Improving Indoor Air Quality for Children in Rural Kentucky

Denerica L. Curry
University of Kentucky

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The document mentioned above has been reviewed and accepted by the student’s advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student’s capstone including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Denerica L. Curry, Student

Corrine Williams, ScD, MS, Committee Chair

Corrine Williams, ScD, MS, Director of Graduate Studies
IMPROVING INDOOR AIR QUALITY FOR CHILDREN IN RURAL KENTUCKY

Capstone Final Project

A paper submitted in partial fulfillment of the requirements for the degree of Master of Public Health in the University of Kentucky College of Public Health
By Denerica L. Curry Columbus, OH

Dr. Corrine Williams, Chair
Dr. Angela Carman
Dr. Robin Vanderpool
Abstract
Community interventions directed towards improving indoor air quality for children are often implemented after exposure has occurred and focuses on parental smoking cessation. Our proposed project will intervene during the prenatal stage prior to exposure and continue to support families 6 months postpartum. Infants are at an increased risk of secondhand smoke exposure due to the amount of time they spend in the home and proximity to the smoker. We hypothesize that by enhancing care of the current home visitation model to include an early intervention we will increase the amount of smoking bans in the home and decrease maternal cigarette consumption.

A. Target Population & Need
Smoking while pregnant is the “single most preventable” cause of low birth weight, illness, and disease in infants and mothers (US Surgeon General 2006). In Kentucky, 22.6% of women self-reported smoking at some point during their pregnancy, and one in five babies are born to mothers who smoke. For newborns the negative consequences of exposure to smoking are associated with temporary health issues immediately following birth, but have the potential for long-term health risk. In Kentucky, a baby born to a mother who smoked during their pregnancy is 2-5 times more likely to die of SIDS. Smoking following delivery exposes the infant to secondhand smoke. According to the Surgeon General of the United States secondhand smoke exposure is never safe (2006). It exposes children to the same dangerous carcinogenic chemicals inhaled by a smoker. These chemicals include formaldehyde, cyanide, carbon monoxide, ammonia, and nicotine. (US Surgeon General 2006). For infants, this...
increases their risk of upper respiratory infections (e.g. bronchitis and pneumonia), asthma, and SIDS. Secondhand smoke has several adverse health outcomes including cancer, asthma, cardiovascular disease in adults, lower respiratory infections, SIDS (Sudden Infant Disease Syndrome), and low birth weight. Children are, on average, exposed to SHS more than non-smoking adults because of the involuntary culture of secondhand smoke exposure (Baxi et al., 2014). Infants spend most of their time in the home making it the primary environment of exposure (Baxi et al., 2014). Infants and children exposed to SHS have an increased risk of developing respiratory (e.g. bronchitis and pneumonia), and ear infections and asthma, in addition to experience long-term consequences from these conditions. Children with asthma, for example, who were exposed to SHS in the household, have more frequent and severe asthma attacks than children who were not exposed (Wang et al., 2015). In Kentucky, asthma is the third leading cause of hospitalizations of children living with a smoker. As a result, Kentucky (KY) consistently has higher-than-average national rates of asthma. In the US, an estimated 22% of children under the age of 18 are exposed to secondhand smoke (SHS) in the home. Infants spend much of their time near surfaces that could be contaminated with secondhand smoke carcinogens (blankets, floor, clothing) and ingest almost twice as much contaminated dust as adults (Roberts et al., 1995). In addition to high rates of smoking during pregnancy, Kentucky has the second highest cigarette smoking rate in the country, with 26.1% of adults smoking. This points to high rates of SHS exposure among children in KY.
One effective way to reduce secondhand smoke exposure in the home is to establish a smoke-free household rule (Rees et al., 2014). In the US, 83% of all homes have a smoke-free household rule; however, this drops to only 43% in homes with at least one adult smoker (MMWR, 2011). Kentucky has the second lowest percentage in the U.S. of all households with a smoke-free rule, with only 29.3% of households with at least one adult smoker having a smoke-free rule (MMWR, 2011). The number of homes with smoking bans have increased over the year but there are still disparities of who adopts them (Zhang et al., 2012). Children who live in a home with a single parent, current smoker, low-income, or less educated parents are less likely to have a smoking ban (Zhang et al., 2012). An infant is exposed to 3-8 times environmental tobacco smoke if household smokers smoke inside the home instead of outside (Matt et al., 2004). Smoking outside does not eliminate environmental tobacco smoke but does greatly reduce exposure. A smoking ban in the home is associated with a decrease in air nicotine levels, caregiver smoking and smoking indoors (Rees et al., 2014).

There are population-level initiatives at the state and federal levels that target reducing SHS exposure. In 2004, Lexington-Fayette County in Kentucky passed an ordinance banning smoking in indoor public spaces. Regulating smoking in public spaces is an effective way of reducing secondhand exposure for nonsmokers (Frazer, 2016). Research analyzing asthma-related emergency department visits found an 18% decrease for child visits. The evidence supports the claim that reducing SHS exposure has positive health effects. Smoke Free Kentucky is state-wide coalition
focused on creating polices to create more smoke-free places. However, more attention on individual families, particularly those containing a smoker, are needed.

One statewide program in Kentucky targeting improving child health outcomes including SHS exposure, is Health Access Nurturing Development (HANDS). HANDS is a voluntary, intensive, evidence-based home visitation program within the Kentucky Department for Public Health that works with first-time parents who are found to be at-risk or overburdened (due to factors including low-income, low education levels, irregular employment history, abuse history, depression, lack of insurance); nearly 85% of HANDS participants receive Medicaid assistance. A primary programmatic goal of HANDS is to focus on providing voluntary services to families at the greatest risk for a range of problematic outcomes, such as low birth weight, pre-term infants, financial difficulties, poor parenting skills, child neglect, substance abuse, and domestic violence. The program is designed to assist parents at critical developmental points beginning prenatally and following a child until two years of age. Currently, the program is available in every county in Kentucky. In 2014-15 HANDS reached over 10,746 at-risk families and provided 201,288 home visits. Home visits are delivered by highly trained para-professional and professional staff to provide information, problem solving, parenting skill development, and assistance in meeting basic needs such as housing, food, health care, and other required services. The program takes a strength-based approach by utilizing 6 protective factors: parental resilience, social connections, knowledge of parenting and child development, concrete support in times of need,
social and emotional competence of children.

HANDS has improved health and social outcomes including: fewer premature infants, fewer low and very low birth weight infants, reduced instances of infant mortality, fewer emergency room visits, fewer children with developmental delay, and fewer incidents of child abuse and neglect. The evaluation data also demonstrate that timing and frequency of visits are key elements in the effectiveness of HANDS. The program appears to have the greatest influence on pregnancy/birth outcomes including length of gestation, birth weight, birth defects, and infant mortality when it begins during the first trimester with a greater number of prenatal visits. HANDS has been used across KY for 15 years and is on the HOMVee list of evidence-based home visiting programs.

The proposed project will leverage the current infrastructure of the HANDS program to focus specifically on SHS exposure within HANDS families. Almost 50% of HANDS families currently report a smoker in the family, which puts their children at increased risk of SHS exposure. In addition to meeting the HANDS requirements, participants in the pilot study must also meet separate criteria. To qualify for inclusion, participants must live within one of the participating counties (Russell, Wayne, McCreary) and enroll prior to the third trimester. Families must also report at least one adult in the home and have no current smoking ban in the home. Based on the need demonstrated by smoking rates in pregnant women and secondhand exposure in the home, the University of Kentucky will partner with the evidence-program HANDS to
enhance usual care by providing environmental feedback along with smoke-free intervention *Smoke Things are Better Outside* to families in an effort to reduce secondhand exposure for children. In the latest Kentucky needs assessment, respondents identified secondhand smoke exposure as one of the most important health concerns (2015, Division of MCH) The project will focus on McCreary, Russell, and Wayne counties are located in rural eastern Kentucky. As shown in table 1.1, these counties show that children are disproportionately affected by tobacco use in their county and demonstrate a need to reduce SHSe. These counties were chosen because they have well established HANDS programs. Russel and McCreary consistently rank in the bottom 20% for all counties in Kentucky for the percentage of births to mothers smoked while pregnant. Map 1.1 Wayne however placed between those two counties, has a steady trend of having one of the lower rates in the region but still considerably higher than the national average.

**Table 1.1 County Health Data**

<table>
<thead>
<tr>
<th>Location</th>
<th>% of Births to mothers who smoked during pregnancy 2011 – 2013 data from birth certificates</th>
<th>HANDS active/exit families 2014-15</th>
<th>% of population Adult smokers (06-12) data from BRFSS</th>
<th>% of Smoke Free Policies in home data from MMWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Cumberland District</td>
<td>49.3%</td>
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<tr>
<td>Wayne</td>
<td>29%</td>
<td>130</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td>Russell</td>
<td>36%</td>
<td>129</td>
<td>31%</td>
<td></td>
</tr>
</tbody>
</table>
Participants are referred to the HANDS by a healthcare provider, 85% are from a local health department (2008, HANDS). In each of the three participating counties, eligible women will be asked to participate by their HANDS home visitor at their first prenatal visit with the program (see Letters of Support). HANDS has significant infrastructure in place as the program exists in all 120 counties in Kentucky. This infrastructure will be critical in the event of expanded roll out of this enhanced care.
The proposed project uses a successful infrastructure that optimizes recruitment and retention of participants. In 2014-15, HANDS served 406 families in the target counties. Of these 406 families, it is estimated 203 families in specified Lake Cumberland District counties have at least one adult smoker in the home, therefore meeting the criteria of our study. Our goal is to recruit 120 newly enrolled eligible HANDS families per year for a total of 240 participants from health departments over the course of 2 years beginning in February 2018. We have based our estimates on the annual reach of HANDS in participating counties and the percentage of smokers. Participants will be recruited through flyers at local health departments and WIC offices, and referrals from HANDS home visitors.

**B. Program Approach**

The objective of the proposed project is to reduce secondhand smoke exposure for children who live in the home with at least one adult smoker through an enhancement of a home visitation program to establish smoke-free policies in the home.

This research is important to public health because it targets exposure for children in rural underserved communities with prenatal and adult smoking rates above the national average. The project also addresses the gap in research pertaining to how early intervention can influence a family’s ability to establish a smoke-free home before children are present.

The HANDS program provides a platform to engage families in early prenatal SHSe prevention by utilizing HANDS home visitors existing skills—both prior to birth.
and after-birth—to target reducing environmental tobacco smoke exposure by establishing a smoking ban in the home. The project will strengthen the existing infrastructure by implementing an evidence-based intervention and objective measure to enhanced care groups. Some Things Are Better Outside is an intervention designed to establish smoke-free policies in homes. The intervention will be implemented in the second trimester over an 8-week period during home visits. HANDS home visitors will tailor the components based on the family’s stage of change. Research shows it is more effective to provide an intervention focused on limiting SHSe in the home rather than smoking cessation as means of protecting children from tobacco smoke (Rosen).

The original study was performed in Atlanta, GA with 40 participants (20 smokers and 20 non-smokers) (2012, Kreger). Participants were recruited at the local health department by fliers. The criteria to participate was the following: 18 years or older, speak and understand English, be a smoker living with at least one other person in the household or a nonsmoker living with a smoker, and not have a total smoking ban. Majority of the study participants were African-American (95%), had an income under $25,000 (75%) and female (70%). 45% of the homes had no children living in the home but 58% had children under the age of 18 years old. The study examined short-term outcomes of the intervention through a pretest-posttest model at 2-weeks follow up. The participants were mailed intervention materials at 2-week intervals. All contact with participants occurred over the phone. The pilot study found 78% of participants attempted to establish smoke free policies. At the 2-week follow-up, 32% of households
with a smoker established a smoke-free home. Researcher’s also used process measures to evaluate the program. 89% of participants found the materials relevant and 95% found them useful. They found that smokers were interested in the materials as much or more than nonsmokers.

The intervention surrounds the “Five-Step Guide to a Smoke-Free Home” booklet which will be incorporated at each step and participants will be able to keep in their home. The 5-steps mirrors the Transtheoretical Model (TTM) which uses 5 steps to conceptualize stages of intent to change behavior. It is commonly used promote change in health behaviors as a process than a single event. Diagram 2.1 illustrates how TTM overlaps with the 5-steps of creating a smoke-free home. The booklet explains the five steps and strategies and tips to establishing and maintain a smoke-free home. The 5-Steps of creating a smoke-free home are the following: 1. Decide to have a smoke free home; 2. Talk to other household members (including other children) about going smoke-free; 3. Pick a date to start the policy; 4. Establish a smoke-free home; 5. Maintain a smoke free home. HANDS home visitors will document through the stages of change assessment how families transition through the model during their time in the study.

Diagram 2.1 Transtheoretical Model and Steps to Change
Step One: Make the decision to have a smoke-free home. The first step focuses heavily on education, defining smoke-free homes, secondhand smoke and indoor air pollution. The HANDS nurses will walk through the interactive education guide with participants and help to create a list of reasons why they should have a smoke-free homes.

Step Two: Talk to household members about establishing a smoke-free ban. Low-income households are more likely to have more members living in the home, so an intervention must focus on household norms and not individual behaviors (Roberts).
Evidence shows it is more effective for families to be responsible for developing the best approach to reduce passive smoking exposure in the home (Emmons). The HANDS home visitors will work with the families to develop problem-solving and negotiating skills to discuss implementing the new policy. Participants will be encouraged to use the list of reasons they created during the previous visits to persuade other household members.

**Step Three:** Set a date. Families will choose a date to no longer allow smoking in the house. A pledge is provided to families to have household members sign and list their reasons of going smoke-free to signify the collaborative effort to establish a smoke-free policy.

**Step Four:** Establish a Smoke-Free Home. After the family has set a date to go smoke-free, HANDS home visitors will work with families to develop a plan and strategy of implementing the policy and informing guests of the new policy. By using a home visitation model, HANDS nurses have access to the inside of the homes and are able to make personalized recommendations for each family based on the house layout, access to outdoor spaces, and family structure. HANDS home visitors will discuss outside areas for smokers, placing environmental cues such as “no smoking” stickers, removing ashtrays, or placing alternative snacks in the home. As an important part of the HANDS curriculum, adults will discuss protocols for smoking outside when children are in the home that avoid leaving children unattended. They are also encouraged to celebrate their smoke-free home.
Step Five: Maintain a smoke-free home. The smoke-free policy is a continuous process, families will continue to reevaluate the challenges and barriers to maintaining a smoke-free home. New challenges or barriers could be the arrival of the baby, weather, changes in family structure.

There are four components of the intervention that will be implemented over the course of 8 weeks. Participants will transition through steps of change at independent rates, but components will be presented in the same order. The first component focuses on education and reviewing the contents in the tool-kit to create a smoke-free home including the “Five-Step Guide to a Smoke-Free Home” booklet. The tool-kit includes a list of reasons to have a smoke-free home, smoke-free home signs, and pledges for household members to sign once they have decided to have a smoke-free home. HANDS home visitors will define secondhand smoke, smoke-free homes and the health risk associated with secondhand smoke.

The second component is the coaching interview. During the coaching interview, home visitors will discuss the barriers and challenges the family is facing along with setting goals for the next visit. HANDS home visitor will be provided with a script that can be tailored according to the participant’s stage of change.

The third component focuses on negotiation and additional education. Participants will receive a “Challenges and Solutions: Keeping your Home Smoke-Free” booklet and a photo story depicting a conversation with household members. HANDS home visitors will work with participants through role-play and discussion to build
negotiation skills to influence other smokers in the home to establish a smoke-free home. They will also cover the dangers associated with smoking in the home and suggest alternative places outside of the home for smokers to smoke.

The fourth component of the intervention includes a newsletter of real success stories of families who established smoke-free homes and a third-hand smoke fact sheet. The testimonies by real families help to make the goal of smoke-free home appear more feasible for participants and provides strategies of maintaining a smoke-free home. During the final session, participants will also receive six “smoke-free” stickers to place in the home.

As an adaptation to the original “Some Thing are Better Outside” we will place air-nicotine monitors in the home. The air nicotine monitors, which serve as an objective measure, will provide families with a direct representation of the tobacco exposure in their homes and help show the progress being made towards their goals. The air nicotine monitors are specific to tobacco and well perceived by users (2013, Wilson). It is important that household members are able to internalize their risk and identify smoking as a source of nicotine exposure (2013, Wilson). By providing personalized feedback to families receiving enhanced care, families are able to monitor their progress towards their goal of a smoke-free home and guide changes to better comply with set goals (2013, Wilson). HANDS nurses are trained to help families make modifications in the home to increase healthy outcomes for children, a skill that we will leverage to help improve air quality in the home.
A smoking ban challenges the social norms and environmental context in the home. The HANDS framework trains home visitors to build parent’s self-esteem, strategize solutions, and share information through healthy interactions. This framework supports their ability to provide valuable environmental feedback to households and work with families to identify social challenges and barriers to applying smoke bans.

Fidelity

HANDS home visitors will be given a checklist of activities to complete while in the house. The checklist will be completed at each visit and includes: the stage of change assessment; air monitor placement; biofeedback of previous reading if applicable; review of previous goals and strategies; a new family goals; reminder to address challenges of implementing smoke ban. The check list serves as an outline for HANDS home visitor and method of assuring fidelity for the research team. We will also monitor fidelity based on participant surveys. Participants will be asked if components were presented to them and what activities did they participate in, e.g., goal setting, role-play, creating lists.

Incentives

The survey will be incentivized by a $25 gift care per survey completed. Surveys are collected at baseline, 4-6 weeks and 6 months for the control and air nicotine monitor groups. Each household could be awarded up to $75 for their participation. The enhanced care group has two additional survey specific to the study and may be awarded a maximum $150. Focus group participants will also be compensated $25 for
their participation.

The program will include Strategies Guided by Best Practice for Community Mobilization throughout the study. We will Establish a Formal Structure by developing contracts with Lake Cumberland District health departments and a local design firm. The contract with the health department will outline how the University of Kentucky will coordinate with state-wide efforts and to strengthen pre-existing programs to target SHSe for children in the home. The design firm will recreate print materials for our project that represent Annual meetings and press releases through Tobacco Free Kids and Americans for Nonsmokers’ Rights will serve as platforms to educate the community about our efforts. We want the community to be aware of new research and encourage community mobilization to support smoking bans in the home. We will engage diverse organizations, community leaders and residents through the creation of our Community Activities Board (CAB).

| Table 2.1 Proposed Community Advisory Board (CAB) Membership. |
|-------------------|-------------------|-------------------|
| **Member** | **Position** | **Organization** |
| John Smith | Smoking cessation specialist | Lake Cumberland District Health Department |
| Tricia Young | Primary Care Physician | Rural Health Clinic |
| Yvette Powers | Respiratory therapist | Lake Cumberland District Hospital |
| Lee Bayer | Housing Authority inspector | Lake Cumberland Housing Agency |
The CAB will be involved in all stages of project development, implementation, quality improvement and sustainability. One of the most important roles of the CAB is to assist in recreating intervention materials. The CAB will assist the public health liaison to identify challenges, barriers and solutions to establishing smoke-free homes specifically for families in Lake Cumberland District. The CAB will meet twice during the planning stage and every 6 months thereafter. During the first meeting they will receive a copy of the original materials, provide feedback for potential changes and brainstorm potential challenges with the study design. The second meeting will be to review the adapted materials and discuss community investment in smoke-free policies in the home. The Community Activities Board is comprised of a team of individuals whose mission is to reduce secondhand smoke exposure and improve the health of the community through evidence-based approaches (Table 2.1). The purpose of the board is to predict trends in secondhand smoke exposure, engage the community and help develop a sustainable project. Members of the board are representatives from the local health department, housing authority, healthcare providers and community members. John Smith smoking cessation specialist from Lake Cumberland District health department. If any participant demonstrates the will to quit smoking throughout the study they will be referred to John. John’s knowledge on smoking cessation and connections to the community are important for implementing and sustaining a program.
that meets the needs and challenges of the community. Tricia Young is a primary care physician at the Rural Health Clinic in Wayne County Hospital. Dr. Young’s clinical understanding of SHSe and negative health outcomes will help the team determine the most appropriate time to intervene. Her experience with our target population in medical settings will be helpful when Yvette Powers is a respiratory therapist at the Lake Cumberland District Hospital. Powers’ has several years of experience working children with cardiopulmonary diseases, such as asthma, that are exacerbated by tobacco smoke exposure. Powers’ will offer valuable insight on goal-setting and developing treatment plans for families with medically vulnerable children. Lee Bayer is an inspector for Lake Cumberland Housing Authority. Bayer was selected to be on the board based on his expertise in maintaining a safe and healthy physical environment. The physical environment in the home holds dust and particulate matter both important elements of indoor air quality. The last two members of our board are women with children living in our targeted area. Our goal is to develop a program that is culturally appropriate and sustainable. As members of the community, Patricia and Evelyn understand the difficulties of changing social norms in the home. Individuals were included in on the CAB based on their investment in the community to improve health outcomes and ability to assist in future sustainability and expansion efforts.

Adaptations

We have adapted the smoke-free intervention to better serve our target population. The three major adaptations involve method and time of deliverance and
cultural sensitivity. Majority of interventions target establishing smoke-free homes when there are children in the home who are already being exposed to SHS. In the original study 43% of the participants did not have children living in the home but it is unknown if they were expecting children. Our project will target families who are expecting a child in an effort to change norms in the home prior to the child being exposed in the home. The original study for the smoke-free policy intervention focused on low income African-American families in Atlanta, Georgia. We will be adapting the materials to be more culturally appropriate by recreating all printed material. The evidence-based information will be the same, but the featured families, challenges, barriers and solutions will be adapted to mirror the challenges and perspectives of our participants. We will utilize our Community Activity Board, focus groups and community meetings to determine necessary changes through qualitative data collection. The Community Activity Board will review the suggestions of the focus group and make their own suggestions. Once the project is in the implementation phase, participants will evaluate the materials during their final visit. We will continuously monitor feedback and make appropriate changes where applicable.

*Some Things are Better Outside* is designed to be mailed to participants with one phone coaching conversation. We will adapt this model and place a trained HANDS home visitors to deliver and present the materials in person. Home visitors will work with public health liaison to find the best way to present material to families. The in-person delivery method allows us to tailor the intervention for each participant which is a
strength of our project. We will contact participants by phone to survey their satisfaction with delivery of the program.

Challenges

Although the HANDS program has a strong history of retaining participants we may face problems with lost to follow up which could be loss of data or an air nicotine monitor. If the structure of the household changes throughout the study (new members or new home) it could affect the participant’s willingness or interest in establishing a smoke-free policy. We will encourage home visitors to monitor and document these changes. Changing social and environment norms in the home can cause tension in the home leading to conflict or violence. We will prepare our staff to screen for domestic violence and offer resources for these families. All participants have the right to exit at any time.

Planning period

We will dedicate the first 6 months as a planning period. The purpose of the planning period is to train staff, develop contracts with collaborating partners and recreate intervention materials. The research team will meet with the CAB in September to discuss recruitment strategies, research design and print material adaptations. Following the meeting with the CAB, research members will invite community members to have an open discussion on the anticipated challenges and barriers associated with establishing smoke-free policies in the home. Community members will also have the opportunity to review original materials. After qualitative data is collected from the CAB,
research team, and the community, the public health liaison will contact the design to make samples with the proposed changes. The samples will be reviewed during the second CAB meeting and by a community focus group. The public health liaison will organize 6-10 members in the community to comprise a focus group. The focus group will review the adapted print materials and provide feedback on the relevance and usefulness.

The planning period will also be used to train home visitors on data collection, air nicotine monitor placement and

C. Performance Measures & Evaluation

We will implement evaluation and performance measures throughout the project to ensure proper implementation and to test efficacy our enhanced intervention. These measures will be evaluated on a bi-annual basis. HANDS home visitors are will be trained in-person on data collection procedures and participate in annual booster training. We will perform formative, process and outcome evaluations to monitor the performance of our materials, participants, and partners.

The aims of this study are to: 1) compare environment markers (home air nicotine) and self-reported progress towards establishing smoke-free policies prenatally and postpartum of all groups, 2) compare maternal smoking groups between groups and within group prenatal and postpartum 3) compare and contrast specified health outcomes of children and their families (smoke-free bans, smoking cessation, asthma hospitalizations, upper respiratory infections, and SIDS). Data will be uploaded and
monitored through the Microsoft program SharePoint. We have reviewed and found that there are no applicable laws that may interfere with implementation of our project or data collection.

The purpose of the project is to improve indoor air quality by enhancing the care of HANDS participants. We expect that more households in both groups will have implemented a smoke-free policy. Specifically, we hypothesize that:

Table 2.2 Grant Timeline

<table>
<thead>
<tr>
<th></th>
<th>Year 1 August 2017</th>
<th>February 2018</th>
<th>Year 2 August 2018</th>
<th>February 2019</th>
<th>Year 3 August 2019</th>
<th>February 2020</th>
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<tr>
<td>Develop partnership agreements with local health department, John Hopkins Laboratory, and design firm</td>
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<td>Train HANDS nurses</td>
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<td>Focus group</td>
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<td>Recruitment of participants</td>
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<td>Implementation of project</td>
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<td>Data Collection</td>
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<td>Statistical Analysis</td>
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<td>Program evaluation</td>
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<td>Sustainability and Expansion Planning</td>
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The percentage of families that report smoking in the home at the six month HANDS visit will be lower among the intervention participants compared to control families.

The proportion of women who report tobacco consumption in the third trimester of pregnancy will be lower among the intervention participants compared to control families.

The long-term goal of this project is to decrease secondhand smoke exposure (SHSe) in a high-risk low-income population thereby improving the health of children and their families. A randomized controlled trial with repeated measures design will be performed to test the effectiveness of an enhancement to an evidence based home visitation program for pregnant women and their families.

Women who participate in our study will be randomly separated into three groups; HANDS only, HANDS +air nicotine monitor, and enhanced HANDS with air nicotine monitors. The first group, HANDS only, will serve as the control group and receive HANDS as standard care. Currently there is no intervention targeting tobacco
use in the home but it is monitored in their assessments. If a participant does express willingness to quit they are directed to a 1-800 quit line. Lake Cumberland counties Taylor, Pulaski, Casey, and Green will serve as the HANDS only control group. The second group will receive HANDS along with an air nicotine monitor in the home. The air nicotine monitor could be an agent of change while also serving as an outcome measurement. Research shows by having a monitor placed in the home, without education or motivational interviewing, there were decreased air nicotine level (2013, Wilson). This will also serve as a second control to compare the effect of receiving the enhanced care. We will recruit from Clinton, Cumberland and Adair also located in Lake Cumberland to receive air nicotine monitors. The third group will receive HANDS, air nicotine monitor and the evidence-based program Some Things are Better Outside.

C.1. Outcome Evaluation

The proposed outcome evaluation study design includes a quasi-experimental design, using within-subject repeated measures along with comparison to a control group. Table 3.1 outlines schedule data collection times.

<table>
<thead>
<tr>
<th>Table 3.1 Data Collection Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced Intervention</td>
</tr>
<tr>
<td>20-28 weeks</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>


Those interested in participating will be screened to determine if they meet study inclusion criteria. An appointment will then be scheduled to obtain informed consent and complete baseline survey on tobacco consumption and secondhand smoke exposure in the home. Baseline interviews will take approximately 30-45 minutes to complete. Families will be randomly assigned to the usual care, air nicotine monitor only or the enhanced intervention following the baseline interview. Participants will be evenly distributed into the three groups. Randomization will occur within county/or health department. A randomization schedule will be constructed for this study using a random

<table>
<thead>
<tr>
<th>28-36 weeks</th>
<th>Air Nicotine monitor placement</th>
<th>Air Nicotine monitor placement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Environmental Feedback</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Process Evaluation survey</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Air nicotine monitor placement</td>
<td>Air Nicotine monitor placement</td>
</tr>
<tr>
<td>4-6 weeks postpartum</td>
<td>Environmental Feedback</td>
<td>Outcome Survey</td>
</tr>
<tr>
<td></td>
<td>Follow up/ Outcomes survey</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phone interview</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*some participants may repeat intervention</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Air Nicotine monitor placement</td>
<td>Air Nicotine monitor placement</td>
</tr>
<tr>
<td>3 months postpartum</td>
<td>Environmental Feedback</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Air Nicotine monitor placement</td>
<td>Environmental Feedback</td>
</tr>
<tr>
<td>6 months postpartum</td>
<td>Follow up Survey</td>
<td></td>
</tr>
</tbody>
</table>
number generator in SAS for Windows.

Data collection points have been selected based on the HANDS program scheduled visits. All surveys will be administered paper and pencil to align with current HANDS data collection protocol. The proposed evaluation measurements will ensure we are able to monitor the number of homes that establish smoke-free homes and reduce maternal smoking. Our primary outcome is the number of households that have implemented smoke-free policies, the secondary outcome focuses on reducing maternal smoking. Our secondary outcome measures targets smokers only. We will compare measurements of smoke-free policies between groups and in-group prenatal/postpartum levels.

*Primary Outcome: 40% of homes in the enhanced care group establish a smoke-free home at 6-month follow up*

The primary outcome will be measured by self-report and an objective measure. The survey will include the same validated questions used in the original study. In the original study at follow up researchers found 63% of households with smokers attempted to establish a smoke-free home and 32% established a smoke-free policy. We will use the 6-month follow up as our final follow up because it is bench mark for HANDS evaluation.

The outcomes will be measured using items from National Behavioral Risk Surveillance Survey and National Adult Tobacco Survey.

Survey questions:
Q1: Which statement best describes the rules about smoking inside your home?
A1. smoking is not allowed anywhere inside your home; smoking is allowed in some places or at some times; smoking is allowed anywhere inside your home; there are no rules about smoking inside your home (CDC BRFSS)

Q2: In the last two months, has anyone tried to establish a smoke-free rule in your current home? By smoke-free, we mean that smoking is not allowed at any time or any place within your home

Q3. How often does anyone smoke inside your home?  
A3: Daily; Weekly; Monthly; Less than monthly; Never; Don’t know

Q4: During the past 7 days, how many days have people smoked in your home in your presence?” (WHO Global Adult Tobacco Survey)

Q5: On how many of the past 7 days, did anyone smoke in your home while you were there?  
A5: Number days (1-7); I was not home in the past 7 days (CDC BRFSS)

The second measurement used to measure out primary outcome is an air nicotine monitor. Air nicotine monitors are an accepted measurement of secondhand smoke exposure enclosed, microenvironment. The monitors are preferred over other methods because they are tobacco specific, sensitive at low concentrations and easy set-up. Air nicotine monitors will be provided by Johns Hopkins Institute for Global Tobacco Control Second Hand Smoke (SHS) Exposure Assessment Laboratory. HANDS home visitors will be trained on placement and set up of monitors via web-training per John Hopkins School of Public Health and Co-Investigator Dr. Aldridge. The monitors are manufactured by John Hopkins School of Public Health and will be analyzed by them. The monitors will be left in the home for approximately seven days, then removed by the HANDS nurse. The monitors will be sent to John Hopkins Exposure Assessment Laboratory to analyzed. Participants in the enhanced care group
will receive their air nicotine levels

*Secondary outcome: Decrease the number of cigarettes consumed by 45%*

Items assessing current tobacco use have been used by the investigators in previous studies and have been adapted from national surveys of adult tobacco use. Surveys will be given to all participants at the two follow up points (6-8 weeks postpartum and 6 months postpartum). The pilot study for Some Things Are Better Outside, found that the number of cigarette consumed decreased by 36%, we will aim for a higher reduction based on our adaptations and focus on smoking cessation support. Information will be collected on type of tobacco product used (e.g., cigarettes, smokeless, tobacco, cigars, loose leaf), when last used tobacco products, number of cigarettes smoked per day, number of days smoked in the last month, number of times they had ever tried to quit and in the past 2 months, number of days abstinent during the last quit attempt, and methods used in the past to quit smoking including medications and nicotine replacement therapy (NRT).

Examples of items that will be included are:

Q1. Are you thinking about quitting smoking within the next 6 months/30 days
   A1. Yes; No
Q2. How many times during the past 2 months have you stopped smoking for one
   Q3. On average, on the days you smoke, how many cigarettes do you smoke in a day?
   A3. Numerical Value
Q4. Did you contact any of the smoking cessation services?
   A4. Yes; No

Two additional questions will be added to assess participants' exposure with other smoke free interventions focusing on city/county smoking bans and local housing
authority smoke-free policies.

The following questions will be added to National Adult Tobacco Survey to assess attitudes and knowledge of SHSe and smoke bans in the home; Does your landlord have a smoking ban for inside the home?; If you have not already, would you implement a smoking ban your home?

C.2. Performance Measures

The program uses a web-based system called HANDS 2.0 as a resource for employees to input program data, retrieve quality assurance reviews, parent satisfaction surveys, training schedules, and the handbook. Home visitors are required to collect participant data including: demographics, family activities, ER visits, insurance coverage, referrals, screening results, childproofing checklist, well child visits and immunization compliance. This data is used to inform future decisions based on participant needs, monitor progress towards benchmarks and quality assurance reviews. HANDS currently collects data on gender and race/ethnicity for all participants starting at the initial referral. Data will be extracted for study participants and imported to ensure that we can report the number of households receiving air quality monitors, and the gender and race/ethnicity of individuals within those households. Additional data will be taken by home visitor using a survey designed by the research team. We will also record data on the number of smokers in the home and smoking status. We will use the

C.3. Formative/Implementation Evaluation

The public health liaison will use the information gathered from the focus groups,
CAB, HANDS home visitors and the research team to create new materials. These materials will be evaluated via phone interviewer for participant privacy survey during the last program visit. The process evaluation will include items from the original study which are:

Q1. How often do you review/look at the materials?
A1. Never; Rarely; Sometimes; Often
Q2. How relevant were the materials to you personally?
A2. Not at all; a little; somewhat; very/a lot
Q3. How useful or helpful was the information in the materials?
A3. Not at all; A little; Somewhat; Very/a lot
Q4. Did you (or someone in your home) any of the following? Yes reported
A4. Come up with a list of reasons for making your home smoke-free?; have a talk with your family or household members about making your home smoke-free; sign the pledge; post the pledge; put up the signs; use the stickers; contact smoking cessation services
Q5. How useful or helpful was the information on air nicotine levels in the home?
A5. Not at all; A little; Somewhat; Very/a lot
Q6. Did you feel comfortable having the air nicotine in your home
A6. Not at all; A little Comfortable; Very Comfortable

At the 6-week postpartum visit, participants will be evaluated on their stage of change in regards to establishing a smoke-free policy, if they have yet to establish a smoke-free policy but are in the contemplation stage we will repeat the intervention. We will repeat the intervention to examine the differences between participants who establish a smoke-free policy prenatal versus postpartum and status of their policy at 6 months. In the original study 43% of their participants did not have children in the home, and we want to know the effects of having children in the home and early adopters vs late adopters. The program is designed as an early intervention prior to the child’s exposure to secondhand smoke in the home but because we know there is a difference between early adopters and late adopters.
To ensure the program is being implemented according to project protocols, there will be several quality assurance activities and checkpoints. HANDS nurses and program coordinator Margret Jones, will communicate weekly though e-mail to discuss scheduled home visits, data collection and challenges. HANDS nurse will work with the program coordinator to address proposed changes or challenges and develop a timeline for implementation. Any proposed changes will be reviewed by PI before implementation. The program coordinator and PI will discuss challenges and progress of the project on a weekly basis. Data will be evaluated on a quarterly basis by data manager Jasmine Price but data input will occur weekly by HANDS nurses through SharePoint.

C.4. Bench marker

Bench markers have been created to help focus the research team’s efforts each year. The principal investigator is responsible for the team’s progress towards these bench markers each year. Analysis of benchmark data will be presented at bi-annual meetings to demonstrate areas of improvement and progress towards outcomes. The bi-annual meetings will be attended by the CAB, home visitors and the research team. These meetings allow for feedback on project implementation and review of participant’s process evaluations.

Year 1: By the end of Y1 the following goals will be met: 1) consultation with Johns Hopkins School of Public Health; 2) contracts developed with local partnering health department (Lake Cumberland District) and design firm 3) all study personnel will
be hired and trained on key components of the enhanced intervention; 4) Initial meeting of Community Activities Board; 5) focus groups will be completed; 6) completion of tailored materials 7) completion of web-based nicotine monitor training for all study personnel; 8) all study personnel will be have access and be trained on the data management system SHAREPOINT; 9) recruitment of 10% of the estimated sample; 10) completion of two site visits to each of the health department (McCreary, Russell, and Wayne); and 11) complete annual project summary;

Year 2: By end of Y2 the following goals will be met: 1) total recruitment of 100% of estimated sample; 2) complete preliminary data analysis of Specific Aims #3; 3) complete annual project summary; 4) complete two site visits to each of the health department to include SHAREPOINT/survey data; 5) present preliminary data at bi-annual meetings with CAB; 6) discuss sustainability and expansion with CAB and research personnel; and 7) assess for attrition and need for additional sampling.

Year 3: By end of Y3 the following goals will be met: 1) complete all data collection through last time-point (6-month postpartum); 2) complete data analysis of Specific Aims #1-3; 3) complete FINAL project summary; 4) complete a site visits to each of the health department; 5) discuss sustainability and expansion with CAB and research personnel; 6) present data at final annual meeting with CAB; 7) Present preliminary data at biennially HANDS meeting

D. Capacity and Experience of the Applicant Organization

University of Kentucky
The University of Kentucky is a public, research-extensive, land grant university dedicated to enriching people’s lives through excellence in teaching, research, and service. As the flagship institution of Kentucky, it plays a critical leadership role for the Commonwealth by promoting human and economic development that improves lives within Kentucky’s borders and beyond. The University is accredited by the Southern Association of Schools and Colleges (SACS). The University of Kentucky support research targeting reducing tobacco consumption and improving air quality through UK Tobacco Policy Research program (UK TPRP) and UK Clean Indoor Air Partnership (CIAP). The University of Kentucky Tobacco Policy Research Program (UK TPRP) is housed in the UK College of Nursing under the direction of Dr. Stacy Aldridge, Co-Investigator for proposed study. The mission of UK TPRP is to foster healthier communities by reducing tobacco use and exposure to secondhand smoke and radon through research, surveillance, and policy development. The UK TPRP has two arms: Tobacco Treatment and Prevention and the Clean Indoor Air Partnership (see below). UK TPRP collaborated with other health care and community partners to implement and evaluate the Bluegrass Quit and Win Partnership, winner of the 2002 Champion for Tobacco-free Communities Award from the National Association of City and County Health Officials. UK TPRP houses the Kentucky Center for Smoke-free Policy, a dissemination and implementation research center that assists communities in the development and implementation of smoke-free policy. UK TPRP is in process of developing an interdisciplinary Tobacco Dependence Treatment Center at UK
HealthCare. UK TPRP consists of a large team of faculty researchers and clinicians, staff from a variety of disciplines, students from both undergraduate and graduate programs across the university, and over 80 community engagement partner organizations. The UK Clean Indoor Air Partnership (CIAP), a community engagement and implementation research program of the UK TPRP, provides communities with science-based strategies for promoting clean indoor air through research, education and policy development. CIAP has been recognized as one of UK’s Commonwealth Collaboratives. CIAP has three Divisions: Research (Rural Smoke-free Communities Project), Education (Radon Awareness Project), and Policy (Kentucky Center for Smoke-free Policy and the Northern Kentucky Clean Indoor Air Collaborative). CIAP has provided technical assistance to multiple Kentucky communities in their efforts to enact smoke-free ordinances and regulations, and radon education to lay and professional groups across the state. CIAP has had success in working with both rural and urban communities and in economically diverse localities. Since 2005, CIAP has had a contract with the State Radon Program to develop educational materials designed to couple the secondhand smoke and radon exposure messages. CIAP serves on the state radon and tobacco control coalitions and the state Radon Strategic Planning Committee.

The Office of Research and Scholarship is the research nucleus of the College of Nursing and is located on the 5th floor of the College. The offices, and services they provide, are easily accessible to faculty and staff at the University. The Office of
Research provides support services and encouragement for the college’s research activities. Available resources include assistance in: locating funding sources; preparing proposals (from inception of idea to proposal submission); literature searches; statistical, research design, and sampling design support; survey development; psychometric consultation; and manuscript and poster preparation and editing. The Office of Research includes offices which house the Associate Dean for Research, her Administrative Coordinator, a Grants Facilitator, a College Grants Officer, an Epidemiologist, a biostatistician, and a full-time master's-prepared Information Specialist. PhD-prepared and Master's-prepared Biostatisticians provide statistical consultation and expertise in epidemiological methods.

**SharePoint**

Microsoft® SharePoint will serve as the online central communication and data hub for administration of the project. SharePoint has been chosen to assist with collaboration and web-publishing for this project, and will exist on a single, protected server at the University of Kentucky. Each participating HANDS nurse and all key study personnel will have secure, password-protected access to the SharePoint site, which will feature a study-specific Document Library (i.e. IRB forms, case report forms, study protocols, etc.), electronic data collection modules, calendar of meetings and events, and study reports. The SharePoint site designed for this project will also feature a Blog for team members to share ideas, announcements, updates and to trouble-shoot any issues.

**Laboratory**
Airborne nicotine sampling and analysis support will be provided by the Johns Hopkins Institute for Global Tobacco Control Second Hand Smoke (SHS) Exposure Assessment Laboratory. John Hopkins laboratory has extensive experience conducting SHS exposure assessments (refs). Briefly, airborne nicotine is sampled using a passive sampler based on a design published by Hammond et al (1987). The sampler consists of a cassette holder, treated sample filter, and a diffusion screen. Once collected, samples are analyzed using gas chromatography with nitrogen detection. The Secondhand Smoke exposure assessment laboratory (SHSEAL) is a part of the Johns Hopkins Institute for Global Tobacco Control (IGTC). The SHSEAL supports tobacco control research through use of a number of methods, including biomonitoring, air sampling, dust sampling and through questionnaires. Specific sampling and analytical methods include airborne nicotine, dust nicotine and hair nicotine. Future methods being developed will include salivary cotinine and nicotine handwiping analysis.

**Discrimination Policy**

The University of Kentucky complies with the federal and state constitutions, and all applicable federal and state laws, regarding nondiscrimination. The university provides equal opportunities for qualified persons in all aspects of university operations, and does not discriminate on the basis of race, color, national origin, ethnic origin, religion, creed, age, physical or mental disability, veteran status, uniformed service, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, social or economic status, or whether the person is a smoker or nonsmoker, as long as the person complies with university policy concerning
smoking.

E. Partnerships & Collaboration

Partners

Division of Maternal and Child Health

Division of Maternal and Child Health (MCH) in the Kentucky Department of Public Health oversees state based initiatives to improve health outcomes of women and children. MCH provides leadership in addressing the needs of this population by directing initiatives to achieve goals as outlined by the needs assessment. HANDS is a Title V program within the division of MCH in the Early Child Development Branch. Other programs include Healthy Start in Child Care, Early Childhood Mental Health, First Steps - Kentucky’s Early Intervention System, Newborn Metabolic Screening and Kentucky Birth Surveillance Registry. In the 2015 needs assessment performed by MCH identified smoking during pregnancy as one of the main issues for infants and babies and will be targeting more resources to this issue.

Lake Cumberland District Health Department

Lake Cumberland District Health Department serves 10 counties in eastern Kentucky, including Russell, McCreary and Wayne. The mission statement of the district health department is to “prevent illness and injury, promote good health practices, and assure a safe environment to protect and improve the health of our communities”. They offer over 70 programs and services to help improve the health outcomes of their citizens. Maternal and Child health programs include a breast feeding peer counselor,
smiling schools, tobacco free schools, and HANDS. Lake Cumberland has great experience implementing evidence-based programs such as Life CHANGE a diabetes prevention program. They also offer an “Unconventional Home Gym” video series to teach residents how to exercise at home if they do not have access to a home gym. Lake Cumberland District Health Department also operates on a 5.3 million-dollar budget.

HANDS

HANDS is well integrated into the state’s infrastructure designed to support the needs of children in Kentucky. The main goal of HANDS aligns with program goals and addresses one of the to improve air quality for children through smoke-free policies established by household members. Local health departments manage HANDS at the county level. Each health department employs a Program Coordinator, Supervisor, Parent Visitor, a Registered Nurse or Social Worker visitor, a Family Support Worker (professional or paraprofessional) and data entry personnel to support HANDS. HANDS collaborates with Kentucky Strengthening Families, Help Me Grow Kentucky, and Connect the Dots to support families graduating out of program by offering referrals, incorporating protective factor language and training parents how to manage difficult behaviors. Evidence-based programs are embedded into the HANDS curriculum to further strengthen the parental support. Examples of these programs include Moving Beyond Depression (MBD) to provide linkage to mental health services and screen mothers for depression, and Growing Great Kids reinforcing parental attachment, life
skills and child development. HANDS home visitors undergo a rigorous training regimen to develop the skill set to assess family needs, reduce family stressors and empower families through strength-based programming. All staff members are required to participate in extensive training as required by the Training Coordinator along with continuing education each year and new trainings held during the bi-annual conference.

*Shatterbox*

Shatterbox is a local graphic design company based in Louisville and Lexington, Kentucky with extensive experience in creating and innovating brand design. We will be collaborating with Shatterbox to create new brochures, guidebooks and other educational materials for our project. Shatterbox works with a team of writers, photographers, and designers to develop brand identity digitally and in print. Their clientele includes Dalton, Cumberland Valley National Bank and The Gray Book.

*Collaborations*

*Smoke-Free Kentucky*

Smoke-Free Kentucky is a coalition of public health groups and other advocates for reducing secondhand smoke exposure and negative health outcomes. The coalition advocates for more smoke-free spaces in Kentucky. Smoke-Free Kentucky will work with our research team during the planning phase and sustainability efforts.

*American’s Nonsmokers’ Rights*

A lobbying organization dedicated to promoting clean air for nonsmokers through increased tobacco legislation on public enclosed spaces. The organization offers a web-
based platform specific to Kentucky to promote our program and research findings.

F. Project Management

<table>
<thead>
<tr>
<th>Role</th>
<th>% Effort</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harper Avery</td>
<td>25</td>
<td>All aspects of study Training, study design, data collection and management, implementation</td>
</tr>
<tr>
<td><strong>Principal Investigator</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stacy Aldridge</td>
<td>10</td>
<td>Training HANDS home visitors on environmental feedback and placement of air nicotine monitors</td>
</tr>
<tr>
<td><strong>Co-Investigator</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Margret Jones</td>
<td>100</td>
<td>Day-to-day operations, quality assurance, data management</td>
</tr>
<tr>
<td><strong>Program Coordinator</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TBD</td>
<td>100</td>
<td>Recruitment,</td>
</tr>
<tr>
<td><strong>Program Coordinator Assistant</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alexandria Tibet</td>
<td>20</td>
<td>Design, planning and implementation of project, coordinate focus groups, analysis of focus group feedback</td>
</tr>
<tr>
<td><strong>Public Health Liaison</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jasmine Price</td>
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<td>Monitoring data management, assist with data analysis</td>
</tr>
<tr>
<td><strong>Data Manager</strong></td>
<td></td>
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</tr>
<tr>
<td>Richard Webster</td>
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<td>Data analysis</td>
</tr>
<tr>
<td><strong>Biostatistician</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HANDS home visitor</td>
<td>100</td>
<td>Implementation of program, data collection, data input</td>
</tr>
</tbody>
</table>

The project team will consist of a principal investigator, co-investigator, project coordinator, data manager, public health liaison, biostatistician, and HANDS nurses contracted from Lake Cumberland District Health Department.

**Principal Investigator**
Harper Avery is a certified Women’s Health Nurse Practitioner and Associate Dean of Research at the UK College of Nursing with experience in prenatal tobacco and smoking cessation research. Dr. Avery has publications on prenatal tobacco use and preterm birth outcomes, measurement of hair cotinine level, and mental health interventions for nicotine abuse during pregnancy. She has led three funded preterm birth prevention studies, including assessments of individual-level tobacco use, secondhand smoke exposure and relapse. She has extensive success in her ability to implement and refine recruitment and retention strategies for pregnant and postpartum women. She has several publications on prenatal tobacco use and behaviors. Dr. Avery is the administrator for Kentucky GIFTS (Giving Infants and Families Tobacco-free Starts) which works in collaboration with the Kentucky Public Health Department to provide smoking cessation interventions and wellness services to prenatal and postpartum mother’s in Appalachia. Dr. Avery has previously implemented programs in selected counties and has an existing relationship with both health departments.

Dr. Avery will oversee all aspects of study. Dr. Avery will work with Dr. Aldridge and Margret Jones to plan trainings of HANDS nurses. As principal investigator, Dr. Avery will work directly with survey design, recruitment, quality meetings, data collection protocols and implementation.

Co-Investigator

Stacy Aldrige Alumni Professor in the Colleges of Nursing and Public Health at the University of Kentucky in Lexington, and is a Faculty Associate at the UK Prevention
Research Center. Dr. Aldridge directs the Tobacco Policy Research Program and the Clean Indoor Air Partnership including the Kentucky Center for Smoke-free Policy in the College of Nursing (see www.mc.uky.edu/tobaccopolicy). Through the Kentucky Center for Smoke-free Policy, Dr. Aldridge and her colleagues have assisted many of Kentucky’s 20 communities to go smoke-free. Dr. Aldridge is currently the Principal Investigator on a 5-year Rural Smoke-free Communities research project funded by the National Heart, Lung and Blood Institute. Aldridge and colleagues partner with the Kentucky Department for Public Health to conduct tobacco policy surveillance in all health department service areas. Aldridge also is the Project Director for a Robert Wood Johnson Foundation-funded project, Northern Kentucky Clean Indoor Air Collaborative for Healthy Communities. Dr. Aldridge is the PI for the FRESH project (Freedom from Radon and Smoking in the Home), measuring the impact of home screening, environmental feedback intervention to reduce radon and SHS in the home. FRESH also uses air nicotine monitors provided by John Hopkins.

Dr. Aldridge experience and expertise in tobacco measurement will be utilized to train HANDS nurse and monitor the use of air nicotine monitors. Dr. Aldridge along with Margret Jones will coordinate the web-based training of HANDS nurses on air nicotine monitors. Challenges related to the monitors will be addressed by Dr. Aldridge.

Program Coordinator

As program coordinator, Margret Jones is in charge of day to day operations of the study, determining adjustments or terminations, quality assurance, training and
planning an annual meeting. Mrs. Jones will work closely with Drs Avery and Aldridge to train HANDS nurses on data collection (air nicotine monitor placement, hair collection, distribution of surveys). Program coordinator is responsible for monitoring data collection, distribution of materials to personnel, evaluation of HANDS nurses and serving as liaison between nurses and the research team. The program coordinator will review research procedures with HANDS nurse in an annual meeting. The annual meeting, lead by Mrs. Jones, will provide an update on the study’s progress and report current data. Members of the research team are expected to attend this meeting. Partners and collaborators of the study will also be invited to attend. In addition to the annual meeting, the program coordinator will communicate with HANDS nurses through individual weekly updates via e-mail. These weekly updates will review scheduled home visits, data collection and performance. Mrs. Jones will be in continuous contact with the research team and partners.

*Project Coordinator Assistant*

As a registered nurse and tobacco treatment specialist, Mrs. Katherine Carmichael will serve in a dual role to coordinate recruitment strategies at the Rural Health Clinic and Lake Cumberland Health Department as well as provide counseling, treatment and educational materials related to tobacco product usage and domestic violence. The specialist will work with the project team to develop protocols for the project’s patients.

*Data Manager*
Jasmine Price has extensive experience in data management and quantitative data analysis. As data manager, Price will work closely with Margret Jones, program coordinator, to ensure data collection is accurate and current. Jasmine Price will also receive the weekly updates from HANDS nurse Price will work with the research team during implementation and the final year of data analysis.

Public Health Liaison

Alexandria Tibet is a community health specialist at the health department, and will serve a public health liaison for the project. Mrs. Tibet will serve as the primary liaison between the HANDS program and University of Kentucky. Mrs. Tibet will work closely with with the media team and Mrs. Jones to recreate the intervention materials. Mrs. Tibet’s close relationships in the community will help to create materials that are relatable and culturally appropriate for the community. Tibet will be responsible for coordinating focus groups to provide feedback on the new materials.

Biostatistician

We will hire a biostatistician to help analyze the data throughout the study. The biostatistician will work closely with the data manager and the principal investigator to manage data and create annual reports

Health Department

The local health department will be collaborating with the the research time to manage and monitor the tasks and responsibilities of HANDS nurses. HANDS nurses are responsible for recruiting participants, placing air nicotine monitors, collecting air
nicotine monitors, hair nicotine testing of infants, and providing environmental feedback when appropriate. The HANDS nurses will be provided with questions to screen HANDS participants for eligibility in the study. Mrs. Jones is responsible for distributing the additional screening survey. Qualified participants should be offered the opportunity to participate prior to 20 weeks. The HANDS nurses will be trained to place air nicotine monitors via John Hopkins web trainings. Stacy Aldridge will be responsible that each participating HANDS nurse has completed each training. They will collect the air nicotine monitors exactly one week following placement and send them to the John Hopkins Laboratory. They will repeat this 4 times throughout the duration of the study of the participant. HANDS nurses will also collect hair samples from the infants at birth and 6 months. Dr. Avery will be responsible for training HANDS nurses how to properly collect hair and provide environmental feedback. HANDS nurses will be required to participate in an initial training and attend the annual meeting as a refresher and updates to data collection protocol. To maintain accurate data, nurses will be required to send weekly data updates to the program coordinator and data manager. These e-mails will serve as record of home visitation and monitoring of data collection.
Appendix 1: Logic Model
Appendix 2: Work Plan

**Goal:** Improve indoor air quality for HANDS participants in rural Kentucky
Annual reach less than 500,000

**Personnel Salary**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>% Effort</th>
<th>Salary</th>
<th>Grant funded Salary</th>
<th>Fringe Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harper Avery</td>
<td>Principle Investigator</td>
<td>25</td>
<td>$110,497</td>
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<tr>
<td>Stacy Aldridge</td>
<td>Co-Investigator</td>
<td>10</td>
<td>$112,345</td>
<td>$11,234</td>
<td>$2,387</td>
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<tr>
<td>Margret Jones</td>
<td>Program Coordinator</td>
<td>100</td>
<td>$72,450</td>
<td>$72,450</td>
<td>$15,395</td>
</tr>
<tr>
<td>Rachel Carmichael</td>
<td>Project Coordinator</td>
<td>100</td>
<td>$65,930</td>
<td>$65,930</td>
<td>$14,010</td>
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<td>Jasmine Price</td>
<td>Data Manager</td>
<td>10</td>
<td>$78,250</td>
<td>$7,825</td>
<td>$1,662</td>
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<tr>
<td>Richard Webber</td>
<td>Biostatistician</td>
<td>8</td>
<td>$72,268</td>
<td>$5,781</td>
<td>$1,228</td>
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<tr>
<td>Alexandria Tibet</td>
<td>Public Health Liaison</td>
<td>35</td>
<td>$55,863</td>
<td>$19,552</td>
<td>$4154</td>
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<tr>
<td>TBD</td>
<td>Phone interviewer</td>
<td>100</td>
<td>$1,000</td>
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<td>$212</td>
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<tr>
<td><strong>Total per year</strong></td>
<td></td>
<td></td>
<td>$211,396</td>
<td>$51,293</td>
<td></td>
</tr>
<tr>
<td><strong>Total program</strong></td>
<td></td>
<td></td>
<td>$634,188</td>
<td>$153,879</td>
<td>$788,067</td>
</tr>
</tbody>
</table>

**Principle Investigator**

Dr. Avery will oversee all aspects of study. Dr. Avery will work with Dr. Aldridge and Margret Jones to plan trainings of HANDS nurses. As principal investigator, Dr. Avery will work directly with survey design, recruitment, quality meetings, data collection protocols and implementation.


**Co-Investigator**

Dr. Aldridge experience and expertise in tobacco measurement will be utilized to train HANDS nurse and monitor the use of air nicotine monitors. Dr. Aldridge along with Margret Jones will coordinate the web-based training of HANDS nurses on air nicotine monitors. Challenges related to the monitors will be addressed by Dr. Aldridge.

**Project Coordinator**

As program coordinator, Margret Jones is in charge of day to day operations of the study, determining adjustments or terminations, quality assurance, training and planning an annual meeting. Mrs. Jones will work closely with Drs Avery and Aldridge to train HANDS nurses on data collection (air nicotine monitor placement, hair collection, distribution of surveys). Program coordinator is responsible for monitoring data collection, distribution of materials to personnel, evaluation of HANDS nurses and serving as liaison between nurses and the research team. The program coordinator will review research procedures with HANDS nurse in an annual meeting. The annual meeting, lead by Mrs. Jones, will provide an update on the study’s progress and report current data. Members of the research team are expected to attend this meeting. Partners and collaborators of the study will also be invited to attend. In addition to the annual meeting, the program coordinator will communicate with HANDS nurses through individual weekly updates via e-mail. These weekly updates will review scheduled home visits and data collection. Mrs. Jones will be in continuous contact with the research team and partners.
Project Coordinator Assistant (PCA)

As the assistant to project coordinator, the PCA will serve in a dual role to coordinate recruitment strategies at the Lake Cumberland Health Department as well as provide counseling, treatment and educational materials related to tobacco product usage. The specialist will work with the project team to develop protocols for the project’s participants.

Data Manager

Price will work closely with Margret Jones, program coordinator, to ensure data collection is accurate and current. Jasmine Price will also receive the weekly updates from HANDS nurse Price will work with the research team during implementation and the final year of data analysis.

Public Health Liaison

Alexandria Tibet is a community health specialist at the Lake Cumberland Health Department, Tibet will serve as our public health liaison working to build a relationship in the community and collect qualitative data. Tibet has previous experience with focus groups and creating health promotion materials.

Phone Interviewer

A phone interviewer will be hired and trained to interview participants following completion of the intervention. The interview will survey participants on their overall experience in the study, and evaluate the HANDS visitor performance. The interviewer will be paid for three phone calls per household. The interviewer must be able to read
questions and type at least 25 wpm. They will be required to record the number of phone calls made and elicited responses.

**Contracted Services**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary</td>
<td>$60,000</td>
<td>$60,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>Training Cost</td>
<td>$5,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fee for service</td>
<td>$15,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$80,000</td>
<td>$60,000</td>
<td>$60,000</td>
</tr>
</tbody>
</table>

A total of $210,000 will be allocated to Russell, Wayne, and McCreary counties to cover salary, travel, and fringe benefits of HANDS nurses. The nurses will be compensated for the extra visits, and data collection at equal pay of Medicaid billing codes with allocated money. The local health department will be collaborating with the the research time to manage and monitor the tasks and responsibilities of HANDS nurses. HANDS nurses are responsible for recruiting participants, placing air nicotine monitors, collecting air nicotine monitors, hair nicotine testing of infants, and providing environmental feedback when appropriate.

**Design firm**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local design firm</td>
<td>$35,000</td>
<td>$5,000</td>
<td>$5,000</td>
</tr>
</tbody>
</table>
We will pay Shatterbox design firm $35,000 to initially remake all of the materials.

We will contract them for an additional two years to make any proposed changes throughout the project period.

### Supplies

<table>
<thead>
<tr>
<th>Item Requested</th>
<th>Type</th>
<th>Number needed</th>
<th>Unit Cost</th>
<th>Amount Requested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air nicotine monitor</td>
<td>500 (2 per family + additional monitors)</td>
<td>90 each</td>
<td>$45,000</td>
<td>$16,200</td>
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<tr>
<td>General office supplies</td>
<td>Pen, paper, pencils</td>
<td></td>
<td>$550</td>
<td></td>
</tr>
<tr>
<td>Educational pamphlets</td>
<td>Smoking cessation</td>
<td></td>
<td>$200</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>$45,750</td>
<td><strong>16,950</strong></td>
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</table>

### Travel

<table>
<thead>
<tr>
<th># attending</th>
<th>Lodging</th>
<th>Cost of Travel</th>
<th>Conference Fee</th>
<th>Number of Nights</th>
<th>Amount Requested</th>
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</thead>
<tbody>
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<td>$750</td>
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<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>5,237</strong></td>
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</tbody>
</table>

Margret Jones will be attending the annual Clean Air for Kids conference in Washington D.C. The conference will cover research advances in improving air quality of children. At the end of the second year, Margret Jones and Dr. Avery will attend the
regional meeting for Tobacco Free Kids to present the progress of the project. There are 9 scheduled site visits or CAB meetings in Lake Cumberland District research personnel are required to attend. We will compensate personnel for travel at the University of Kentucky mile reimbursement rate for a personal owned vehicle at 54 cents per mile. We estimate at 78 miles each way; this will total 1,404 miles throughout the duration of the study.

**Total Budget**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel</td>
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<td>$262,689</td>
<td>$262,689</td>
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<td>Incentives</td>
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<td>Supplies</td>
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<td>Travel</td>
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<td><strong>Total</strong></td>
<td>396,295</td>
<td>$338,900</td>
<td>$332,309</td>
<td>$1,095,650</td>
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55
References

Family and carer smoking control programmes for reducing children’s exposure
to environmental tobacco smoke. Cochrane Database of Systematic Reviews

Effectiveness of motivational interviewing to reduce head start children's
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Florek E, Piekoszewski W, Basior A, Merritt AT, Mazela J, Lechowicz W, Kornacka MK,
Kramer L. Effect of maternal tobacco smoking or exposure to second-hand smoke on the levels of 4-
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PMID: 21893699.

Frazer, K., Callinan, J. E., McHugh, J., van Baarsel, S., Clarke, A., Doherty, K., &
Kelleher, C. (2016). Legislative smoking bans for reducing harms from
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Cochrane Database Syst Rev, 2, Cd005992.

http://doi.org/10.1097/PEC.0000000000000179


http://doi.org/10.1136/tc.2003.003889


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