childhood into adult hood. Asthma, allergies, and immune deficiency as well as some neurodevelopment disorders could occur (Hertz-Picciotto et al., 2008). In addition, certain exposure to these pollutants in the prenatal patient has been linked to increased risk of childhood cancer (A.C.O.G, 2013). As the reproductive process involves the construction of new cells, these chemicals can disrupt placental oxygenation and processes involving low birth weight and neurocognitive development. (Vafeiadi et al., 2014). The National Institute of Environmental Health Sciences (NIEHS) reports that environmental pollutants are small and able to disrupt the endocrine system by mimicry of the hormonal system thus disrupting biological processes, including male reproductive and immune system processes (National Institute of Environmental Health Sciences, 2010).

Volatile organic compounds (VOC's) are present in the form of organic solvents. These compounds are emitted from certain solids and liquids into the air in room temperature from wide variety of products in the home. VOCs are compounds, which can change effortlessly into gas (Adgate et al., 2004). Concentration of VOC' is consistently higher indoors than outdoors (Ghosh et al., 2013). Formaldehyde is another pollutant found in the homes (Amiri et al., 2015). This pollutant is a colorless strong smelling chemical that is vaporized from products in a room temperature.

VOCs were found in newly purchased furniture, materials used for house renovations, new carpets adhesives, flooring finishing, paints, and certain cosmetics and hair products (Ghosh et al., 2013). VOCs are a prominent component of many products used in the kitchen, bedroom, and bathroom. Hexane, ethylbenzene, *o*-xylene, D-Limonene, formaldehyde, acetone, propanol and hexanal are some examples of VOCs

which can be found in building materials and household and personal care products (Kotzias, 2005). Exposure to formaldehyde may result in small biparietal diameter during the second trimester, which may lead to preterm birth, low birth weight, as well as possible congenital malformation (Amiri et al., 2015). This pollutant can also affect the fetus development (Hertz-Picciotto et al., 2008). Another source of indoor air pollutants are the household cleaning products, like window cleaner and bleach that if mixed with other cleaners like disinfectant, the combination produces a toxic gas that if inhaled puts the regular user at risk, much more so in the pregnant woman (Kay, 2012). Because these products frequently change packaging, and instructions for use vary from product to product, it is very difficult for users to determine how to safely use products. Most of these products contain formaldehyde, acetone, ethyl alcohol, butane, *p*-dichlorobenzene, and chloroform that are known to cause hormonal abnormalities, reproductive problems and birth defects (A.C.O.G, 2013; De Coster & van Larebeke, 2012). When these items are used, they can be volatile and release chemicals in the environment. Through inhalation these chemicals get mixed into the bloodstream. Although, the mechanism of action is not clear, some studies show that the chemicals interfere with some physiological pathways, for example they may alter levels of hormones and cause birth defects (Kelly et al., 2012) or change the oxygenation process in the placenta, and result in low birthweight or premature birth (Kannan et al., 2006).

Personal care products are another source of air pollutants found in the home; perfume and body sprays, nail polish, hair products and cosmetics contain VOC's (Wolff et al., 2017). New furniture and carpets can be another source of indoor pollutants. Many manufacturers use formaldehyde in the production of these products (Amiri et al., 2015).

As a result, “off-gassing” occurs, exposing pregnant women to formaldehyde, which can cross into the placenta (Pope, Mishra, Thompson, Siddiqui, et al., 2010). Formaldehyde has been found to be associated with congenital malformation and premature births (Duong et al., 2011).

The vulnerable population of women and children are exposed to indoor pollutants in the home, school, workplace, and neighborhood each year. Despite the U.S. having the most advanced technology for maternity and prenatal health, adverse outcomes do not seem to be improving; preterm deliveries, fetal growth retardation, low birth weights, and numerous congenital abnormalities are still occurring (A.C.O.G, 2013). Environmental and indoor pollutants have been identified as playing a significant role in the health and wellbeing of pregnant women, unborn fetuses and newborns (Nieuwenhuijsen et al., 2013). Because exposure to indoor air pollutants has a noteworthy effect on fetal development during early development, it is important to educate the patient on the dangers of such pollutants before pregnancy as the damage can already be done by the time a woman knows she is pregnant and seeks prenatal care (Sutton, Stotland, & Miller, 2012). Pregnant women and those planning to become pregnant may not be aware of potential adverse effects to the wellbeing of a fetus if exposed to indoor air pollutants or may be knowledgeable but not aware of how to reduce exposure.

Looking at some of the current practices and attitudes of pregnant women around chemical exposures, one common practice is that pregnant woman think, if their doctor or nurse doesn't explicitly tell them to avoid something it's probably safe. Most expectant patients know about the problems with smoking during pregnancy or being around

second hand smoke. Very few patients are aware of potential harm caused by certain chemicals from products in the environment, such as household cleaning products and personal care items. There are many pregnant women that don't have access to basic information on how to protect themselves and their unborn child from exposures to toxic chemicals. One practice that is very common among pregnant women is that all products are safe if they are on the shelf and sold to consumers. One practice that was very consistent with pregnant women is making sure some type of fragrance spray, candle, or fragrance burner was utilized to make the house smell good. Another common practice is remodeling, renovations, painting and purchasing new baby furniture. Pregnant patients are unaware of the health effects on the newborn and fetus when exposed to certain chemicals.

Providers could play a critical role in providing education to pregnant patients and identifying those who might be at increased risk for exposure to toxic chemicals. Some of the providers may lack knowledge about specific exposure risk and how to advise them on reducing exposures and obtaining an environmental assessment. The purpose of this project is to reduce pregnant and postpartum women's exposure to indoor air pollutants.

### **Methodology**

The project was initiated following approval from the University of Alabama in Huntsville (UAH) Institutional Review Board (IRB). The project was conducted in its entirety at three private Obstetrical Outpatient clinics owned by the same group located in Georgia. This study was continuation of a preliminary study, conducted in Spring-Fall 2016, to measure the indoor VOCs levels in pregnant women's dwellings. In the preliminary study, indoor VOCs measured by passive monitors in 54 pregnant women's

living room and bedroom. From the group of participants who participated in the preliminary study, 20 women who had different levels of VOCs and agreed to participate in a phone interview were selected for this project.

The inclusion criteria for the project were women who participated in the initial study that provided a measure of the levels of VOCs with results available at the time of interview, were postpartum/or breastfeeding, were at least 19 years old, were able to read and speak English and self-reported as a non-smoker. Exclusion criteria included pregnant women less than 19 years old, had high-risk pregnancy, were alcohol or substance abusers, reported as a smoker, and does not read or write English.

A questionnaire, which includes 12 open-ended questions (Table 1 & Attachment B), was developed to obtain the patient's knowledge, attitude, and practices regarding exposure to indoor air pollutants. Specific questions targeting selected exposures were drawn from the previous study results that measured certain chemical levels in the home. The patients were asked specific questions to determine what they knew about environmental indoor air pollutants. Phone interviews were conducted December 20<sup>th</sup>, 2016 through February 3, 2017. Phone interviews were recorded and responses were documented verbatim. All patients were given a small incentive gift valued at ten dollars for participating in the interview.

### **Data Analysis**

Statistical analysis was performed using the Statistical Package for the Social Sciences (SSPS) version 24.0. Demographic data were analyzed to describe sample characteristics such as age, marital status, race, employment status, education, family income and gestational age during the initial implementation of the project. Data were



analyzed using descriptive analysis of selected variables. The patient's interview questions were analyzed using frequency distribution of common theme responses.

<i>Table 1. Indoor Air Pollutant Questionnaire</i>
1. Do you have any health issues in your family?
2. Do you live with anybody that smokes in your home? Can you do anything to stop them from smoking in the home?
3. There have been several indoor air pollutants identified in your home from the VOC and FA monitoring. What are some of the products you commonly use in your home?
4. Do you know what products you use in your home that could increase your exposure to chemicals?
5. Are there any products that you use in your home that you think are unsafe?
6. When did you first start using products with chemicals in your home? How did you learn about these products with chemicals? How did you know the products with chemicals were safe to use?
7. Do you think that you could change the type of products you use in the home i.e. air fresheners, candles, house cleaners, and personal items to reduce your level of exposure to pollutants in your home? If no, why would you not make these changes? What would be the process for making these changes? What would be some of the challenges you would face making these changes?
8. Did you have any house renovations, purchase of new furniture, painting or recent move into a new home during your pregnancy? Did you know that these changes can increase your level of exposure to chemicals?
9. These are a list of some indoor air pollutants found in your home. Are you aware of the names of any of these chemicals?
10. Do you have house plants in your home? If no, why not?
11. Do you open your windows, or doors to let fresh air in your home? If no, why not?
12. Did you know that opening windows and having houseplants could reduce the level of indoor air pollutants in your home?

## **Results**

### **Demographics**

Table 2 depicts the demographic data of the sample. The sample consisted primarily of pregnant females that were 19 to 28 years of age (70%) of primarily Caucasian decent (55%). A majority of the pregnant woman (50%) were unemployed. The education range of participants was more diverse with most participants having completed high school or GED (35%), having an Associate's degree (20%), or having a Bachelor's degree or higher (30%). The family income level of the participants was very low; 60% had income levels of \$30,000 or less annually. Most the pregnant women (65%) were greater than thirty-eight weeks' gestation during the beginning of the project. The family health issues reported during the interview were illnesses such as allergies (30%), asthma (15%), ADHD (5%), hypertension (10%), and other medical conditions (15%). Smoking continues to be a health issue among participants; 30% of the pregnant women stated they lived with a smoker and 33% of these smokers continued to smoke in the home even after being asked to avoid smoking in the home.

Table 3 addresses the patient's knowledge level regarding the use of specific indoor air pollutants. A majority the participants (50%) where aware of the increased exposure from cleaning products such as bleach, window cleaners and house cleaning items. Only (25%) identified personal care items such as hair sprays, perfumes and nail polishes as a chemical that increased exposure levels. Less than (10%) had no knowledge of what products could expose them to increased levels on indoor air pollutants.

Considering the level of pollutants in each individuals' home, measured in the preliminary study, the participants were asked to list products that are used in the home that would correlate to these pollutants. As shown in Table 3 (85%) of participants used

Variable		n	%
Age	18 to 25 years	10	50
	26 to 28 years	4	20
	29 to 33 years	6	30
Marital Status	Married	8	40
	Single-divorced	2	10
	Single-never married	8	40
	Living with partner	2	10
Race	Black/African American	6	30
	White/Caucasian	11	55
	Hispanic/Latino	2	10
	Other	1	5
Employment status	Employed Full time	6	30
	Employed Part time	4	20
	Not-Employed	10	50
Education Level	High School or less	6	30
	GED	1	5
	Some College	2	10
	Two Year College Graduate	4	20
	Four Year College Graduate	5	25
	Post Graduate	1	5
	Other	1	5
Family Income Level	Less than \$10,000	4	20
	\$10,001-\$20,000	6	30
	\$20,001-\$30,000	2	10
	\$30,001-\$40,000	3	15
	\$40,001-\$50,000	2	10
	Greater than \$50,000	3	15
Gestation Age	35 weeks	1	5
	36 weeks	2	10
	37 weeks	4	20
	38 weeks	6	30
	Greater than 39 weeks	7	35
Family Health issues	Asthma	3	15
	Allergies	6	30
	ADHD	1	5
	Hypertension	2	10
	Medical	3	15
Smoking issues	Does anyone smoke in the	6	30
	Do they smoke inside	2	33.5
	They do not smoke inside	4	66.5
	Have you asked them not to	6	100
	You did other measures to	2	100

some type of air fresheners or sprays to make the home smell good, and 45% used candles and candle burners, which is linked to negative health problems such as increased allergic reactions and asthma (Dodson et al. (2012). Most the pollutants used in the home by participants (100%) came from personal items such as hair sprays, perfumes and nail polish and house cleaning supplies such as bleach, detergents and dryer sheets. These pollutants have been linked to eye and skin irritation and can burn the throat or cause respiratory issues (Dodson et al. (2012).

**Table 3.** *Distribution of common responses to questions addressing the knowledge level of pregnant women regarding indoor air pollutants*

Question	Common responses	No	%
Do you know what products you use in your home that could increase your exposure to chemicals? (N=20)	Cleaning products such as bleach, Clorox, pine sol, pledge, window cleaners	10	50
	Personal hair items, perfumes hair sprays	5	25
	Bug and ant sprays	3	15
	I don't know what adds chemicals	2	10
There have been several indoor air pollutants identified in your home from the VOC and FA monitoring. What are some of the products you commonly use in your home? (N= 20)	Air Fresheners, Glade spray, free breeze, spray air wick	17	85
	Candles, candle burners, plug in fresheners	9	45
	Hair spray, perfumes, nail polish body sprays spray deodorant	20	100
	Bleach, Clorox washing detergents	20	100
	Dryer sheets bounce, Downy liquid softener	16	80
	House cleaners 409 spray, pledge Ajax	18	90
Are there any products that you use in your home that you think are unsafe to use? (N=20)	House cleaning products	7	35
	Bug Spray and Ant Spray	7	35
	Anything that burns the eyes	3	15
	All product used are safe	3	15

Regarding common practices and attitudes (Table 3), the participants identified only two products they felt to be unsafe to be used in the home. 70% stated only unsafe product used in the home are cleaning products and bug sprays. When asked about

names of chemicals that were products to use (15%) participants felt all products were safe to use.

Home improvements and furniture purchases are very common in pregnant participants. As the family size increases, there is a need for additional space and

*Table 4. Distribution of common responses to questions addressing Common practices and Attitudes of pregnant women regarding indoor air pollutants*

Question	Common responses	No	%
When did you first start using products with chemicals in your home? (N=20)	I have been Using since childhood when old enough to help around home	10	50
	Since I moved away from home	5	25
	Long as I can remember	5	25
How did you learn about these products with chemicals? (N=20)	I learned from family i.e. mother, aunt's grandmother	10	50
	TV ads social media magazines and ads	8	40
	Friends and people I have lived with	2	10
	Reading the label	5	25
How did you know the products with chemicals where safe to use? (N=20)	I read labels	6	30
	My Family has been using it	4	20
	I don't know if safe or not	10	50
Do you think that you could change the type of products you use in your home i.e. air fresheners, use of candles, type of house cleaners and personal items to reduce the level of exposure to Pollutants in your home? (N=20)	Yes	12	60
	No	8	40
If no, why would you not make these changes? (N=8)	I like my house smelling good	5	62.5
	All the items I use are safe	2	25
	Cost more money to change	1	12.5
What would be the process that you would do to make these changes? (N=12)	Find the safe products first and then pull the bad one's out	4	34
	Slowly change one product at a time	2	16
	Pull all out at once and get the safe one's now	6	50

furniture. Paints, adhesives, new carpet and wood treatment emit toxic gases that contaminate indoor air quality (Dodson et al., 2012). Of the participants, 65% purchased new baby furniture and engaged in some sort of new renovations with 100% having no knowledge of the negative impact this would have on indoor air quality (Table 4). Several measures have been used to reduce the level of pollutants in the homes. Opening doors and windows and allowing fresh air in the home, and adding fresh plants, has been shown to reduce the level of indoor air pollutant in the home. In the questionnaire, 55% of the participants did open windows to let fresh air in the home. (Table 4) The participants that did not open windows stated that they felt unsafe leaving windows and doors open. 85% of the participants had no plants in the home, and 100% of participants did not know these practices would assist with decreasing indoor air pollutants in the home. (Table 4

## **Discussion**

Identifying the source of these indoor air pollutants is an important first step in the fight to reduce the harmful effects of these exposures. Once the source has been identified, steps need to be taken to educate pregnant clients to remove or reduce their exposure to the pollutants (P. Sutton et al., 2012). It is very important for health care providers to become knowledgeable about toxic indoor air pollutants (American Lung Association, 1994). The obstacles healthcare professionals encounter include the inability to find tools with which to identify risks and exposures, tools that can communicate ways to reduce or avoid exposures and evidence based guidelines with which to counsel (Stotland et al., 2014). With the emergence of new chemicals entering the environment so frequently and lack of regulations to limit this process, it is important to educate the patient on how to assess what is safe to use and what is not safe (A.C.O.G,

2013; P. Sutton et al., 2012) . Additional time must be spent in office visits on addressing what should be done to reduce the exposures to indoor air pollutants and how to deal with the outcomes of exposure to these pollutants.

The challenge exist it seems, in the limited time available for educational sessions for healthcare staff to their pregnant patients and also patients of reproductive age, coupled with healthcare personnel being uncomfortable with answering questions that may be their opinions rather than evidence based medicine (P. M. Sutton et al., 2016). It also involves the numerous exposures to indoor air pollutants in the rural and low-income populations who are particularly vulnerable to the exposure effects (Kay, 2012; P. Sutton et al., 2012). The time spent with pregnant patients or females with intention to get pregnant in educating about the exposures to indoor air pollutants can influence the opinion of a pregnant female or female of reproductive age about her use of pollutants. (P. Sutton et al., 2012) Thus the attitude of pregnant women can be modified and practices changed if they have been educated about the potential adverse outcomes associated with reproductive interrupters (A.C.O.G, 2013);(Mello & Hovick, 2016).

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# Appendices



October 4<sup>th</sup> 2016  
Dr. Azita Amiri  
College of Nursing  
University of Alabama in Huntsville

Dear Dr. Amiri,

The UAH Institutional Review Board of Human Subjects Committee has reviewed your proposal, *Challenges and enablers for reducing second hand smoke (SHS) exposure during pregnancy*, and found it meets the necessary criteria for continued approval. Your proposal seems to be in compliance with this institutions Federal Wide Assurance (FWA) 00019998 and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46).

Please note that this approval is good for one year from the date on this letter. If data collection continues past this period, you are responsible for processing a renewal application a minimum of 60 days prior to the expiration date.

No changes are to be made to the approved protocol without prior review and approval from the UAH IRB. All changes (e.g. a change in procedure, number of subjects, personnel, study locations, new recruitment materials, study instruments, etc) must be prospectively reviewed and approved by the IRB before they are implemented. You should report any unanticipated problems involving risks to the participants or others to the IRB Chair.

If you have any questions regarding the IRB's decision, please contact me.  
Sincerely,

Bill Wilkerson

William Wilkerson  
IRB Chair  
Dean, Honors College



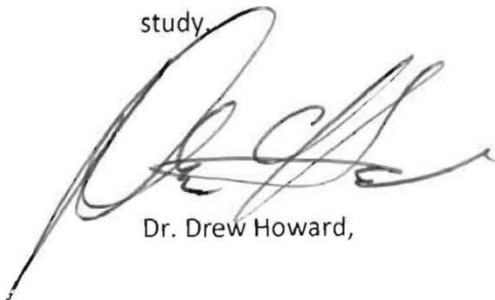
# howard center

FOR WOMEN'S HEALTH

January 29, 2016 Azita Amiri PhD. RN College of Nursing University of Alabama

Dear Dr. Amiri,

I am pleased to support your Research Proposal to assess possible environmental chemical levels in our pregnant patient homes, I give full approval for Donna Ammons RN, MSN, DNP candidate of the University of Huntsville School of nursing to recruit potential study participants from our clinical practice. We will take no responsibility for any equipment that may not get returned from patients that are in the study. I look forward to collaboration with you on this work. Please keep us informed of your study.



Dr. Drew Howard,

Dr. Drew Howard & Dr. Kaylar Howard  
1948 Old Ocilla Road, Tifton, GA 31794  
(p) 229.391.3500 (f) 229.391.3499








### OBSTETRIC ENVIRONMENTAL EXPOSURE ASSESSMENT TOOL

Name: \_\_\_\_\_

Due Date: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Date: \_\_\_\_\_

QUESTIONS		YES	NO	COMMENTS
	<b>Smoking</b>			
	(A) Do you smoke?			
	(B) Does anyone smoke inside your home?			
	(C) Does anyone smoke inside your car?			
	<b>Household Cleaning Products</b>			
	(A) Do you use cleaning products in your home?			
	(B) Do you use air fresheners, candles or any other items to make your home or car smell good?			
	(C) Do you use dryer sheets in your clothes dryer?			
	<b>Personal Care Items</b>			
	(A) Do you use hairspray?			
	(B) Do you process your hair? i.e., hair color, chemical hair straightening			
	(C) Do you polish your nails?			
	(D) Do you have your fingernails done in a nail salon?			
	(E) Do you use spray perfumes?			
	(F) Do you use spray deodorants?			
	<b>Renovations/Repairs/Furniture</b>			
	(A) Do you plan to renovate your home during your pregnancy, i.e., new carpet, new paint, home addition(s)?			
	(B) Do you plan to paint the baby's room?			
	(C) Do you plan to buy baby furniture?			
	<b>Indoor Air Quality</b>			
	(A) Do you have plants in your home?			
	(B) Do you have plants in your work area?			
	(C) Do you leave doors open in your home to circulate air?			
	(D) Do you leave the windows open in your home to circulate air?			





OBSTETRIC ENVIRONMENTAL EXPOSURE EDUCATIONAL TOOL






Name: \_\_\_\_\_

Due Date: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Date: \_\_\_\_\_

PRENATAL ENVIRONMENTAL EXPOSURE		STEPS TO REDUCE RISK	PRENATAL ENVIRONMENTAL EXPOSURE	STEPS TAKEN TO REDUCE RISK
	<b>Smoking</b> 1. Environmental tobacco smoke is a major source of indoor air pollution 2. Smoke can be harmful to your baby and effect it's growth.	1. Pregnant women should not smoke. 2. Pregnant women should not allow smoking in their home or car. 3. Pregnant women should avoid places where smoking is allowed.		
	<b>Home Cleaning Products</b> 1. Some of your cleaning products may need to be handled carefully and many may not be safe to use during your pregnancy.			
				
				



OBSTETRIC ENVIRONMENTAL EXPOSURE EDUCATIONAL TOOL

Name: \_\_\_\_\_  
 Date of Birth: \_\_\_\_\_

Due Date: \_\_\_\_\_  
 Date: \_\_\_\_\_





PRENATAL ENVIRONMENTAL EXPOSURE		STEPS TO REDUCE RISK	PRENATAL ENVIRONMENTAL EXPOSURE	STEPS TAKEN TO REDUCE RISK
		<p>to boiling water, and let simmer on the stove top to infuse scents throughout your home.</p> <p>8. Look for the DFE logo when purchasing or using cleaning products.</p> <p>9. The DFE logo on a product means that EPA scientists have screened each ingredient for potential human health and environmental effects, and that based on current available information, the product contains only those ingredients that pose the least concern among chemicals in their class.</p> <p>10. Avoid use of dryer sheets and liquids. Thin film of artificial chemicals builds on your clothes. They also include hidden fragrant chemicals. Throw an old sweater in the dryer to reduce drying time and static cling.</p> <p>11. Make your own scented alternatives to store-bought scented cleaning products. ***</p>		
	<b>Personal Care Items</b>	<p>1. Limit use of personal care products. Personal care products contain a Shop for personal care products labeled "fragrance free." Artificial fragrances can be made up of</p>		

OBSTETRIC ENVIRONMENTAL EXPOSURE EDUCATIONAL TOOL

Name: \_\_\_\_\_  
Date of Birth: \_\_\_\_\_

Due Date: \_\_\_\_\_  
Date: \_\_\_\_\_



PRENATAL ENVIRONMENTAL EXPOSURE		STEPS TO REDUCE RISK	PRENATAL ENVIRONMENTAL EXPOSURE	STEPS TAKEN TO REDUCE RISK
	<p>Personal care products contain a wide variety of chemicals, including some known to be of concern, and many that lack research to prove safety for women's health. These products are applied directly to skin where they are easily absorbed into our body.</p>	<p>hundreds of chemicals.</p> <ol style="list-style-type: none"> <li>2. Read the labels. Avoid parabens, phthalates, and synthetic musk fragrances.</li> <li>3. Check skin deep data base at <a href="http://cosmeticsdatabase.com">cosmeticsdatabase.com</a> to find safer products.</li> <li>4. Use fewer products and use them less frequently to reduce exposure.</li> </ol>		
	<p><b>Renovations/Repairs/Furniture</b></p> <p>When the renovations start, you may be exposed to building materials that may contain lead or other toxic chemicals. Some of the chemicals may cause breathing problems.</p>	<ol style="list-style-type: none"> <li>1. Allow someone else to do your painting and renovations or delay renovating until after your baby is born, if possible.</li> <li>2. Allow someone else to paint rooms and ventilate area well while painting is in progress.</li> <li>3. If purchasing baby furniture, allow furniture to be aired out in the garage or spare room to allow chemicals to air out of furniture.</li> </ol>		
	<p><b>Indoor Air Pollution</b></p> <p>Common indoor plants may provide a valuable weapon in fighting rising levels of indoor air pollution. Opening windows and doors reduce level of pollutants in the air.</p>	<ol style="list-style-type: none"> <li>1. Choose one 10 – 12-inch potted plant per 100 square foot of home for the most effective air purification.</li> <li>2. Open doors and windows and use fans to maximize air brought in from the outside to reduce levels of chemicals in the air in your home.</li> </ol>		

OBSTERIC ENVIRONMENTAL EXPOSURE EDUCATIONAL TOOL



Name: \_\_\_\_\_

Due Date: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Date: \_\_\_\_\_

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<b>ALL PURPOSE CLEANER</b>	Mix 1 part white distilled vinegar and 1 part water with in a spray bottle.
<b>SOFT SCRUB CLEANSER</b>	Mix 2 cups baking soda, ½ cup liquid castile soap, and 4 teaspoons vegetable glycerin in a sealed glass jar.
<b>CARPET DEODORIZER</b>	Sprinkle baking soda on carpet. Let sit for an hour or overnight. Vacuum it up.
<b>LAUNDRY DETERGENT</b>	Mix 1 cup soap flakes (just finely grate a bar of unscented soap), ½ cup baking soda and ½ cup washing soda. Use just 1 – 2 tbsp. per load.
<b>FABRIC SOFTENER</b>	Add ½ cup white distilled vinegar to rinse cycle of your washer.
	Use wool dryer balls <u>in your</u> dryer to fluff up clothes and absorb static.
<b>DRYER SHEETS</b>	Hang your laundry out to dry in nice weather instead of using your dryer, for fresh smelling clothes and sheets. This will help you save money on your electric bill, too.
	Form a loose ball with aluminum foil, and place it in the clothes dryer when clothes are drying. The foil ball will decrease static electricity build up in your clothes.

## ***JOGNN Guidelines for Authors***

*The Journal of Obstetric, Gynecologic, &*

*Neonatal Nursing (JOGNN)* is the official journal of the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN). A peer-reviewed journal, *JOGNN* reflects practice, research, policies, opinions, and trends in the care of women, childbearing families, and newborns. *JOGNN* presents the scholarship that is the driving force behind nursing practice. Although not required, queries may be addressed to Nancy K. Lowe, CNM, PhD, FACNM, FAAN, Editor, *JOGNN*,

University of Colorado Denver, College of Nursing, C288-28, 13120 East 19th Ave., Aurora, CO 80045. For additional information about *JOGNN* go to <http://jognn.awhonn.org>, e-mail [jognn@awhonn.org](mailto:jognn@awhonn.org), or call 877-234-3925.

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The editor welcomes manuscripts in the following categories:

**Research**—reports of original studies that generate new knowledge for clinical practice. **In Review**—systematic or integrated literature reviews, including specific implications for practice, policy, or research.

**Principles & Practice**—analysis of innovations and trends in clinical practice, care delivery systems, education programs, and public policy; reports of quality improvement and program evaluation projects with clear implications for practice beyond the study site using the SQUIRE guidelines (Cook & Lowe, 2012).

**Case Reports**—new information through case reviews of nursing and inter-professional care. Authors must provide written consent from the participant when clinical descriptions make identification possible.

**Contemporary Perspectives**—brief, critical commentaries on professional issues or societal trends.

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Invited guest editors solicit focused

manuscripts for review. Queries from potential guest editors of proposed series may be addressed to Marilyn Stringer, PhD, WHNP-BC, RDMS, [stringer@nursing.upenn.edu](mailto:stringer@nursing.upenn.edu).

### ***Requirements for Submissions***

1. Manuscripts must be original, not published previously, and not under consideration by another publication. The editor will consider publishing a complete report following the publication of preliminary findings (e.g., in an abstract) or presentations.
2. The authors must disclose any commercial interest they have in the subject of their study as well as the source of any financial or material support. Each author must complete a combined copyright transfer & author disclosure form, which will be uploaded with the manuscript files in the Editorial Manager system.
3. A copy of institutional review board (IRB) approval (or a letter from the IRB chair stating that approval for the study is not required) is required for any research published in *JOGNN*.

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In order to qualify as an author for a manuscript submitted to *JOGNN*, all persons designated as authors should qualify for authorship, and all those who qualify should be listed. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. Such participation ordinarily includes all of the following:

- Involvement in conception or design of the project or other scholarly work
- Important contribution(s) to critical aspects of the conduct of the research or other scholarly work
- Drafting the manuscript submitted and revising it for important intellectual content
- Approval of the final, submitted version

Participation that does not qualify for

authorship includes data gathering, provision of financial or other support, or review of a preliminary draft. When a large, multi-center group has conducted the work, the group should identify the individuals who accept direct responsibility for the manuscript.

The maximum number of authors usually permitted is six on research manuscripts and four on all other types of manuscripts. If more than these numbers of authors are desired, specific information explaining the role of each author should be included in a cover letter.

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### **Reporting Guidelines**

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#### **CONSORT**

The CONSolidated Standards Of Reporting Trials (CONSORT) provides direction for reporting randomized controlled trials and includes the CONSORT Statement, a checklist focused on the structure of the report, and a flow diagram to document the progression of all participants through the trial.

#### **STROBE**

The STROBE guidelines stand for STrengthening the Reporting of OBServational studies in Epidemiology. Similar to CONSORT, these guidelines provide direction for the reporting of nonexperimental quantitative research.

#### **PRISMA**

The Preferred Reporting Items of Systematic reviews Meta-Analyses (PRISMA) provides standards for the preparation of reports of systematic literature reviews and meta-analyses. An expansion of the previous QUOROM Statement, PRISMA can be applied to reviews of randomized trials and other types of research and includes a checklist and flow diagram. Also review the guidance provided in "Systematic reviews" (Lowe, 2009).

#### **MOOSE**

The MOOSE guidelines provide specific

direction for reporting Meta-analysis Of Observational Studies in Epidemiology.

#### **SQUIRE**

The SQUIRE guidelines provide Standards for Quality Improvement Reporting Excellence. These guidelines should be used for all reports of quality improvement projects.

#### **STARD**

The STARD statement provides STANDards for the Reporting of Diagnostic accuracy studies.

#### **CARE**

The CAse REport (CARE) guidelines include recommendations and a 13-item checklist for guidance in writing a case report. Although written from a medical perspective, these guidelines are generally applicable to nursing case reports.

### **Preparation for all Manuscripts**

Double-space all pages, including the abstract, text, references, tables, and legends. Use 12-point font and uniform margins of 1" at the top, bottom, right, and left. Do not right justify lines. Do not divide words at the end of a line.

Number pages consecutively. Include a shortened version of the title at the top of each page to identify the manuscript. The running head must not contain any author names or initials. In the left margin, consecutively number each line of text.

The average article in *JOGNN* is 15 to 18 manuscript pages, plus references, tables, illustrations, and callouts. Review articles can be longer than 18 pages if indicated.

Refer to the *Publication Manual of the American Psychological Association (APA)*, sixth edition, for grammar, punctuation, and style; *Webster's Eleventh Collegiate Dictionary* for spelling of nontechnical words; *Dorland's Illustrated Medical Dictionary* for spelling of medical terms; and Haller and Holditch-Davis (2000) for guidelines on statistical reporting. In general, it is not necessary to specify the statistical package used to analyze research data. Use generic names of all drugs and products. Report physical measures in SI (International System of Units) units. For examples of conversion to SI equivalents, refer to the APA manual.

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Limit the title to no more than 15 words. Ensure that the title summarizes the main idea of the paper; is fully explanatory standing alone; and avoids the use of the words method, results, a study, and an experimental investigation. Colons in titles should be avoided.

### **Keywords**

Submit 3–10 keywords with the abstract for use in indexing the article.

### **Abstract**

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Include an abstract of no more than 75 words (in paragraph form). The abstract should be factual, not descriptive, and should provide the main points of the paper. Instead of saying what will be described, describe it.

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Include an abstract of no more than 250 words using the following headings:

- Objective
- Design
- Setting
- Participants
- Methods
- Results
- Conclusion

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Include an abstract of no more than 300 words using the following headings:

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- Conclusion

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Include an abstract of no more than 250 words using the following headings:

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- Patients

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- Results
- Conclusion

### ***Précis***

Authors should provide a précis for use in the Table of Contents. The précis is a single sentence of no more than 25 words, written in the present tense and stating the conclusion(s) of the report. The précis should be similar to the abstract's conclusion.

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Provide three callouts of not more than 25 words each. Callouts highlight a major premise or conclusion of a manuscript. Indicate in the manuscript approximately where each callout should appear in the published article. Avoid repeating text found in the abstract or the first page. Callouts for research manuscripts should identify the problem the study addresses, the primary conclusions of the study, the major implication for practice, or factors that contribute to the conclusions of the study.

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Tables of studies included in systematic reviews should use the following column headings: author/date, participants, methods, interventions, outcomes. Information included for each study should be presented in a standardized manner and be as succinct as possible.

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- References (begin on a new page).
- Tables (each on a separate page).
- Figures (each on a separate page).

### **Submission Checklist**

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