



**THE UNIVERSITY OF QUEENSLAND**  
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**Smoking cessation promotion in the pediatric clinic:**

**Increasing pediatricians' rate of screening for second hand smoke exposure,  
counseling caregivers to stop smoking and referring caregivers to smoking  
cessation programs.**

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*A thesis submitted for the degree of Master of Philosophy at  
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School of Medicine*

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## **Abstract**

Smoking and second hand smoke exposure (SHSe) is the single most preventable cause of morbidity and mortality in the United States (Beaty, Dornelles, Sahuque, & Urrego, 2013). Currently, it is estimated that 46 million people in America are smokers (CDC, 2011). Although this only represents 14% of the population, approximately 54% of all children aged 3-11 are exposed to SHS (CDC, 2011). Infants and children exposed to SHS are at a 2.5 times increase risk of sudden infant death syndrome (SIDS) (NCDPH, 2008). In addition, SHS is responsible for up to 300,000 annual cases of bronchitis, pneumonia and otitis media in infants and children (CDC, 2011). In order to reduce this burden in children, it is imperative that those around them stop smoking.

Adults who participate in smoking cessation programs are more likely to reach their goals (Secker-Walker, Gnich, Platt, & Lancaster, 2002). Currently, the Louisiana Smoking Cessation Trust (SCT) is available to help Louisiana residents who began smoking prior to 1988 cease their dependency on tobacco. Approximately 460,000 of the 675,000 smokers in Louisiana are eligible for the SCT; it was unclear as to how many of those qualified are utilizing this free service. The first project in our series of studies aimed to determine if the caregivers of our pediatric population fit the criteria to participate in the SCT services. We found that 31% of caregivers smoke (national average is 14%), of which 44% were eligible for the SCT. In addition, 33% of SCT eligible caregivers were interested in smoking cessation. These findings demonstrated that our pediatric population is particularly vulnerable to the harms of SHSe; however, many of the smoking caregivers qualify for services provided by the SCT.

Next, we aimed to assess pediatricians' baseline knowledge and confidence level with respect to promoting smoking cessation and the SCT among caregivers. We found that the majority of pediatricians did not have formal smoking cessation training (only 7.4%) and only 7% refer to the SCT. Pediatricians stated that they were confident to screen, counsel and refer caregivers; however, they were significantly less likely to report actually screening for SHSe ( $p=0.037$ ), counsel ( $p=0.007$ ) and refer caregivers ( $p<0.001$ ). As a result, efforts should be made to increase the rate in which pediatricians provide smoking cessation, counseling, and referrals to the SCT through education and training.

Our next study aimed to determine if a short intervention implemented among pediatricians improves the promotion of smoking cessation to caregivers and awareness of the SCT. Pediatricians were randomly assigned to the control (C) or intervention group (IG). IG received an information lecture. All pediatricians received a survey to assess knowledge, confidence and behaviors in smoking cessation promotion and utilization of the SCT at baseline and post intervention. IG was more likely to make referrals to the SCT, compared to controls ( $p=0.048$ ) and to baseline ( $p=0.0065$ ). IG was more confident in recommending the use of NRT ( $0.040$ ) and schedule a follow up ( $p=0.029$ ) following the intervention. IG behavior increased with respect to referring caregivers ( $p=0.027$ ), discussing SHSe ( $0.031$ ) and nicotine replacement therapy ( $p=0.047$ ) post intervention. This study demonstrated to us that a short intervention significantly improved pediatricians' knowledge of the SCT. This intervention can increase confidence and behavior in various parameters of smoking cessation promotion; however, not all parameters were increased. Most notably, IG was more likely to refer without a change in screening and counseling behaviors.

In our next study, we aimed to determine if the implementation of a children's book in the pediatric setting could increase smoking cessation promotion. The children's book was tangible material geared to the pediatric patient, with the goal that the entire family would be involved in the caregivers smoking cessation journey. We found that the children's book significantly increased screening rates.

Lastly, it was our hope to find an intervention that would increase screening and counseling rates among pediatricians. Pediatric clinics were randomly assigned to no lecture, changes in electronic health record (EHR) (G1), lecture, no changes in the EHR (G2) or a lecture and EHR changes (G3). We found that documentation of SHSe was significantly greater statistically in the G3, when compared to G1 and G2 ( $p<0.01$ ). Documentation of SHSe was significantly greater statistically in the G1, compared to G2 ( $p<0.05$ ). No difference between groups was generated with respect to counseling. These results demonstrate that the implementation of a lecture with EHR prompts may be a brief and effective way to increase screening in the pediatric setting.

The findings of our project helped to further assess methods that may be utilized to encourage pediatricians to increase smoking cessation behaviors. We found that our pediatric population was especially susceptible to the harms of SHSe and that our pediatricians were not adequately performing smoking cessation promotion. Our

interventions did increase screening rates and physicians' referral behaviors; however, further studies are necessary to increase counseling rates in the pediatric clinic setting.

## **Declaration by author**

This thesis is composed of my original work, and contains no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

I have clearly stated the contribution of others to my thesis as a whole, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, and any other original research work used or reported in my thesis. The content of my thesis is the result of work I have carried out since the commencement of my research higher degree candidature and does not include a substantial part of work that has been submitted to qualify for the award of any other degree or diploma in any university or other tertiary institution. I have clearly stated which parts of my thesis, if any, have been submitted to qualify for another award.

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## **Publications during candidature**

### **Peer-reviewed papers**

1. **Hall K**, Kisely S, Gastanaduy M, Urrego F. Pediatricians' confidence and behaviors in smoking cessation promotion and knowledge of the Smoking Cessation Trust. *Ochsner J*. 29 Apr 2016. Epub ahead of print.
2. **Hall K**, Kisely S, Urrego F. The use of pediatrician interventions to increase smoking cessation counseling rates among smoking caregivers: A systematic review. *Clin Pediatr (Phila)*. 28 Feb 2016. doi: 10.1177/0009922816632347. Epub ahead of print.
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<b>Contributor</b>	<b>Statement of Contribution</b>
Katharine Hall Thomas, MBBS (Candidate)	Study concept (50%)  Study design (75%)  Data analysis (70%)  Acquisition of data (100%)  Manuscript preparation (50%)
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## **Keywords**

Pediatrician intervention, smoking cessation, smoking cessation screening, smoking cessation counseling, smoking cessation referral, smoking cessation trust of Louisiana, pediatric caregivers, CEASE intervention

## **ANZSRC**

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## **List of Abbreviations**

AAP – American Academy of Pediatrics

ANOVA – A One Way Analysis of Variance (ANOVA)

BPA – Best Practice Alerts

CEASE - Clinical and Community Effort Against Secondhand Smoke Exposure

EHR – Electronic Health Record

HSD - Honest Significant Difference

LPLA - Louisiana Product Liability Act

LPN – Licensed Practical Nurse

IRB - Institutional Review Board

MI - Motivational Interviewing

NCI - National Cancer Institute

OHS – Ochsner Health System

SCT – Smoking Cessation Trust

SHS - Second hand smoke

SHSe - Second hand smoke exposure

SIDS – Sudden Infant Death Syndrome

USPSTF - The United States Preventive Service Task Force



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# **Chapter 1**

## **1 Introduction**

Second hand smoke (SHS) is a major health concern. Infants and children exposed to SHS are at risk of worsening asthma, respiratory infections, otitis media and sudden infant death syndrome (SIDS) (U. S. Department of Health Human, 2006). In fact, infants of mothers who smoke had a 68% higher infant death rate, compared to infants whose mothers did not smoke (Mathews & MacDorman, 2004). In addition, SHSe places children at risk for respiratory tract infections, otitis media, severe asthma and decelerated lung development (Beaty et al., 2013) These statistics demonstrate the dangers of SHS exposure to children.

There is no safe level of second hand smoke exposure (SHSe); even short exposure irritates the airway and exacerbates asthma in children who already suffer from this condition. Also, chemicals in SHS have been shown to change the structure of platelets, causing them to adhere to vessel walls leading to decreased coronary flow (NCDPH, 2008)

Unfortunately, 54% of American children are exposed to SHS (CDC, 2011). This alarming percentage demonstrates the immediate need for smoking cessation among caregivers of children.

Currently, there is a Smoking Cessation Trust (SCT) in place to help more than 200,000 residents of Louisiana who began smoking prior to 1988 quit smoking. The ruling in *The Scott et al. vs. American Tobacco Company, et al.* class action lawsuit deemed anyone who started smoking prior to 1988 not covered by the Louisiana Product Liability Act (LPLA) (La. R.S.9:2800.51) and therefore eligible to compensation for the harmful effects of nicotine (SCT, 2013). This 250 million dollar trust will fund cessation medication, individual or group counseling, telephone quit support and intense cessation support services (SCT, 2013). This program is available free of charge to those that qualify.

Currently, less than 6% of all eligible people are enrolled in this program. The utilization of smoking cessation programs is a key component to decreasing SHS exposure among the pediatric population. The SCT has the potential to make a huge impact, socially and



economically. As part of the court ruling, the SCT is not permitted to advertise its service. The SCT's inability to advertise threatens the full potential of the trust.

Pediatricians can play an important role in determining accessibility to the statewide smoking cessation program. Smoking caregivers underutilize medical services for themselves but visit their children's pediatrician four times per year on average (Taylor BV, 1998; Wilson KM, 2011). The fact that the AAP recommends 10 well children visits before the age of 2 (A.A.P Pediatrics, 1997) (Fiore et al., 2008). This gives pediatricians ample time to form relationships with caregivers and follow up on caregivers' smoking cessation progress. As a result, pediatricians play a vital role in screening, counseling and referring caregivers to smoking cessation programs (Beaty et al., 2013).

Given this data, it is necessary to assess if pediatric patients are benefiting from the SCT through the mechanism of caregiver enrollment and if it is possible for pediatricians to reach this population. Perhaps this age group does not accompany children to doctor visits, therefore making advocating for the Trust's services at pediatrician appointments useless. Secondly, we do not know if pediatricians are aware of the SCT and routinely screen, counsel and refer caregivers to smoking cessation services. Perhaps pediatricians are in fact quite comfortable and able to conduct smoking cessation promotion, but it is the smoking caregivers who are not interested in smoking cessation.

If it is discovered that our pediatric population could benefit from promotion of the SCT and pediatricians are not promoting smoking cessation, interventions will be implemented to increase pediatricians' rates of screening for SHSe, counseling caregivers to stop smoking and referring smoking caregivers to the SCT (and other smoking cessation programs).

It has been shown that children who observe caregivers smoking are more likely to smoke themselves, thus putting them at risk for future damages associated with active smoking (CDC, 2011). According to the Social Cognitive Theory (SCT), children observe a model performing a behavior and the consequence of said action guides subsequent behaviors (Bandura, A., 1986). As a result, it is imperative that we stop smoking in caregivers to prevent the cycle of morbidity and mortality associated with nicotine use.

If our project is successful in increasing pediatricians' ability to promote smoking cessation among caregivers, this research may lay the foundations for future work in reducing SHSe in children.



## **Chapter 2**

### **2 Literature Review<sup>1</sup>**

#### **2.1 Introduction**

Smoking is the leading cause of preventable morbidity and mortality (CDC, 2011). Smoking rates in the United States are 18%, and over half of all children under the age of 11 are exposed to SHS (CDC, 2011; Gergen, Fowler, Maurer, Davis, & Overpeck, 1998). SHSe contributes to various health issues among children, such as bronchitis, pneumonia, and otitis media in infants and children (CDC, 2011). In addition, smoking cessation adds an average of 7 years to a parent's life span (Johansson, Hermansson, & Ludvigsson, 2004).

There is no safe level of tobacco exposure; even short exposure irritates airways and exacerbates asthma in children who already suffer from this condition. Particles and gases given off by cigarettes can cling to walls, clothes, hair and skin, causing the poisonous effects to linger in the home (NCDPH, 2008). Cotinine levels, a major metabolite of nicotine, can be up to seven times greater in children of parents who exclusively smoke outside the home, compared to those children of non smoking parents (Matt et al., 2011). These alarming statistics demonstrate the immediate need for smoking cessation among caregivers of children. The best way to reduce or eliminate a child's SHSe is to mitigate caregiver smoking. Smokers who use structured programs are more likely to stop smoking compared to those who try independently (Secker-Walker et al., 2002). Although structured smoking cessation programs are widely available through private health insurance or community-run programs, participation is limited by a lack of awareness of their availability among both caregivers and physicians. In addition, caregivers often do not see their own healthcare provider (Winickoff, Buckley, Palfrey, Perrin, & Rigotti, 2003). Given the American Academy of Pediatrics' recommendations of 10 well-child care visits by 2 years of age, parents will visit their child's pediatrician much more often than their own physician (Fiore et al., 2008; American Academy of Pediatrics,

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<sup>1</sup> Adapted from Hall, K., Kisely, S., Urrego, F. The use of pediatrician intervention to increase smoking cessation screening, counseling and referral rates among smoking caregivers –systematic review. *Clin Pediatr (Phila)*. Feb 28 2016; DOI: 10.1177/0009922816632347 <http://cpj.sagepub.com/content/55/7/583.short>

1997). This makes visits to the pediatrician an ideal setting to increase awareness and educate caregivers on the benefits of smoking cessation.

Several studies have addressed various interventions aimed at educating physicians to appropriately reduce SHSe among the pediatric population. The United States Preventive Service Task Force (USPSTF) states that counseling delivered to smokers for less than 10 minutes is effective at increasing smoking cessation and abstinence from smoking for 1 year (Force, 2009). To the best of our knowledge, there is no systematic review analyzing interventions geared to pediatricians to increase subjective and objective screening, counseling and referral rates of caregivers to smoking cessation programs. Therefore, we are conducting a narrative review to see if interventions geared at pediatricians increase their ability to screen, council and refer caregivers to smoking cessation programs to reduce morbidity among the pediatric population.

## 2.2 Methods

### Search Strategy

We conducted a search using PubMed/Medline (1966 to June 2015), EMBASE (January 1974 to June 2015) and PsychINFO (1840- June 2015) for studies using free text and MeSH term combinations that included: pediatric\* AND intervention AND smoking cessation. Assessment for study eligibility was unblinded. Studies of interest were limited to the following: 1) interventions aimed at a physician group responsible for pediatric patients that were original articles and reviews; 2) studies that investigated the effects of interventions on screening for smoking status, providing smoking cessation counseling to caregivers who smoke, and/or referring caregivers to smoking cessation programs, and; 3) studies published in English.

The titles and abstracts of all papers identified in the electronic searches were inspected for relevance. Full text of all papers that met inclusion criteria were obtained and reviewed to determine relevance. References were also searched for additional studies. The first author cross-referenced narrative and systematic reviews, posters, conference abstracts, letters to editors, and other articles that did not meet the inclusion criteria for relevant articles. Data collection was done by two researchers (K.H) and (F.U). Data extracted included the following: purpose of study, study design, participant population, intervention used and method of measuring intervention success. Any inconsistencies or disagreements during the selection of the studies, data extraction and quality evaluation

were resolved by discussing the study with all researchers (K.H., F.U. and S.K.) to reach a unanimous decision.

We were unable to carry out a meta-analysis because of sample heterogeneity and the wide range of methodologies employed in the studies we included. These included pre-post designs and controlled studies with non-randomized assignment of participants, as well as randomized controlled trials. In addition, there was a range of interventions and a variety of outcomes. We, therefore, undertook a narrative review.

#### Inclusion and Exclusion Criteria

We included all studies in which an intervention was aimed at a pediatrician with the intention of decreasing smoking rates of caregivers. The primary outcome was increasing screening, counseling and referral rates through intervention methods.

Both randomized control trials and non-randomized control trials were included in this review. Quasi-experiments were included on the basis of the limited number of RCTs.

Studies that consisted of health care workers other than pediatricians or pediatric residents (including but not limited to Physician Assistants, nurses, nurse practitioners, physiotherapists, diabetes educators, medical assistants) were excluded from the study. Although allied health care workers are essential to the reduction of SHS exposure, it appears that smoking cessation interventions administered by a physician are more likely to produce positive results than those delivered by allied health care workers (Kristin V Carson, 2012). Our specific goal, therefore, was to determine what interventions were most suitable for physicians given their training and limited time with each patient.

We included a wide range of possible interventions. These included the National Cancer Institute's (NCI) Smoking Cessation Training Program, the Clinical and Community Effort Against Second-hand Smoke Exposure (CEASE) model, Motivational Interviewing, prompts in electronic health care records and physician feedback.

In terms of outcomes, we included any study that used caregivers' exit interviews, physicians' self-reported surveys and/or electronic (or manual) chart review.

## 2.3 Results

The initial search of relevant databases (PubMed, Embase, PsychINFO) in June 2015 yielded 478 studies deemed relevant for the systematic review. All titles were reviewed for study relevance and language requirements. Definitive exclusions were made in 407 studies based on the purpose of the study and intervention method used. The remaining 71 abstracts were screened for eligibility. Of these, seven were excluded based on participant criteria, article duplicates (n=23), the purpose of the study (n=6) and intervention method used (n=13). This left 22 articles for full-text review. Of these remaining articles, exclusions were made on the basis on the type of participants (6), the purpose of the study (3) and intervention used (3). The final study we excluded was an abstract of an oral presentation (1). This resulted in 9 studies being included in the systematic review (Figure 1).

### Subjects

Pediatric residents were the only subjects in 6 studies (Collins, D'Angelo, Stearns, & Campbell, 2005; Houston et al., 2006) (Hymowitz, Pyle, Haddock, & Schwab, 2008; Hymowitz, Schwab, & Eckholdt, 2001; J. D. Klein, Portilla, Goldstein, & Leininger, 1995; Lee et al., 2004; Scal, Hennrikus, Ehrlich, Ireland, & Borowsky, 2004), while pediatricians were the sole subjects in 2 studies (Beaty et al., 2013; Hipple, Nabi-Burza, Hall, Regan, & Winickoff, 2013) (Table 1). The effects of the intervention were investigated in both pediatricians and pediatric residents in 1 study (Sharifi et al., 2014) (Table 1).

### Intervention Sample Size

The smallest sample size was 26 residents in one pediatric residency program while the largest consisted of 2069 residents enrolled in 16 different pediatric residency programs (Hymowitz et al., 2008) (Table 1).

### Intervention Methods

Four studies in this review employed the NCI's "5A's": Ask caregivers if they smoke, Advise that they quit smoking, Assess readiness to quit smoking, Assist with smoking cessation efforts and Arrange for the use of smoking cessation programs (Hymowitz et al., 2008; Hymowitz et al., 2001) (Table 1)

Two studies employed CEASE, a module to encourage physicians to take three steps to promote smoking cessation: ask caregivers if their child lives with anyone who smokes, assist with smoking cessation and refer caregivers to smoking cessation programs (Table 1).

Motivational interviewing (MI) was the intervention of choice in one study (Scal et al., 2004). MI has two critical components: one being the level of importance that one puts on the behavior in question and the second being the level of confidence that the individual has in their ability to change behaviors (Scal et al., 2004). MI aims to improve perceived importance of smoking cessation and confidence in the caregiver's one's ability to change (Scal et al., 2004) (Table 1).

A further study used prompts in the electronic health record system, supplemented with a 15-minute training session on tobacco smoke exposure management (Sharifi et al., 2014) (Table 1).

One study used practice-based evaluation of residents' performance (Houston et al., 2006). The intervention group received a feedback lecture, a form with individual feedback, and individual performance review sessions at their midyear evaluation (Houston et al., 2006) (Table 1).

### *Measures*

Electronic (Beaty et al., 2013) (Sharifi et al., 2014) and manual (Collins et al., 2005; Houston et al., 2006) chart review was used in four studies to measure outcome (Table 1). Caregiver exit interviewers were used in five (Hipple et al., 2013; Hymowitz et al., 2008) (Hymowitz et al., 2001; J. D. Klein et al., 1995) while physician self-report surveys were used in four studies (Hymowitz et al., 2001; J. D. Klein et al., 1995) (Scal et al., 2004) (Collins et al., 2005) (Table 1).

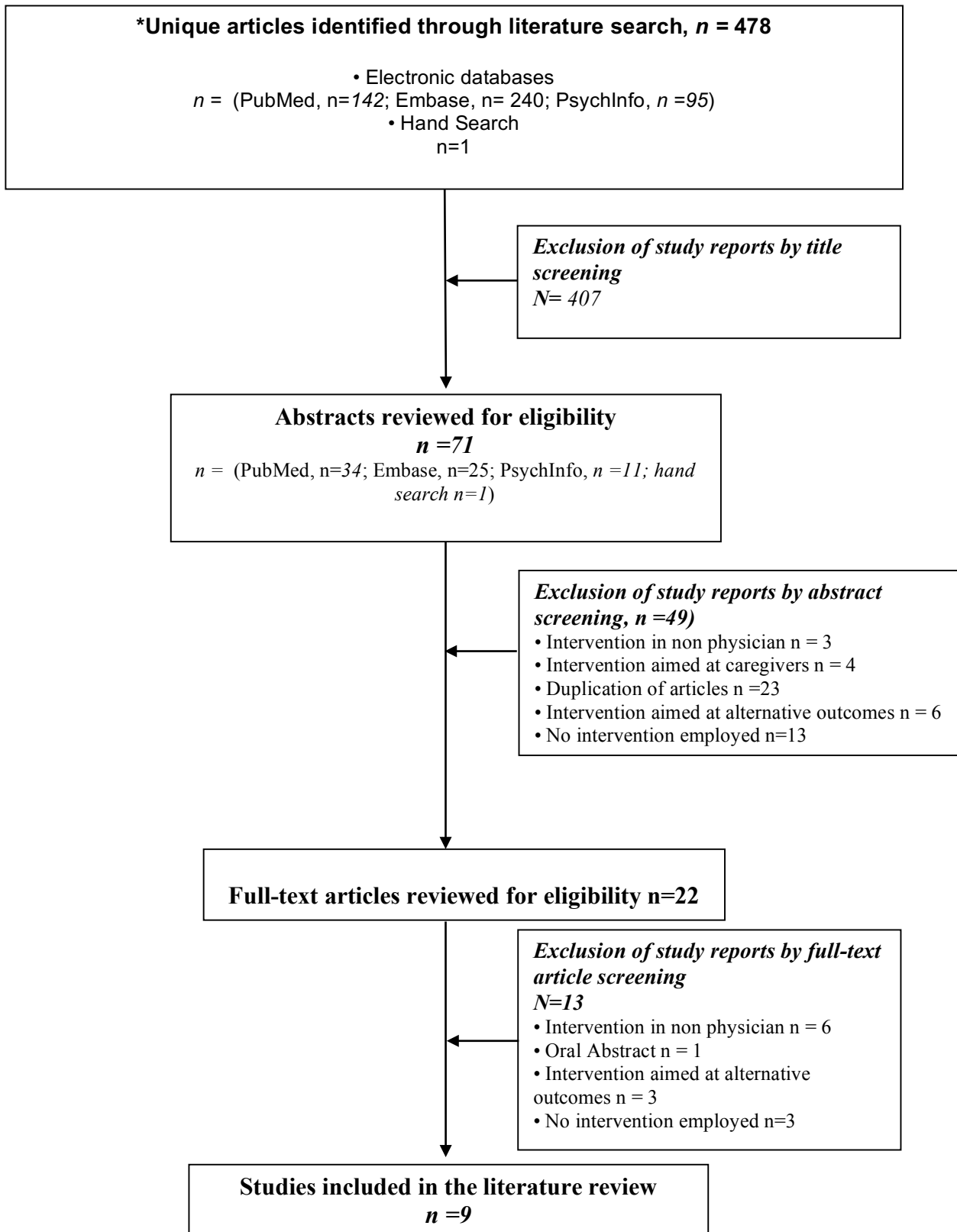


Figure 1: Quorum diagram of study selection



### *Data Collection*

All nine studies assessed pediatricians' interventions on counseling caregivers to stop smoking (Beaty et al., 2013; Collins et al., 2005) (Hipple et al., 2013; Houston et al., 2006; Hymowitz et al., 2008; Hymowitz et al., 2001; J. Klein et al., 2010; Scal et al., 2004; Sharifi et al., 2014). Eight studies also assessed pediatricians' interventions on screening caregivers for smoking behaviors (Collins et al., 2005; Hipple et al., 2013; Houston et al., 2006; Hymowitz et al., 2008; Hymowitz et al., 2001; J. Klein et al., 2010; Sharifi et al., 2014) while five studies examined the effect of an intervention on pediatricians' providing referrals to caregivers (Beaty et al., 2013; Hymowitz et al., 2008; Hymowitz et al., 2001; J. Klein et al., 2010; Sharifi et al., 2014) (Table 1).

### *Other Data Collection*

Several other variables were examined in the studies reviewed. However, no variable was consistently reported throughout all reports. For instance, one study followed up with the caregiver population to determine if they had stopped smoking or reduced SHS exposure in the home (Hymowitz et al., 2008). Two studies examined the impact of the intervention on other preventative health measures, such as the use of car seats or restraints, immunization rates, measurement of eye alignment (Houston et al., 2006) and screening and counseling for alcohol and drug abuse among caregivers (Hymowitz et al., 2001).

A final variable was caregivers' and pediatricians' acceptance of smoking cessation discussions being conducted during pediatric office visits (Beaty et al., 2013; Bunik et al., 2013; J. D. Klein et al., 1995; Sharifi et al., 2014).

**Table 1: Literature review matrix**

Author, Date and Ref.	Participants	Variables Assessed	Intervention Method	Intervention Assessment; Study Design	Results	Implications
Beaty et al. (2013)	Pediatricians	Screening; Counseling; Referring	CEASE Education modules delivered during a lunch period; materials from CEASE, ACCP Tobacco Dependence Treatment Toolkit, Quit With Us Louisiana website were provided to pediatricians.	Chart review (n=213); quasi experimental design	No difference in screening 67.2% vs. 59.8%, $p=0.317$ ; increased proportion of counseling (51.5% vs. 31.9% $p<0.05$ ); 0 caregivers were offered a referral	An intervention using the CEASE protocol may increase the rate of counseling.
Collins et al. (2005)	Pediatric residents	Screening; Counseling	NCI's 5A's Smoking Cessation Training Program and a small group problem-solving session over two 1.5 hour conferences; manuals were provided to residents and materials were provided for distribution.	Physicians' self survey (n=32), Chart review (n=185), Caregivers' report (n=185); quasi experimental design	Significant difference in self reported screening and counseling rates ( $p<0.001$ )  Chart review indicated statistically significant increase in screening (40% vs. 20%, $p<0.01$ ) and providing literature (23% vs. 3%, $p<0.01$ ); no significant difference documenting in counseling ( $p=0.05$ )  Caregivers who smoke seen by intervention group reported an increase in counseling (77% vs. 52%, $p = 0.02$ )	Intervention and materials may significantly improve their behaviors, attitudes, and confidence in providing smoking cessation counseling to caregivers.
Hipple et al. (2013)	Pediatricians	Screening; Counseling	CEASE training methods delivered during a 1-hour online training module; pediatricians provided with CEASE material for distribution.	Caregivers' report (n= 647); randomized control trial	Intervention resulted in statistically significant increases in screening rates (24% vs. 39%, $p<0.001$ ) and counseling caregivers to reduce SHS (11% vs. 18%, $p= 0.035$ ).	An online smoking cessation training course and materials may lead to an increase in screening for parental smoking and counseling caregivers to reduce SHS.
Houston et al. (2006)	Pediatric residents	Screening; Counseling	An objective practice-based evaluation of residents' performance with a feedback lecture, individual feedback form, and an individual performance review sessions; no materials provided for distribution.	Chart review (n=3958); quasi experimental design	No significant increase in screening for smoking status ( $p=0.1$ ); Chart views demonstrated a significant increase in counseling caregivers to quit smoking ( $p<0.001$ )	A multifaceted feedback curriculum may increase rates of counseling among residents.
Hymowitz et al. (2001)	Pediatric residents	Screening; Counseling; Referring	NCI's 5A's Smoking Cessation Training Program for 1-hour every 2 months from October to June; materials were provided for distribution.	Caregivers' report (n=826), Physician's self survey (128; Baseline=27, 1997=35, 1998 =38, and 1999=28; quasi experimental design	Caregivers reported no significant difference in screening for smoking status. Caregivers reported a significant increase in smoking cessation counseling (41% to 72%, $P< .01$ ) and cessation referrals (18% vs. 56% , $p<0.01$ ). Physicians reported no significant increase in screening for smoking status. Physicians reported a statistically significant increase in counseling (78% vs. 100%, $p<0.01$ ) and	A comprehensive intervention based on 5A's may increase pediatricians' rate of advising cessation and assisting with cessation. Different methods may be explored to improved pediatricians screening for smoking status.

					referrals to smoking cessation programs (18% vs. 54%, $p<0.01$ ).	
Hymowitz et al. (2008)	Pediatric residents	Screening; Counseling; Referring	NCI's 5A's Smoking Cessation Training Program provided quarterly; materials were provided for distribution.	Caregivers' report (Baseline $n=1438$ ; Year 4 $n=1646$ ); randomized control trial	Caregivers reported no statistically significant change in screening for smoking behaviors (74% vs. 80%). Caregivers reported a statistically significant increase in counseling and assistance with quitting.	Interventions based on the NCI's 5A's may be useful to increasing pediatricians' rate of counseling caregivers to quit smoking, as well as refer and assist them with smoking cessation.
Klein et al. (1995)	Pediatric residents	Screening; Counseling; Referring	NCI 5A's smoking cessation curriculum delivered over 6 weeks; materials consisted of NCI Smoking Cessation Guide for residents.	Caregivers' report (baseline $n=62$ ; post $n=60$ ), Physician's self survey ( $n=46$ ); quasi experimental design	Caregivers reported an increase in residents screening for smoking status (17% vs. 27%, $p<0.05$ ); no significant difference in being counseled to quit (100% vs. 27%; $p=0.18$ ).  Trained residents reported an increase in screening for smoking status (47 vs. 62, $p<0.05$ ); no significant difference in counseling caregivers to quit (75% vs. 83%, $p=0.16$ ) or referring caregivers to smoking cessation programs.	Screening for smoking behaviors among caregivers may increase after an intervention.
Scal et al. (2004)	Pediatric residents	Counseling	3 hour intervention based on motivational interviewing principles with a 1 hour reminder session held 6 weeks later; no materials were provided for distributed.	Physician's self survey ( $n=32$ ); quasi experimental design	Statistically significant increase in counseling frequency (2.95 vs. 3.27, $p<0.01$ ) and confidence (3.19 vs. 3.80, $p<0.01$ )	Interventions may be used to increase physicians' rate of counseling and confidence in their counseling ability.
Sharifi et al. (2014)	Pediatricians and Pediatric residents	Screening; Counseling; Referring	15 minute training session on tobacco smoke exposure management impacted physicians and electronic health record prompts; no materials were provided for distribution.	Chart review ( $n=3919$ ); quasi experimental design	Significant differences increase in counseling (11% vs. 60%, $p<0.05$ ) and referrals made to smoking cessation programs (1 vs. 31) No significant difference in screening (35.5 vs. 36.1%, $p<0.0$ )	A brief intervention and EHR prompts may increase counseling and quit line referral rates among smoking caregivers.

## Screening

Eight of the nine included studies examined the effect of pediatricians' screening on caregivers' smoking status (Beaty et al., 2013; Collins et al., 2005; Hipple et al., 2013; Houston et al., 2006; Hymowitz et al., 2008; Hymowitz et al., 2001; J. D. Klein et al., 1995; Sharifi et al., 2014). Of these studies, 4 used the NCI's 5A's intervention method (Collins et al., 2005; Hymowitz et al., 2008; Hymowitz et al., 2001; J. D. Klein et al., 1995), 2 used CEASE (Beaty et al., 2013; Hipple et al., 2013), one used EHR prompts (Sharifi et al., 2014) and one used feedback sessions to promote change (Houston et al., 2006).

For the studies using the NCI's 5A's program, the results were mixed: two studies did not demonstrate a significant increase in screening (Hymowitz et al., 2008; Hymowitz et al., 2001) while two studies reported an increase (Collins et al., 2005; J. Klein et al., 2010). Successful approaches were characterized by shorter timeframes. Collins et al. utilized two 1.5 hour sessions and reevaluated pediatricians 6 months later to find that screening for smoking status had increased (40% vs. 20%,  $p < 0.01$ ) (Collins et al., 2005). This timeline is very similar to Klein et al. who also found a significant increase in screening after a lecture delivered over lunch and reevaluated 6 months later (17% vs. 27%,  $p < 0.05$ ) (J. D. Klein et al., 1995).

The two studies showing no change in screening rates delivered the content over the course of 9 months and 4 years (Hymowitz et al., 2008; Hymowitz et al., 2001).

The studies using the CEASE method also had mixed results. Beaty et al. (2013) demonstrated no increase in screening rates after a one-hour CEASE intervention (Beaty et al., 2013), whereas Hipple and colleagues (2013) generated significant increases in screening rates by providing a one-hour online CEASE intervention (24% vs. 39%,  $p < 0.001$ ) (Hipple et al., 2013).

Neither EHR prompts with training sessions (Sharifi et al., 2014) nor practice-based evaluation of residents' performance with a feedback lecture provided any change in screening rates among pediatricians (Houston et al., 2006).

## Counseling

All nine studies evaluated the effect of an intervention on pediatrician's rate of delivering counseling services to caregivers (Beaty et al., 2013; Collins et al., 2005; Hipple et al.,

2013; Houston et al., 2006; Hymowitz et al., 2008; Hymowitz et al., 2001; J. D. Klein et al., 1995; Scal et al., 2004; Sharifi et al., 2014). All results were compared to usual care, either pre-intervention data or a cohort that did not receive an intervention.

The majority of studies (8 out of 9) indicated that an intervention produced significant increases in physicians self-reported ability to counsel caregivers, caregivers' perceived receipt of counseling and/or EHR indicating that smoking cessation counseling had been administered (Beaty et al., 2013; Collins et al., 2005; Hipple et al., 2013; Houston et al., 2006; Hymowitz et al., 2008; Hymowitz et al., 2001; Scal et al., 2004; Sharifi et al., 2014).

In the two studies using the CEASE intervention, there were significant increases in smoking cessation counseling delivered by pediatricians (Beaty et al., 2013; Hipple et al., 2013). Beaty et al. provided an educational lecture adapted from CEASE with QuitLine information provided to pediatricians. As a result, an increased rate of smoking cessation counseling was delivered by caregivers (51.5% vs. 31.9%  $p < 0.05$ ) (Beaty et al., 2013). Hipple et al. also provided a one hour online training session adapted from CEASE, which also resulted in an increase in counseling (18% vs. 11%,  $p = 0.035$ ) (Hipple et al., 2013).

Among the 4 studies employing the NCI's 5A's intervention; 3 of the 4 reported a significant increase in counseling rates (Collins et al., 2005; Hymowitz et al., 2008; Hymowitz et al., 2001; J. D. Klein et al., 1995). Collins et al. used the NCI's 5A's Smoking Cessation Training Program and a small group problem-solving session over two 1.5-hour conferences (Collins et al., 2005). Upon evaluation 6 months later, pediatricians demonstrated a significant difference in self-reported counseling rates ( $< 0.05$ ) (Collins et al., 2005). In addition, smoking caregivers seen by the intervention group reported an increase in counseling, compared to the control group (77% vs. 52%,  $p = 0.02$ ) (Collins et al., 2005).

Hymowitz (2001) conducted didactic presentations, small group discussion, and role-playing, based on NCI's 5A's for one-hour every 2 months from October to June with yearly follow ups (Hymowitz et al., 2001). This intervention resulted a significant increase in self-reported counseling (78% vs. 100%,  $p < 0.01$ ), an increase in caregivers-reported smoking cessation counseling (41% to 72%,  $P < 0.01$ ) and cessation referrals (18% vs. 56%,  $p < 0.01$ ) (Hymowitz et al., 2001).

Hymowitz et al. (2008) published a study demonstrating that quarterly seminars, role-playing and access to Solutions for Smoking, an online program that used the NCI's 5A's

paradigm, led to an increase in the number of residents who advised caregivers to stop smoking and offered help in smoking cessation (Hymowitz et al., 2008).

One study used a 3-hour intervention based on motivational interviewing principles with a one-hour reminder session held 6 weeks later. This method demonstrated both a significant increase in counseling frequency (2.95 vs. 3.27,  $p < 0.01$ ) and confidence (3.19 vs. 3.80,  $p < 0.01$ ) (Scal et al., 2004).

Sharifi and colleagues (2014) used a 15-minute training session on tobacco smoke exposure management and how to utilize electronic health record prompts (Sharifi et al., 2014). Caregivers received more counseling as a result of this intervention (11% vs. 60%,  $p < 0.05$ ) (Sharifi et al., 2014).

Houston and associates conducted an objective practice-based evaluation of residents' performance with a feedback lecture, individual feedback form, and performance review sessions (Houston et al., 2006). Chart views demonstrated a significant increase in residents counseling caregivers to quit smoking ( $p < 0.001$ ) (Houston et al., 2006).

## Referring

Five of the nine studies included in this review examined the effects of an intervention on referral rates delivered by pediatricians to smoking caregivers (Beaty et al., 2013; Hymowitz et al., 2008; Hymowitz et al., 2001; J. D. Klein et al., 1995; Sharifi et al., 2014).

Three studies used the NCI's 5A's intervention method (Hymowitz et al., 2008; Hymowitz et al., 2001; J. Klein et al., 2010), 1 used CEASE (Beaty et al., 2013) and the last 1 used EHR prompts.

Of the three studies that employed the NCI's 5A's protocol, 2 found a significant increase in referral rates at yearly evaluations (Hymowitz et al., 2008; Hymowitz et al., 2001). The third study showed no overall increase in referral rates from baseline after the implementation of the NCI's 5A's intervention (J. Klein et al., 2010)

Beaty and colleagues used the CEASE method; however, their study did not generate a change in referral rates (Beaty et al., 2013)

Shafari et al., who used electronic health record prompts produced a significant change in the amount of caregivers receiving referrals (1 vs. 31,  $p < 0.05$ ) (Sharifi et al., 2014).

## 2.4 Discussion

We reviewed studies that evaluated the efficacy of an intervention for pediatricians to increase the delivery of smoking cessation counseling to caregivers. We also chose to look at studies that assessed the effect of an intervention on screening for SHS exposure and delivery of smoking cessation referrals.

### Screening

Although the CEASE method produced an increase in counseling rates, this method generated mixed results with respect to screening rates. The CEASE method increased screening significantly when delivered completely online (Hipple et al., 2013), but not when administered in person (Beaty et al., 2013). The success of the online delivery method may pave the way for other interventions as it produced positive results without requiring significant staff or financial resources to implement. Other studies have also found that online smoking cessation training may be beneficial. Schmelz et al. reported that an online tobacco cessation course geared to health professional students improved student-reported ability and skills to ask patients if they smoke (Schmelz, 2010)

The NCI's 5A's protocol, the preferred method in the majority of studies, also generated mixed results when used to increase screening rates. A factor that varied between studies using the NCI's 5A's protocol was the length of each intervention. Interestingly, studies that were implemented over 9 months (Hymowitz et al., 2001) and 4 years (Hymowitz et al., 2008) did not demonstrate significant increases in screening rates, compared to those implemented over 2 hours (Collins et al., 2005) and 6 weeks (J. D. Klein et al., 1995), respectively. These results appear to be counterintuitive, as one would expect constant exposure to the intervention to reinforce its contents more; however, the results follow the same pattern reported by Carson et al. in regards to smoking cessation counseling (Kristin V Carson, 2012).

Although previous studies have shown that using various interventions to increase screening rates was effective, taken together, these studies show mixed results.

### Counseling

Most studies that used the CEASE, NCI, Electronic Health Record (EHR) prompts, practice-based evaluation and feedback showed significant increases in counseling rates among smoking caregivers. These results are in line with studies of primary care

physicians where training to deliver smoking cessation messages resulted in an increased rate of smoking cessation counseling (Thorogood M, 2006).

Of the interventions included in our review, the CEASE method resulted in the most consistent benefits. The reason for this could lie in the simplicity of this method. As previously discussed, CEASE has three principles, while the NCI's 5A's use five methods to stop smoking. Implementing the CEASE method, therefore, takes less time than applying the NCI's 5A's. Although the majority of studies using the NCI method generated significant changes in counseling rates, these findings were not universal. Interestingly, the number of NCI sessions delivered and duration of these training sessions did not affect counseling rates. This finding is in accordance with Carson and colleagues, who found that physicians trained to deliver smoking cessation counseling using only a short, single session were just as likely to generate significant changes in smoking cessation as physicians who were educated using longer, multiple training sessions (Kristin V Carson, 2012).

The majority of studies included in this review had physicians deliver the smoking cessation counseling training. All studies reporting that a physician delivered training session produced statistically significant increases in counseling. Studies that did not specify who delivered the intervention produced mixed results (Hipple et al., 2013; Hymowitz et al., 2008; Hymowitz et al., 2001; J. D. Klein et al., 1995). A possible explanation is that continuing medical education provided by non-physicians may not be as effective as that provided by physicians (Allen, 2007). Physicians may relate better to other physicians when learning strategies requiring specific interview techniques such as those needed to counsel smokers compared to a simple reminder to screen for smoking.

## Referring

Beaty and colleagues were the only group to look at the effects of the CEASE method on referral rates. This study reported no increase in referral rate, possibly because counseling was the main focus of this intervention. Physicians were taught how to document counseling efforts and use the appropriate billing codes, which may have left the pediatricians concentrating on counseling caregivers and documenting their recommendations, rather than providing referrals (Beaty et al., 2013)

By contrast, all interventions using NCI's 5A's protocol, with associated materials, generated significant positive increases in referral rates. It is, therefore, possible that



having a tangible representation of being referred may increase caregivers' recollection of receiving a referral. The material may also serve as a reminder to the caregiver once the visit has been completed and have returned home. Kottke et al (1989) found that PCP's who were given only materials just as likely to produce supportive cessation material as those physicians who received both training and materials (Kottke, 1988). This may further stress the importance of the material rather than the smoking cessation training to increase referral rates.

Given the small number of studies that examined the effect of an intervention on pediatricians with the interest of increasing referral rates, and the fact that only 3 studies demonstrated significant results, current evidence is insufficient to make recommendations about appropriate interventions to increase referrals. Future studies should focus on the effect various smoking cessation materials have on referral rates.

## 2.5 Limitations

The measures used to assess changes in screening, counseling and referral varied widely. Exit interviews and self-reports are subject to reporter and recall bias to varying degrees. Caregiver and physician recall of smoking cessation tend to underestimate and overestimate smoking cessation discussions, respectively (Hymowitz et al., 2008). Physicians may over inflate their self-reports due to social desirability bias, perhaps to please those who provided the training or justify their time spent in the intervention (Garg et al., 2007). Chart reviews are not exempt from these biases, as physicians were still required to document aspects of the clinic visits. Physicians and residents have multiple competing demands and perhaps not every smoking cessation behavior is accurately documented.

Some studies did not test for possible confounders such as age, gender, physician training, residency tract, number of patient visits per year, past use of tobacco products, living with a smoker, previous tobacco education, self-education in tobacco cessation and knowledge of SHS risks was not tested in some studies (Beaty et al., 2013; Bunik et al., 2013; Garg et al., 2007; Sharifi et al., 2014). These factors may influence self-reports and should be measured when considering the validity of an intervention.

Other confounding variables may affect the intervention. For example, information conferences for residents were mandated in 5 studies (Collins et al., 2005; Houston et al., 2006; Hymowitz et al., 2008; Hymowitz et al., 2001; J. D. Klein et al., 1995). A study by

Piccano et al. (2003) demonstrated a lack of correlation between noon conference attendance and long-term information recall, which questions the efficacy of this learning method (Picciano, 2003). Another factor is the professional background of the person delivering the training. It has been shown that physicians prefer to have CME delivered by physicians (Allen, 2007). In addition, face-to-face delivery of educational material is superior to all other methods used (Kottke, 1988). In line with findings in our review, Silagy et al. (1994) found that there was no benefit to using a time intensive intervention to train physicians to provide smoking cessation advice, when compared to a minimal interaction approach (Silagy, 1994).

A pre-post study design was used in the majority of studies (Beaty et al., 2013; Bunik et al., 2013; Garg et al., 2007; Hymowitz et al., 2008; Hymowitz et al., 2001; J. D. Klein et al., 1995; Scal et al., 2004; Sharifi et al., 2014). In a pre-post study design, a control group is absent. As a result, the pre-test acts as the baseline from which the effect of the intervention is measured against. A limitation of this design is that it is impossible to ensure that the pre-test group will be homogeneous and thus comparable to the post-test group. This study design does not take into account any social phenomenon that may influence physicians' interactions with smoking caregivers, independent of the intervention. Although a randomized control trial would eliminate systematic variances, it may not be practical in many clinical settings.

Of those studies that compared the results of their intervention to a control group, the number of subjects in each group was not always even, due to methods by which the residents were assigned to each group. A larger group lead to a greater chance of detecting a difference between groups (Collins et al., 2005). In addition, residents were often assigned to groups due to their schedule. Since this allocation method was not random, there may be intrinsic group differences that could independently influence each group (Collins et al., 2005). Residents from a previous class were used as the control group in one study (Houston et al., 2006). This control group would not have been exposed to the same secular trends, and, therefore, cannot serve as a control for outside confounding variables.

Finally, although the CEASE method may be the best protocol to increase counseling, these conclusions are based on only two studies. Future studies are therefore required of the CEASE method to ensure that this result holds true when applied to a greater number of physician groups.

## 2.6 Conclusion

Reducing SHS exposure among children is essential to decrease morbidity and mortality among the pediatric population. Given that caregivers visit their child's physician more frequently than their own, pediatricians can play a vital role in screening, counseling, and referring caregivers to smoking cessation programs.

In summary, this systematic review demonstrates that a short intervention using CEASE principles delivered by physicians may increase smoking cessation counseling among caregivers of pediatric patients. The best intervention to improve screening is less clear but results to date suggest that either a CEASE course delivered online or a short intervention using the NCI's 5A's would be best. However, further studies are necessary to determine the efficacy of these methods on a larger scale. For the purpose of increasing referrals of smoking caregivers to smoking cessation programs, this review demonstrates that pediatricians should be trained using either model with the addition of concrete materials. In the interest of increasing all three parameters of smoking cessation promotion, one should consider using the CEASE model with supplemental materials.

These results need to be viewed with caution given heterogeneous samples, the non-randomized assignment of many participants, lack of controls in some studies, and the possibility of recall, reporter, or social desirability bias. It may be beneficial for future studies to consistently examine interventions using both subjective and objective measurements. With reference to materials, it would be of interest for future studies to provide detail of the materials available for distribution. In addition, future research is needed to determine the best material to distribute to caregivers during consultations to elicit optimal recollection of smoking cessation advice.

## **Chapter 3**

### **3 Aims, hypotheses and rationale**

The thesis consists of five studies. The first study serves to assess if caregivers of pediatric patients in the Ochsner Children's Clinic are eligible for the SCT and if they are utilizing their services. The second study will evaluate if pediatricians are aware of the SCT and will assess and compare their confidence and behavior in promoting smoking cessation. The third, fourth and fifth studies will examine if various interventions on pediatricians can increase the rate in which pediatricians promote smoking cessation behavior among their patients' caregivers.

#### **3.1 Study 1: Caregivers Knowledge, Utilization and Interest in the Smoking Cessation Trust of Louisiana.**

**Aim 1:** To assess if caregivers of infants and children in our pediatric population are eligible for the SCT and to increase awareness of the SCT program in those who began smoking prior to 1988.

**Rationale and hypothesis:** The SCT is an invaluable tool to aid in smoking cessation. If a significant number of caregivers are eligible for the trust, but not utilizing its services, promotion of the SCT services should stimulate smoking cessation. By better understanding the behavior of our population, we can also determine how to disseminate information about the trust. *It is hypothesized that there will be a significant number of caregivers eligible for the SCT who are not utilizing the services in which they are entitled.*

#### **3.2 Study 2: Pediatricians' knowledge, confidence and behaviors in promoting smoking cessation and the SCT.**

**Aim 1:** To assess pediatricians' baseline knowledge and utilization of the SCT.

**Rationale and hypothesis:** Pediatricians have the potential to promote smoking cessation in a large number of caregivers. It is necessary to assess pediatricians' baseline knowledge of the SCT so that we can determine if an educational session is necessary to

inform pediatricians of the services offered by the Trust. *It is hypothesized that there will be a significant number of pediatricians who are not familiar with the SCT*

**Aim 2:** To assess and compare pediatricians' knowledge and confidence level with their behaviors in screening caregivers for SHSe, providing smoking cessation counseling and referring smoking caregivers to cessation programs.

**Rationale and hypothesis:** By better understanding the knowledge and confidence levels of the pediatricians, we can know how best to deliver information about the SCT. This knowledge will also help us to provide interventions and resources to help pediatricians feel more confident and improve their rate screening for SHSe, counseling caregivers to stop smoking and referring smoking caregivers to smoking cessation programs, such as the SCT. *It is hypothesized that pediatricians will report a lack of confidence in their ability to screen for SHSe, to counsel caregivers to stop smoking, and to refer smoking caregivers to smoking cessation programs and thus report not participating in smoking cessation promotion behavior. It is hypothesized that there will be no difference in pediatricians' self reported confidence levels when compared to their self reported behavior levels in screening, counseling and referring smoking caregivers.*

### **3.3 Study 3: The use of an intervention to increase pediatricians' smoking cessation promotion and knowledge of the Smoking Cessation Trust**

**AIM 1:** To determine if a short intervention consisting of a lecture aimed at pediatricians will increase pediatricians' awareness of the SCT.

**Rationale and hypothesis:** The SCT is underutilized. Given that a lecture-centered intervention relies on very few resources, it may be easily implemented in any pediatrician's clinic. The results of this study, therefore, may have the power to influence smoking cessation among thousands of Louisiana residents. If this study demonstrates that a short lecture can increase smoking cessation promotion and the number of referrals to the SCT made by pediatricians, then widespread SCT promotion among all pediatricians practicing in the state of Louisiana via a brief lecture may be the next step in reducing SHSe among our pediatric patients. *It is hypothesized that increased awareness will be achieved via physician participation in the present study.*

**Aim 2:** To determine if a short intervention consisting of a lecture aimed at pediatricians will subjectively increase their ability to promote smoking cessation to their patients' caregivers.

**Rationale and hypothesis:** It is important to determine if short intervention in question will increase the rate of screening, counseling and referring caregivers to smoking cessation programs based on self reports by physicians. It is necessary to assess if pediatricians believe that they are performing the essential tasks to reduce SHS exposure among children. *It is hypothesized that an intervention will significantly increase physicians' subjective ability to screen, counsel, and refer caregivers to smoking cessation programs.*

### **3.4 Study 4: The effect of a children's book on pediatricians' rate of screening for second hand smoke exposure**

**AIM 1:** To determine if a read-along children's book will increase pediatricians' subjective ability to screen for SHSe and provide smoking cessation counseling.

**Rationale and hypothesis:** This facet of the project will help further our knowledge about which intervention is best to increase the rate of screening for SHSe. If a children's book proves to generate significant results, we can distribute the book on a larger scale in hopes of reaching a broader proportion of the population. *It is hypothesized that an intervention consisting of a read-along children's book will significantly increase physicians' subjective ability to screen for SHSe.*

### **3.5 Study 5: Increasing pediatricians' promotion of smoking cessation among caregivers**

**Aim 1:** To determine which intervention (a combination of a lecture and EHR prompts, a lecture only or EHR prompts only) aimed at pediatricians is best to increase screening for SHSe and counseling caregivers to stop smoking during pediatric patient visits.

**Rationale and hypothesis:** It is important to determine which intervention will increase the rate of screening for SHSe and counseling caregivers to stop smoking. Time is a scarce commodity in the pediatric clinic; if we find that an intervention that consists solely of EHR prompts is as effective as one that is comprised of EHR prompts plus a lecture, it would be beneficial to implement EHR prompts alone to decrease SHSe among pediatric patients. *It is hypothesized that EHR prompts accompanied with a lecture will demonstrate*

*no statistically significant difference in screening and counseling, when compared to an intervention consisting of EHR prompts alone or lecture alone.*

## **Chapter 4**

### **4 Methodology**

This chapter describes the methods of study 1, study 2, study 3, study 4 and study 5. This includes participation recruitment and outcome measures. Specific method details can be found in the chapters corresponding to each study (Chapter 5, Chapter 6, Chapter 7, Chapter 8 and Chapter 9). Throughout the studies listed in this thesis, various clinics within the Ochsner system participated. We had a total of 9 Ochsner clinics participate.

#### **4.1 Study 1: Caregivers Knowledge, Utilization, and Interest in the Smoking Cessation Trust of Louisiana.**

##### **Participants**

The sample population consisted of caregivers of pediatric patients who visited Ochsner for Children's clinic from Sept 1, 2014 to Jan 1, 2015. Inclusion criteria included being a caregiver (we defined a *caregiver as anyone who cares for and is around the child, eg: another parent, sibling, grandparent, other family member, friends, babysitters, etc.*) and able to provide knowledge regarding the smoking behaviors of other caregivers in the child's life. Exclusion criteria included not being able to read English.

Ethics approval of the pilot study was obtained at both Ochsner Health System's Institutional Review Board (IRB) and through the University of Queensland (Appendix A). All parents were given an information sheet for their perusal and a consent form indicating that completing the survey implied consent (Appendix B). Questionnaires were distributed and data collection for the study has been obtained (Appendix C).

##### **Outcome measures**

The caregivers completed the survey and could provide information on up to three additional caregivers. Caregivers provided information about their gender, relationship to the child, and their smoking status. If participants indicated that they were a smoker, the year at which they began smoking, their interest in smoking cessation, and previous



smoking cessation attempts were also asked. Information on medical insurance was also obtained.

## **4.2 Study 2: Pediatricians' knowledge, confidence and behaviors in promoting smoking cessation and the SCT.**

### **Participants**

The study population consisted of all pediatricians who practice in six Ochsner clinics within the Ochsner Health System from Dec 1, 2015 to Feb 1, 2016. The pediatricians were recruited via email and the study was advertised throughout the clinics. Inclusion criteria consisted of any pediatrician who practiced within the Ochsner Health System. There were no exclusion criteria implemented.

Ethics approval of the study was obtained at Ochsner Health System's Institutional Review Board (IRB) (Appendix D). All pediatricians were emailed information regarding the study, along with a link to the survey (Appendix E). Physicians were informed that the completion of the study indicated implied consent.

### **Outcome measures**

Objective outcomes were assessed via a survey. Pediatricians were emailed a link to a questionnaire about their gender, length of practice, familiarity with the SCT, and previous training in smoking cessation. This survey also assessed confidence levels and regular smoking cessation behaviors in screening, counseling and referring caregivers to smoking cessation programs via six questions. A likert scale was utilized to measure responses.

## **4.3 Study 3: The use of an intervention to increase pediatricians' smoking cessation promotion and knowledge of the Smoking Cessation Trust**

### **Participants**

The study population consisted of general pediatricians who practiced at one of six pediatric groups associated with Ochsner's Health System from December 1, 2015 to April 1, 2016. Our subject population also were the participants of study 2. Of the 36 practicing general pediatricians, 27 participated in the study (75%). The primary investigator of the study contacted each pediatrician via email to notify them of the study and inform them

that their clinic would be assigned at random to an intervention group or control group. All pediatricians were encouraged to participate. Inclusion criteria consisted of any pediatrician who practiced within the Ochsner Health System. No exclusion criterion was implemented. This study was reviewed by the Ochsner Institutional Review Board and met approval (Appendix F). The University of Queensland School of Medicine Low Risk Ethical Review Committee determined that the project complied with the provisions contained in the National Statement on Ethical Conduct in Human Research (Appendix G).

This study was an unblinded randomized control study in which six pediatric clinic sites were randomly assigned to either the specific intervention or as the control. All six clinics remained enrolled in the study until completion.

Pediatricians in the intervention group received an educational lecture delivered by a physician (F.U.) during physicians' lunch hour and lunch was provided. During this time, pediatricians watched a PowerPoint presentation that discussed the effects of SHSe in children, and reviewed guidelines in place to reduce SHSe and available resources that could be implemented to incorporate these guidelines into practice. The lecture also contained information on the SCT and what benefits the SCT could provide smoking caregivers.

### **Outcome measures**

Two months post-intervention implementation, pediatricians in all groups received a 23-question survey. The survey was completed anonymously to promote candor; however, although the physician's identity remained unknown, the clinic at which the physician practiced was identified. Five questions assessed pediatricians' demographics, prior smoking cessation training, and familiarity with the SCT. The remaining eighteen questions assessed pediatricians' confidence and behavior in promoting smoking cessation via a likert scale. Confidence was rated on the following likert scale: Definitely No, 2 = Not Really, 3 = Indifferent, 4 = Probably Yes, 5 = Definitely Yes. Behavior was rated on the following likert scale: 5 point likert scale: 1= Never, 2 = Rarely, 3 = Unsure, 4 = Often, 5 = Always (Appendix H).

#### **4.4 Study 4: The effect of a children's book on pediatrician's rate of screening for second hand smoke exposure and counseling caregivers to stop smoking**

##### **Participants**

This randomized controlled clinic study was performed from April 15, 2016 to May 15, 2016, at seven pediatric groups associated with Ochsner's Health System. This study was reviewed by the Ochsner Institutional Review Board and met approval (Appendix F). The University of Queensland School of Medicine Low Risk Ethical Review Committee determined that the project complied with the provisions contained in the National Statement on Ethical Conduct in Human Research (Appendix G).

All 7 clinics were randomly assigned to either an intervention or control group. The control group did not receive a children's book, while pediatricians in the intervention group were supplied children's books to distribute during clinic visits (Appendix I). Of note, six of the seven clinics had previously participated in Study 3 (and thus, half had received a lecture).

The children's book was written by K.H. and F.U. and illustrated by Mark Andersen, a local artist (Appendix J).

##### **Outcome measures**

One month after the interventions were completed, outcomes were assessed via chart review. Screening, and counseling were recorded and compared to determine if a children's book is a beneficial addition to the pediatric clinic setting to increase smoking cessation promotion.

#### **4.5 Study 5: Increasing pediatricians' promotion of smoking cessation among caregivers**

##### **Participants Outcome**

The study population consisted of general pediatricians who practiced at one of five pediatric groups associated with Ochsner's Health System from December 1, 2015 to April 1, 2016. The primary investigator of the study contacted each pediatrician via email to notify them of the study and to inform them that their clinic would be assigned at random to one of three groups, all consisting of an intervention. All pediatricians were encouraged to

participate. Inclusion criteria consisted of any pediatrician who practiced within the Ochsner Health System. No exclusion criterion was implemented. This study was reviewed by the Ochsner Institutional Review Board and met approval (Appendix F). The University of Queensland School of Medicine Low Risk Ethical Review Committee determined that the project complied with the provisions contained in the National Statement on Ethical Conduct in Human Research (Appendix G).

All five clinics remained enrolled in the study until completion. This study did not have random assignment; pediatrician group was assigned to either a group that received changes in the Electronic Health Record (EHR) (G1), lecture and no changes in the EHR (G2) or a lecture and EHR changes (G3) based on previous group assignments. In studies 2,3 and 4, clinics that had not received a lecture or children's book (and served as the controls for the previous studies) were to serve as G1. Clinics that had received a lecture but no assigned to distribute a children's book to serve as G2. G3 was comprised of a clinic that had not participated in either study.

Group 1 (G1)	Group 2 (G2)	Group 3 (G3)
No Lecture	Lecture	Lecture
EHR prompts	No EHR prompts	EHR prompts

**Table 2: Treatment group assignment for Study 4**

The EHR used in this study was EPIC Systems. Pediatricians in G1 and G3 received an email alerting providers of the changes on the EHR to aid in screening, counseling and referring caregivers. Various drop down boxes were made available for providers to record any smoking cessation promotion distributed during the visit in the patient's EHR. Pediatricians were encouraged to contact EHR helpdesk or the study's PI with any questions.

Pediatricians G3 received an educational lecture delivered by a physician (F.U.) during physicians' lunch hour and lunch was provided. During this time, pediatricians watched a PowerPoint presentation that discussed the effects of SHSe in children, reviewed

guidelines in place to reduce SHSe and available resources that could be implemented to incorporate these guidelines into practice.

### **Outcome measures**

EHR data was obtained in a single extraction on all patients who had presented to a Ochsner clinic for a pediatric visit. A one-month period was allocated for intervention completion and data was extracted over a three-month period of time (January 1 2016 to include data on the documentation of screening for SHSe ICD-10 code SHSEZ77.22). The data on counseling caregivers to cease smoking was acquired by assessing the usage of Best Practice Alerts (BPA).

## Chapter 5

### 5 Caregivers Knowledge, Utilization, and Interest in the Smoking Cessation Trust of Louisiana (Study 1)<sup>2</sup>

*The SCT is underutilized. This pilot study examined whether caregivers visiting the Ochsner Children's Center were eligible for the SCT and utilizing services provided by the Trust. The outcome of this study helped determine if efforts are needed to promote the SCT among caregivers and improve SHS screening, smoking cessation counseling, and referrals to the SCT.*

#### 5.1 Abstract

Second hand tobacco smoke (SHS) affects 40% of children. Children who are exposed are at increased risk for significant morbidity and mortality. It is imperative that caregivers do not smoke around children. Smoking cessation programs have been shown to increase the rate of success in those who wish to quit. Not all caregivers, however, have knowledge of, or have access to, smoking cessation programs. Currently, the Smoking Cessation Trust (SCT) program of Louisiana is available to anyone who began smoking prior to 1988. Caregivers visit the pediatrician more often than their primary care provider. Pediatricians play a vital role in the promotion of smoking cessation. **Methods:** The study population consisted of pediatric patients' caregivers who visit Ochsner Children's Health Center. Caregivers were offered a questionnaire to assess their age, gender, relationship to the child, medical insurance, smoking status, and cessation attempts. Data of three other caregivers was also ascertained. Data was entered into a computerized database/spreadsheet for analysis using Statistical Analysis Software (SAS). **Results:** 84 caregivers were assessed. 31% of caregivers smoke, of which 44% were eligible for the SCT. Eligible caregivers included grandmothers (33%), grandfathers (16%), and fathers (25%). In the last 12 months, 25% of SCT eligible caregivers tried quitting. Currently, 33% of SCT eligible caregivers were interested in smoking cessation. **Conclusions:** Smoking prevalence in our cohort higher is than the national average (31% vs. 18%).

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<sup>2</sup> Adapted from Hall, K., Egger, A., Dezara, C., Kisely, S., Urrego, F. The Smoking Cessation Trust Program of Louisiana: The Pediatrician's Role in Identifying and Referring Eligible Patients. *Ochsner J.* 2015; 15 (3): 237-240. PMID: PMC4569154. <http://www.ochsnerjournal.org/doi/full/10.1043/TOJ-15-0027>

44% of the caregivers are eligible for the SCT. Pediatricians are in a unique position to screen, counsel, and refer to the SCT.

## 5.2 Introduction

Smoking is the single most preventable cause of morbidity and mortality in the United States (CDC, 2011). Currently, it is estimated that 46 million people smoke (CDC, 2011). Although this only represents 18% of the population, approximately 54% of all children under the age of 11 years are exposed to second hand smoke (SHS) (CDC, 2011). Cotinine levels, a major metabolite of nicotine, can be up to seven times greater in children of parents who smoke compared to those children of non smoking parents (Matt et al., 2011). SHS is responsible for up to 300,000 annual cases of bronchitis, pneumonia, and otitis media in infants and children (CDC, 2011). Tobacco smoke exposure is estimated to cause over 5,000 deaths annually (Aigne & Stoddard, 1997). This data demonstrates the need for smoking cessation for the benefit of both caregiver and child.

Smokers who participate in cessation programs are more likely to reach their goals (Secker-Walker et al., 2002). The SCT is a 250 million dollar trust will fund cessation services from 2011 to 2021 (SCT, 2013). As previously mentioned, those who began smoking prior to 1988 qualify for this program. Those eligible for the SCT represent approximately 460,000 of the 675,000 smokers; of those, only 28,392 applicants have applied and 27,255 have been approved to the program (CDC, 2011; SCT, 2013). Given the large number of individuals who are not using the SCT services, the pediatric clinic may be an opportune location to advocate for the use of such services. The American Academy of Pediatrics (AAP) recommends that all pediatric health care providers ask, advise, and refer smoking caregivers to available cessation services (T. S. E. Winickoff J.P., McMillen R.C., Klein J.D., Rigotti N.A., Weitzman M., 2005). There is no data regarding whether smoking caregivers of pediatric patients in Louisiana are utilizing the SCT. The objective of this study, therefore, was to assess the age of caregivers of children attending the Ochsner Children's Health Center to determine if they were eligible and utilizing services provided by the SCT. Ochsner Children's Health Center is a non-profit, academic, multi-specialty center that specializes in comprehensive care for children.

### **5.3 Methods**

This was a cross sectional study in which the primary objective was to determine the caregivers' age among our pediatric population and thus their eligibility for participation in the SCT. A secondary objective was to assess caregivers' gender, relationship to the child, medical insurance status, prior smoking cessation attempts, prior use of smoking cessation aids, and current smoking cessation interest to better understand the demographics of this population.

The study population consisted of caregivers of pediatric patients who visited Ochsner for Children's clinic from Sept 1, 2014 to Jan 1, 2015. The only inclusion criterion was that the respondent be a caregiver and able to provide information about other caregivers of the child.

Caregivers were given a questionnaire to complete by a Licensed Practical Nurse (LPN). This was a self-administered questionnaire consisting of 34 questions that investigated the smoking status and demographic features of the patient's caregivers. Completion of the survey occurred during the course of the clinic visit. The main purpose of the survey was to gain information regarding caregivers smoking status and smoking start date to ascertain SCT eligibility. Secondary information included the caregiver's gender, age, relationship to the child, medical coverage, smoking cessation attempts, aids used during smoking cessation attempts, and if the caregiver is currently interested in quitting smoking. Subjects were informed that the completion of this questionnaire would take approximately 5 minutes and that participation in this study was completely voluntary. Subjects were also instructed that the completion or non-completion of this questionnaire would in no way impact the treatment that their child received at the facility. Caregivers returned the questionnaire upon completion to the LPN.

### **5.4 Statistics**

A descriptive analysis was conducted to identify the average age of caregivers, the distribution of caregiver relationships and medical insurance status, and the proportion of caregivers who smoked. A subset analysis was conducted within caregivers who did smoke to determine the percentage of eligible caregivers for the SCT and attitudes about and actions towards smoking cessation. Categorical data is reported as proportion distributions, and continuous data is reported as mean and standard deviation.

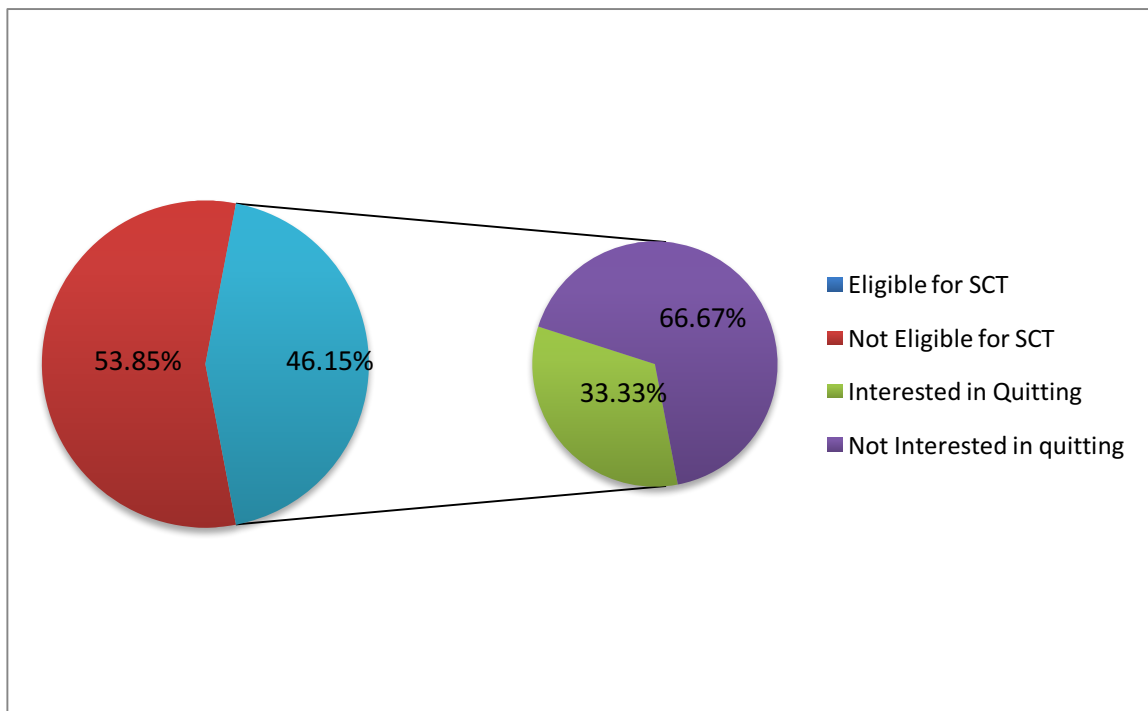


## 5.5 Results

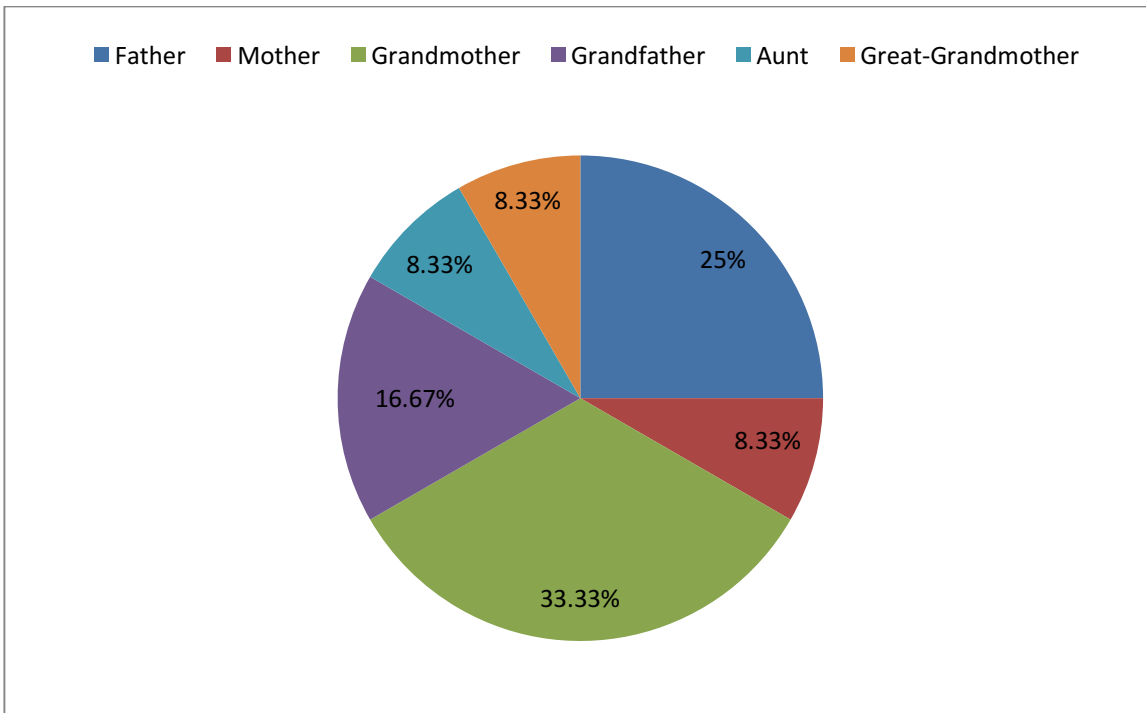
Twenty-nine participants completed the questionnaire and each gave information on approximately three additional caregivers to give a total of 84 assessments (Appendix C). Thirty-one percent (31%) of all caregivers smoked, of whom 44% began prior to 1988, making them eligible for the SCT. Thirty-three percent (33%) of eligible caregivers were interested in smoking cessation. The remaining fifty-six percent (56%) of caregivers who smoked were not eligible for the SCT. Figure 2 represents the SCT eligibility of the caregivers, as well as those interested in smoking cessation.

The majority of eligible caregivers were female (58.33%). Caregivers were most commonly grandmothers (33%), followed by fathers (25%), grandfathers (16%), great grandmothers (8.33%), mothers (8.33%), and aunts (8.33%). Figure 3 represents the relationship of SCT eligible caregivers to child.

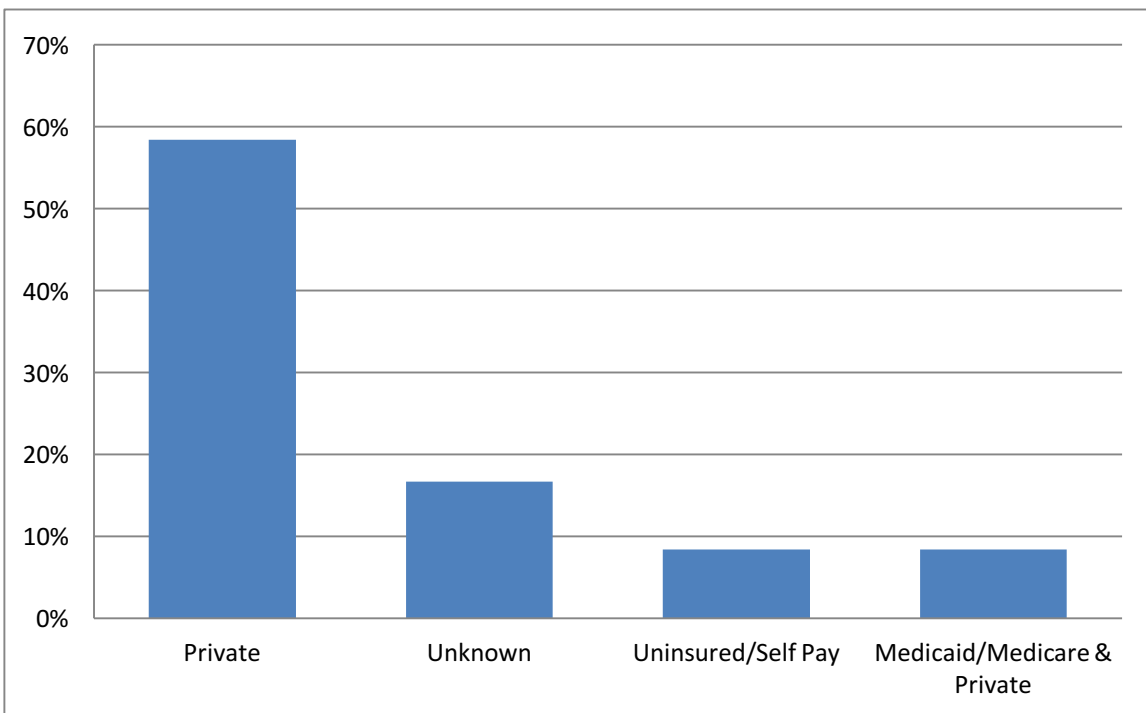
SCT eligible caregivers had predominantly private insurance (58.33%). The insurance status of the other participants included unknown (16.67%), uninsured/self pay (8.33%), Medicaid/Medicare (8.33%) and Medicaid/Medicare plus private (8.33%). Figure 4 represents the medical insurance held by SCT eligible caregivers.



**Figure 2: SCT eligibility of caregivers and proportion of smokers interested in quitting**



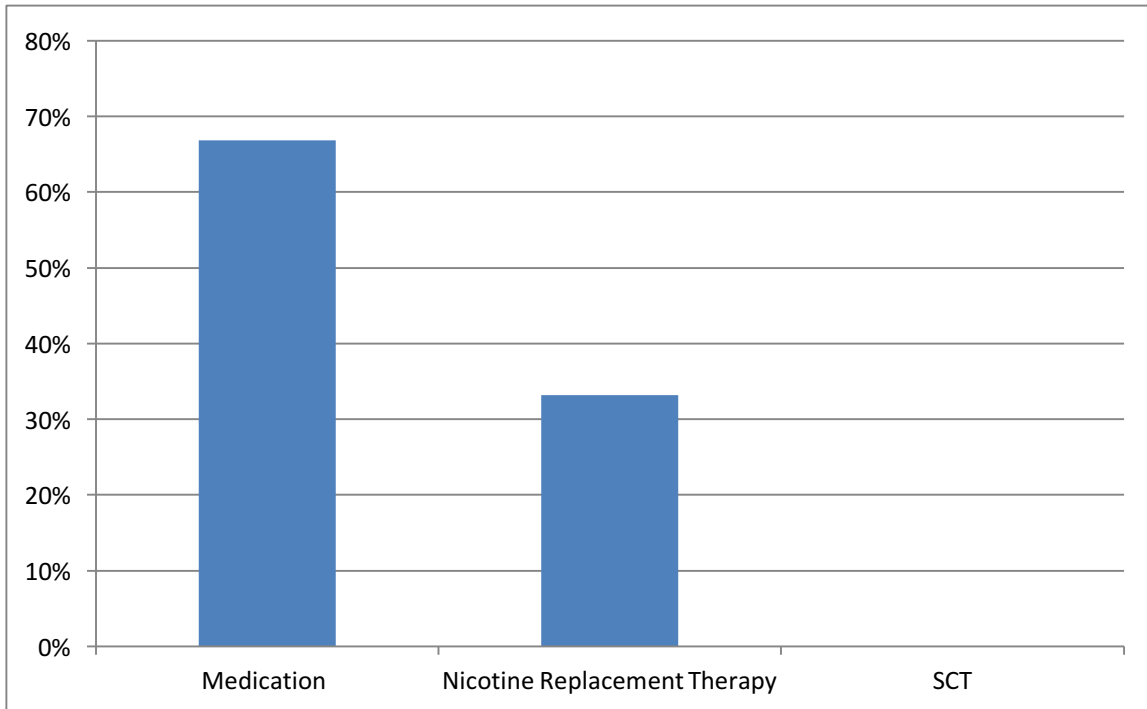
**Figure 3: Relationship of SCT eligible caregivers to child**



**Figure 4: Medical insurance held by SCT eligible caregivers.**

Of the SCT eligible caregivers, twenty five percent (25%) had attempted to stop smoking in the previous 12 months. The majority of eligible caregivers (16.7%) attempted to quit smoking through the use of bupropion or varenicline. Of the remainder, 8.3% used nicotine replacement medication (ex: patch, gum, lozenges, spray), and no one used

programs offered by the Smoking Cessation Trust Fund of Louisiana. Figure 5 represents aids used by SCT eligible caregivers in smoking cessation attempts.



**Figure 5: Aids used by SCT eligible caregivers in smoking cessation attempts.**

## 5.6 Discussion

This study reveals that there are a significant number of SCT eligible caregivers who are not being reached and do not utilize the SCT, and therefore, do not benefit from the smoking cessation services offered by said trust. Thirty one percent (31%) of caregivers in our cohort smoked, almost double the national average of 18% (CDC, 2011). Louisiana residents, in general, and pediatric patients specifically, are therefore at an increased risk of smoking related morbidity.

Of those caregivers who smoked, 44% were eligible for the SCT and approximately one third of those indicated that they are interested in stopping. Furthermore, 25% of eligible caregivers actually attempted to stop smoking in the past 12 months. These numbers are very encouraging. Chart review reveals that approximately 19,825 children visits are conducted across all Ochsner Pediatric clinics per year. Based on the results from this pilot study, Ochsner pediatricians may access to approximately 8,729 SCT eligible

smokers per year, our results estimate that perhaps one third, or 2,880 of these caregivers, will potentially be motivated to quit using the SCT services (assuming that at least one caregiver accompanies the child to their visit). The opportunity for pediatricians to refer eligible caregivers to the SCT should be utilized. The reality of this situation, however, is less promising. Currently, only 27,255 of the estimated 460,000 eligible smokers are enrolled in the SCT. This makes up approximately 5.9% of all eligible smokers; this number is much lower than the 33% who indicated that they were interested in quitting. In addition, not one of our subjects indicated that they had used the SCT to aid in their smoking cessation attempts in the previous month. These statistics shed light on a very important and pressing issue facing Louisiana today. In a state with such a high prevalence of smokers, less than 6% of eligible residents are utilizing the SCT.

The question that begs to be answered is this: why are more people not using the SCT? One reason may be the Trust's inability, by nature of the SCT agreement, to directly advertise its services. For this reason, physicians may serve as a means to disseminate information and promote the SCT. In addition, patients may have limited financial and social resources that prevent them from seeking smoking cessation guidance from their primary care physician. As a result, physicians and other health care providers have to ensure that smokers are aware of the available smoking cessation services. It is also imperative that doctors are made aware of the program given that many are not aware of the smoking cessation programs that exist and, therefore, are not promoting them to their patients (McMenamin, Halpin, & Ganiats, 2012). It has been shown that widely promoted smoking cessation programs make it easier for smokers to quit (McAfee, Babb, McNabb, & Fiore, 2015). The state of Massachusetts' experience with a widely promoted Medicare smoking cessation program provides a good example of the importance of the promotion of the SCT program. Smoking cessation programs were heavily promoted to Medicare recipients, resulting in 37% of Medicare enrollees using the program (Land et al., 2010). Smoking rates fell from 38% to 28%, while myocardial infarctions dropped by half. For every dollar Medicare spent on the smoking cessation program, \$3.12 was saved among Medicare enrollees (Land et al., 2010) (Singleterry et al., 2014). Such programs demonstrate the power of promotion; if the SCT were to be fully endorsed by physicians and implemented to eligible smokers, the program could achieve great impacts parallel to those achieved in Massachusetts.

Smoking cessation services are not all the same. Medicare programs, for example, have co-pay requirements and variable coverage depending on the individual's plan (Singleterry

et al., 2014). It has been shown that removing such barriers is essential in increasing smoking cessation rates (Fiore et al., 2008) (Land et al., 2010). By contrast, the SCT does not implement such restrictions. SCT will arrange, at no cost to the smoker, cessation medications, individual / group cessation counseling, telephone quit-line support, and/or Intensive cessation support services. The majority of SCT eligible caregivers in our cohort had private insurance. Given the insurance demographics of our study population, pediatricians play an important role in privately insured patients who do not visit their primary physician regularly.

We acknowledge that a limitation of this study is the relatively small sample size. In addition, information on participation rates was not collected. The small sample size reflects the difficulties in approaching families regarding this issue. This may have led to selection bias in that caregivers who were less comfortable about discussing their smoking status, such as those who were visiting due to respiratory complaints, might have been less likely to participate. This finding is not consistent throughout the literature, as it has been shown that caregivers are open to questions regarding smoking status (T. S. E. Winickoff J.P., McMillen R.C., Klein J.D., Rigotti N.A., Weitzman M., 2005). In addition, the low utilization of the SCT was similar to enrollment rates of the general population. A final limitation is that tobacco use was assessed through self-report without biochemical confirmation.

The results from the current study demonstrate the need for pediatricians to play an active role in screening, counseling, and referring eligible caregivers to the SCT. Our future studies will focus on increasing the SCT awareness to the pediatric health care providers as well as easy access to SCT representatives by creating an on-site kiosk where caregivers have immediate access to information regarding the SCT and enrollment to smoking cessation services. It is important to consider that over half of the caregivers in our study (56%) were not eligible for participation in the SCT, as the majority began smoking after 1988. As a result, many of our patients' smoking caregivers will not have the benefit of the free services provided by the SCT. However, there are other smoking cessation programs that SCT ineligible caregiver may utilize given that all plans offered as part of the Federal Affordable Care Act are required to cover tobacco cessation treatments. Louisiana does not, however, require private health insurance plans to cover smoking cessation programs. As a result, the patient may incur a cost, depending on their plan.

## 5.7 Conclusion

It is imperative that smoking cessation programs, such as the SCT, are promoted and utilized. The SCT is a free program to any resident of Louisiana who began smoking before 1988. Despite the high number of SCT eligible caregivers in the present study who indicated that they were interested in smoking cessation, none had used services from the Trust. In addition, it was found that the majority of eligible caregivers in our cohort have private health insurance, which has been shown to lead to a lower rate of primary care visits to discuss smoking cessation. As result, a caregiver's visit to the pediatrician may be the ideal time for them to be informed about the SCT.

In conclusion, the SCT has the potential to make an important contribution to reducing the health and financial burden associated with tobacco smoke exposure among the pediatric population. Promotion of this program is essential and pediatricians are in a unique position to screen, counsel and refer to the SCT.

## Chapter 6

### 6 Pediatricians' knowledge, confidence, and behaviors in promoting smoking cessation and the SCT (Study 2)<sup>3</sup>

*Pediatricians have the potential to make a large impact in the promotion of smoking cessation. It is essential that pediatricians know of the smoking cessation services available to their patients' caregivers, such as the SCT, in order to advocate for the use of such programs. It is also imperative that pediatricians feel confident in their ability to promote smoking cessation to smoking caregivers. This study examined if pediatricians are confident to promote smoking cessation and if pediatricians are performing such actions. The outcome of this study helped determine if efforts should be made to promote the SCT among pediatricians, as well as improve pediatricians' confidence and rate of screening for SHSe, counseling caregivers to stop smoking, and referring caregivers to smoking cessation programs, such as the SCT.*

#### 6.1 Abstract

Second hand smoke exposure (SHSe) increases morbidity and mortality in children. 31% of caregivers who accompany their child to Ochsner Children's Clinic smoke; however, not one of those eligible utilizes the Smoking Cessation trust (SCT), a free smoking cessation program eligible to those who began smoking before 1988. The objective of this study was twofold: first, to assess pediatricians' knowledge and comfort level with the SCT and secondly, to assess and compare pediatricians' confidence and behaviors with regards to smoking cessation promotion in caregivers. **Methods:** Pediatricians were given a questionnaire to assess 12 parameters regarding their confidence and practice when screening, counseling, and referring caregivers to smoking cessation programs. **Results:** 36 questionnaires were administered, of which 27 were completed (75%). Only 7.41% had formal training in smoking cessation, 18.52% had never heard of the Smoking Cessation Trust (SCT), 92.59% did not refer to the SCT. All of the pediatricians stated that they were confident in their ability to screen for SHSe, 62.96% % were confident in providing counseling, and 44.45% were confident in offering referrals. The majority of pediatricians

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<sup>3</sup> Adapted from Hall, K., Kisely, S., Gastanaduy, M., Urrego, F. Pediatricians' confidence and behaviors in smoking cessation promotion and knowledge of the Smoking Cessation Trust. *Ochsner J.* 29 April 2016; <mailto:http://www.ochsnerjournal.org/doi/full/10.1043/TOJ-16-0010>

very often or always screened for SHSe (77.78%); however, 25.93% counseled smoking caregivers to quit, and only 11.11% provided a smoking cessation referral. Pediatricians stated that they were confident to screen, counsel, and refer caregivers; however they were significantly less likely to report actually screening for SHSe ( $p<0.05$ ), counsel ( $p<0.05$ ) and refer caregivers ( $p<0.05$ ). **Discussion/Conclusion:** Efforts should be made to increase the rate in which pediatricians provide smoking cessation, counseling, and referrals to the SCT through education and training.

## 6.2 Introduction

Second hand smoke exposure (SHSe) increases morbidity and mortality in children (Barnoya J, 2005; DiFranza JR, 2004; Ezzati M, 2003). It has been reported that 54% of children aged 3-11 years have continued SHSe (CDC, 2011). Discrepancies in SHSe also exist; children growing up in low income families are 7-10 times more likely to be exposed to tobacco than children of higher socioeconomic households (Singh GK, 2010).

Pediatricians often treat the harmful effects of SHSe. Pediatricians follow their patients closely during the first 2 years of life, as the American Academy of Pediatrics (AAP) recommends 10 well child visits during this time period (A.A.o Pediatrics, 1997) (Fiore et al., 2008). This increased frequency of visits puts pediatricians in a prime position to screen for smoking status, counsel caregivers to stop smoking, and refer caregivers to smoking cessation programs. In fact, the AAP recommends that pediatricians screen for SHSe at every visit (Sims, 2009).

Despite this recommendation, many studies have demonstrated that pediatricians infrequently screen caregivers for smoking status and SHSe in the home (Beaty et al., 2013; Winickoff et al., 2003). A national survey demonstrated that only 9% of caregivers who smoked received smoking cessation counseling from a pediatrician during their child's office visit. It has been hypothesized that pediatricians do not feel confident with counseling adults, as they do not have direct experience with this age group (Garg et al., 2007).

A recent study estimated that 31% of a caregivers of patients at the Ochsner Children's Clinic smoke, which is much higher than the US national average of 18% (Hall, 2015). This makes the Ochsner pediatric population particularly susceptible to the effects of SHSe. In addition, it was found that 0% of caregivers who smoke were aware of the Smoking Cessation Trust (SCT) of Louisiana, a free smoking cessation program available to any



Louisiana resident who began smoking prior to September 1<sup>st</sup>, 1988 (Hall, 2015).

It is estimated that the Ochsner pediatricians can refer approximately 8,700 SCT eligible smoking caregivers to the trust (Hall, 2015). These results indicate that the promotion of smoking cessation by Ochsner pediatricians may have a large impact on this particularly vulnerable population.

A critical barrier to smoking cessation promotion in the pediatric clinic is the lack of physician self-efficacy and self confidence in their ability to provide adequate counseling to caregivers (Garg et al. 2007). The Social Cognitive Theory suggests that a physician's self-efficacy is associated with their frequency of counseling. In fact, prior research has demonstrated that the higher a physician's self-reported self-efficacy, the more likely it was that counseling was provided at clinic visits (Zapka et al. 1999). A study found that prior provider training in smoking cessation counseling was more influential in determining pediatricians self-efficacy in smoking cessation promotion, even greater than years of practice (Cabana et al., 2004).

The objective of this study was twofold: first, to assess pediatricians' knowledge and comfort level with the SCT and secondly, to assess and compare pediatricians' confidence and behaviors with regards to smoking cessation promotion in caregivers.

### **6.3 Methods**

The study population consisted of all 36 general pediatricians from six different Ochsner pediatric clinics. Of note, physicians in clinics 3 and 4 rotate between these two locations. Additionally, clinics 5 and 6 also rotate between these two locations. Thus, data from these groups have been reported together. The questionnaires were made available online to all pediatricians from November 15 2015 to January 15 2016.

Pediatricians were sent an email with a link to the online questionnaire. The questionnaire consisted of 12 questions (presented in Appendix J). This informed the pediatricians that the questionnaire would take approximately 5-10 minutes to complete and that participation in this study was completely voluntary. The questionnaires were self administrated and consisted of 8 questions to assess pediatricians' confidence and practice when screening, counseling, and referring caregivers to smoking cessation programs. Questions were based on a review of literature regarding screening for SHSe, counseling caregivers to stop smoking, and referring caregivers to smoking cessation

programs. Five faculty members in pediatrics and public health reviewed the questionnaire for content validity.

Three questions assessed demographics (including gender of the pediatrician, the clinic in which they practiced, and how many full years they have been practicing medicine). One question assessed prior professional training in smoking cessation. Two questions assessed knowledge of the SCT and the prevalence in which they refer smoking caregivers to said trust.

Two questions focused on pediatricians' confidence level and pediatrician's smoking cessation behavior in the clinic, assessed via a likert scale. A five point scale was used to document pediatrician's level of agreement with the statements and scores as 1 = Definitely No, 2 = Not Really, 3 = Indifferent, 4 = Probably Yes, 5 = Definitely Yes. Participants were asked to state their level of agreement with the following questions: (1) screen caregivers for smoking behavior, (2) counsel smoking caregivers about cessation options, (3) refer caregivers to smoking cessation programs.

This study was reviewed by the Ochsner Institutional Review Board and met approval.

## **6.4 Analysis**

A descriptive analysis was conducted to identify the distribution of pediatrician's characteristics such as gender, length of practice, clinic in which the pediatricians practiced, as well as knowledge of the SCT, and confidence levels and behavior reports on screening, counseling and referring smoking caregivers to the SCT.

The differences in pediatricians' confidence level and self-reported behavior on screening, counseling and providing referrals, were examined using the Wilcoxon signed ranks test, given that likert scales can be considered ordinal data variables. Statistical significance was demined as  $p < 0.05$ .

## **6.5 Results**

36 questionnaires were administered to five pediatric clinics in the Ochsner Health System, of which 27 were completed (75%).

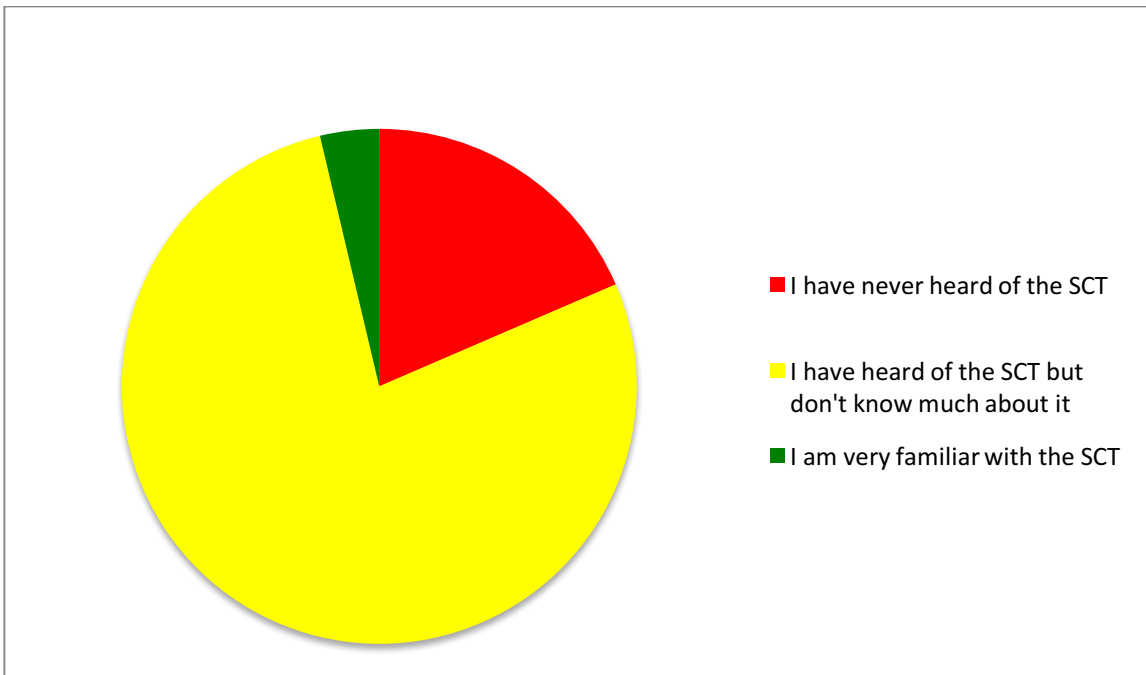
Response rates at the four clinics ranged from a high of 100% to a low of 43%. In three out of 4 it was at or above 63%. Pediatrician clinical location, duration of practice, and

training experience in smoking cessation are presented in Table 3. The majority of respondents were female (77.80%), practiced medicine at the Metairie/Destrehan clinic (37.04%), had been practicing medicine for 11-15 years (25.93%), and had no prior professional training in smoking cessation (92.59%).

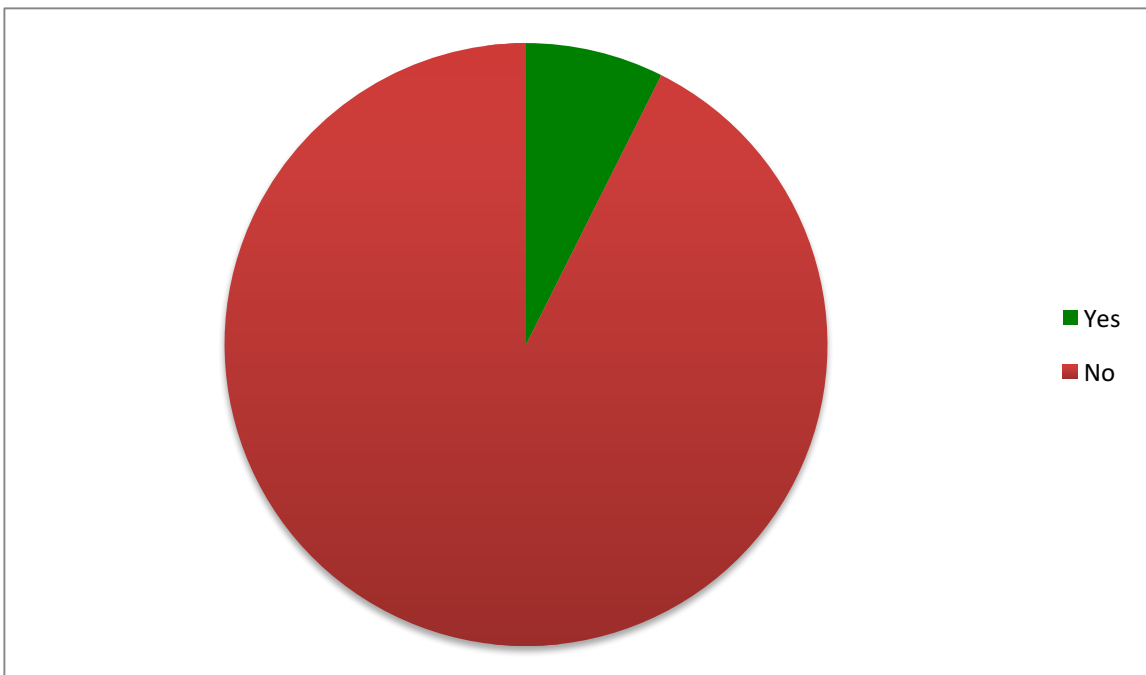
Familiarity and use of the SCT are reported in Figure 6 and 7. The majority of pediatricians were aware of SCT but not familiar with its services (77.78%), while 18.52% had never heard of the program. Only 3.70% reported being very familiar with the SCT. The vast majority of pediatricians in our study reported that they have never referred a caregiver to the SCT (92.59%).

Total		27	100.0
Characteristics		No.,%of clinic	% of total
<b>Clinical Location</b>	Clinic 1	9, 100	33.33
	Clinic 2	10, 83	37.04
	Clinic 3	6, 63	22.22
	Clinic 4 and 5	2, 43	7.41
		No.	% of total
<b>Years of Practice</b>	0-5	5	18.52
	6 to 10	5	18.52
	11 to 15	7	25.93
	16 to 20	4	14.81
	>20	6	22.22
<b>Completion of Smoking Cessation Training</b>	Yes	2	7.41
	No	25	92.59

**Table 3: Pediatrician's demographic characteristics, site and duration of practice and training experience in smoking cessation**



**Figure 6: Pediatricians' familiarity of the SCT**



**Figure 7: Pediatricians' use of the SCT**

Pediatricians' confidence in their ability to promote smoking cessation among caregivers is presented in Table 5. 100% of pediatricians stated that they were confident in their ability to screen for SHSe. 62.96% were confident in providing counseling and 44.45% were confident in offering referrals.

Pediatricians' smoking cessation behavior is presented in Table 4. The majority of

pediatricians screened caregivers for smoking behavior very often or always (77.78%); however, only 25.93% reported counseling smoking caregivers to quit, and only 11.11% reported providing a smoking cessation referral.

<b>Confidence</b>	<b>Not confident n, %</b>	<b>Indifferent n, %</b>	<b>Confident n, %</b>
Screen caregivers for smoking behavior	0, 0.0	0,0.0	27, 100.0
Counsel smoking caregivers about cessation options	8, 29.63	2, 7.41	17, 62.96
Refer caregivers to smoking cessation programs	12, 44.44	3, 11.11	12, 44.45
<b>Behavior</b>	<b>Perform Rarely or never n, %</b>	<b>Perform Often or always n, %</b>	<b>Usually n, %</b>
Screen caregivers for smoking behavior	3, 11.11	21, 77.78	3, 11.11
Counsel smoking caregivers about cessation options	17, 62.97	7, 25.92	3, 11.11
Refer caregivers to smoking cessation programs	18, 78.3	3, 11.11	2, 7.41

**Table 4: Pediatricians' confidence and behavior in screening, counseling and referring caregivers to smoking cessation programs**

A comparison between confidence level and self-reported behavior is recounted in Table 5. In each measure of smoking cessation promotion, there was a significant difference between confidence level and actual self-reported behavior. Pediatricians stated that they were confident in screening, counseling, and referring caregivers; however they were significantly less likely to report that they screened for SHSe, counsel caregivers to stop smoking, and refer caregivers to smoking cessation programs ( $p < 0.05$ ).

	<b>Confident (Mean±SD)</b>	<b>Behavior (Mean±SD)</b>	<b>t-value</b>	<b>p-value</b>	<b>DF</b>	<b>Z-score</b>	<b>p-value*</b>
Screen caregivers for smoking behavior	4.5±0.5	4.0±1.1	2.14	0.037	52	-2.67	$p < 0.05$
Counsel smoking caregivers about cessation options	3.4±1.0	2.6±1.1	2.81	0.007	52	-3.41	$p < 0.05$
Refer caregivers to a smoking cessation program	3.0±1.1	1.9±1.1	3.74	0.001	52	-4.20	$p < 0.05$

\*Wilcoxon signed ranks test.

**Table 5: Mean difference between self-reported confidence and behavior on screening, counseling and referring smoking caregivers**

## 6.6 Discussion

### Confidence and behavior in the promotion of smoking cessation

The results of this study indicate that pediatricians are very confident in their ability to screen for SHSe, but less so in providing counseling and referrals to caregivers. Physician behavior followed this trend, with SHSe screening occurring most frequently, followed by counseling and referrals.

Interestingly, pediatricians report significantly greater confidence in their ability to promote smoking cessation than actually doing so. Past studies have hypothesized that lack of confidence is the reason for pediatricians' failure to promote smoking cessation in caregivers. It has been stated that pediatricians do not spend much time with adults, leading to a lack of self-assurance in this area (Garg et al., 2007). Our study challenges this assumption, as the majority of pediatrician's report feeling confident, especially in their ability to screen for SHSe. Another factor, therefore, must account for the discrepancy between confidence level and behavior.

A lack of formal training may account for the incongruity found in this study. The literature reports that pediatric residents receive significantly less smoking cessation training than family physician residents (76% vs 32%  $p < 0.001$ ) (Kenney, 1988). These results are in line with our findings, as the vast majority of pediatricians indicate that they have never received smoking cessation training (92.59). Perhaps pediatricians are confident in their ability to provide smoking cessation services but have not been trained to incorporate these actions into their clinical encounters. Various studies have demonstrated that smoking cessation education can increase physician rates of screening, counseling, and referring caregivers to smoking cessation programs ((Beaty et al., 2013; Garg et al., 2007; Hipple et al., 2013; Hymowitz et al., 2001). Furthermore, practicing pediatricians report that they are more likely to promote smoking cessation if they have training (Zapka et al., 1999). In addition to providing education, these training sessions may also serve as a reminder to pediatricians to promote the reduction of SHSe, as well as provide strategies to incorporate such behaviors into everyday practice.

It has been postulated that pediatricians do not believe that addressing tobacco use in the caregiver is their responsibility (Hymowitz et al., 2001). Although it is ideal to segregate duties, reserving smoking cessation promotion for primary care physicians is not practical. As previously mentioned, caregivers visit their child's pediatrician often during the first two

years of life, making this time an optimal time to modify caregivers' behaviors. In addition, in low socioeconomic status where smoking is more prevalent, caregivers are less likely to have insurance to visit their primary care provider.

Studies to date have used the National Cancer Institute's (NCI) and the Community Effort Against Second Hand Smoke Exposure (CEASE) smoking cessation training program to increase the rate by which pediatricians deliver smoking cessation promotion with marked success (Beaty et al., 2013; Hipple et al., 2013; Hymowitz et al., 2008; Hymowitz et al., 2001). It is suggested that future studies implement these training sessions to increase provider compliance with smoking cessation promotion, with an emphasis on counseling and referring caregivers. In addition, education sessions may wish to teach pediatricians how to approach smoking cessation from the standpoint of the child's health. It has been reported that pediatricians feel confident in discussing the harmful effects of SHSe to caregivers, as it relates to children (Garg et al., 2007). This may be one mechanism in which pediatricians integrate smoking cessation promotion in their practice.

### Smoking Cessation Trust

This study found that Ochsner pediatricians are not familiar with the SCT and the services that this program offers. It is of no surprise then, that the vast majority of pediatricians are not referring smoking caregivers to this service. This underutilization of the SCT services is not unique to the Ochsner population.

Approximately 200,000 smokers in Louisiana are entitled to the trust; however, only 30,731 eligible smokers applied for SCT-funded smoking cessation services in 2013(Hall, 2015).

The SCT has the potential to make a large social impact, since it is a free program offered to a state that has a high prevalence of smokers (CDC, 2011; Hall, 2015). One of the stipulations of the court settlement is that the SCT cannot advertise any services. This makes disseminating information about the Trust extremely difficult.

This is where pediatricians come in. Pediatricians can disseminate information about the Trust to their patients' caregivers, which may help the caregiver stop smoking by assisting in their cessation efforts. Based on our results, however, it is apparent that Ochsner pediatricians need to be made aware of the SCT and its extensive services.

The literature supports the opinion that an intervention geared to pediatricians increases physicians' ability to refer caregivers to smoking cessation programs (Hymowitz et al., 2008; Hymowitz et al., 2001; Sharifi et al., 2014). A review of the literature deciphers that the best method to increase referral rates determined that pediatricians should undergo smoking cessation training and be equipped with smoking cessation materials for distribution (Beaty et al., 2013; Collins et al., 2005; Garg et al., 2007; Hymowitz et al., 2008; Hymowitz et al., 2001; J. Klein et al., 2010; Scal et al., 2004; Sharifi et al., 2014)

Future studies may wish to implement interventions involving smoking cessation education and materials to pediatricians to increase the use of smoking cessation programs.

## 6.7 Limitations

We acknowledge a limitation of this study is the potential for nonresponse bias, as one particular clinic had a low response rate. All clinics surveyed are affiliated with the Ochsner Health System. It is expected that each clinic in this study have equal access to smoking cessation resources. It is, therefore, not expected that additional responses from the particular clinic with a low response rate would change our results. Despite this, sample bias should be considered.

A second noteworthy limitation of this study is the potential for self-report bias. Confidence and behavior were measured by self-report without an independent assessment of accuracy. However, any bias would likely be in the direction of underestimating the disparity between self-reported confidence and actual behavior given that counseling and referral could be seen as desired practice. In addition, questionnaires were anonymous to reduce respondent bias. Nonetheless, the intrinsic inaccuracy of self-reports should be considered when examining this study.

Also, we had little information to provide non-SCT eligible caregivers. We provided them information on the 1-800-QUIT-NOW hotline and resources available from the American Lung Association. Future research projects will focus on ways to promote smoking cessation among this group as well.

In addition, the questionnaire responses for assessing pediatricians' behavior in screening, counseling, and referring caregivers consisted of "never", "rarely", "usually", "very often" and "always". Differentiating the variance between the definition of "usually" and "very



often” may have caused confusion in our respondents. In future studies, it is recommended that words with clear, non-overlapping definitions be used.

## **6.8 Conclusion**

Our pediatric group reported that they screen, counsel, and refer patients at a significantly lower rate than their level of confidence indicates. In addition, our pediatricians are unfamiliar with, and therefore underutilize the SCT services.

Efforts should be made to increase the rate in which pediatricians provide smoking cessation, counseling, and referrals through education and training. Providing a smoking cessation educational intervention, with particular emphasis on screening, counseling and referring caregivers to the SCT, is likely to provide pediatricians with the necessary tools to help reduce SHSe in infants and children.

## Chapter 7

### **7 The use of an intervention to increase pediatricians' smoking cessation promotion and knowledge of the Smoking Cessation Trust**

*As previously discussed, the pediatric setting is an ideal location for promoting smoking cessation in the caregiver. Particularly, the pediatric clinic is an opportune time to discuss the SCT. Unfortunately, the pediatric clinic is also very busy and pediatricians are often caught between various demands. In our previous study, we determined that Our pediatric group reported that they screen, counsel and refer patients at a significantly lower rate than their level of confidence indicated. It is important to determine if a brief educational session can impact the confidence level and behavioral rates of screening for SHSe, counseling caregivers to stop smoking and referring caregivers to smoking cessation programs. This intervention requires little resources and its financial burden is low. The cost to benefit ratio of this intervention has the potential to be very high. If the outcome of this study determines that this short intervention has the power to influence smoking cessation promotion, it can be widely implemented throughout Louisiana with relative ease.*

#### **7.1 Abstract**

**Introduction:** The link between second hand smoke exposure (SHSe) and health issues in children has been well established. The objective of this study was to determine if a short intervention implemented among pediatricians promotes improvement in the promotion of smoking cessation to caregivers and increase pediatricians' awareness of the Smoking Cessation Trust (SCT). **Methods:** Pediatricians from 6 clinics were randomly assigned to the control (C) or intervention (IG) group. All pediatricians received a survey to assess baseline knowledge, confidence, and behaviors in the SCT and smoking cessation promotion. Pediatricians in IG received an educational lecture delivered by a physician. Two months post intervention, pediatricians in C and IG received a survey to assess changes from baseline. **Results:** Out of 36 general pediatricians, 27 completed the surveys for use in the analysis of this study (75%). IG made more referrals to the SCT,

compared to C ( $p=0.048$ ) and to baseline ( $p=0.0065$ ). Pediatricians in IG were more confident in recommending the use of NRT (0.040) and schedule a follow up to discuss smoking cessation ( $p=0.029$ ) following the intervention. IG was more likely to refer caregivers to smoking cessation programs ( $p=0.027$ ), discuss a child's health risk from SHSe (0.031), and recommend the use of NRT to help quit ( $p=0.047$ ) post intervention.

**Conclusions:** The results from this study indicate that a short intervention can increase confidence and behavior in various parameters of smoking cessation promotion and significantly improve the rate in which pediatricians report referring smoking caregivers to the SCT.

## 7.2 Introduction

The negative effects of SHSe on the pediatric population have been well documented and, as such, people need to stop smoking around children (CDC, 2011; Johansson et al., 2004; Matt GE, 2004; Matt et al., 2011; Taylor BV, 1998; U. S. Department of Health Human, 2006; Wilson KM, 2011; Winickoff et al., 2012). However, smoking cessation is a very difficult process, with less than 10% of smokers being successful in their attempt to quit per year (Kahende, 2007).

These disappointing results have prompted greater efforts to improve the efficacy of smoking cessation strategies. For instance, the US Public Health Service Guideline for the Treatment of Tobacco Use and Dependence determined that undergoing smoking cessation counseling, Nicotine Replacement Therapy (NRT) and quit lines can significantly increase cessation rates, especially when combined (Fiore et al., 2008)

An example of a service that provides these interventions is the Smoking Cessation Trust of Louisiana. This is free to Louisiana residents who began smoking prior to 1988 (SCT, 2013). Despite this, the SCT is not utilized to its full potential, possibly because of its inability to promote its services (Hall, 2015)

If pediatricians could promote smoking cessation during these frequent visits, a decrease in SHSe among children may be achieved. Unfortunately, pediatricians do not appear to be taking this opportunity, despite the fact that pediatric visits provide an optimal teaching moment and caregivers are receptive to receiving smoking cessation advice at these appointments (Winickoff J P 2006; H. P. L. Winickoff J.P., Case B., Sinha P., Rigotti N.A., 2001; H. V. J. Winickoff J.P., Palfrey J.S., Perrin J.M., Rigotti N.A. , 2003; T. S. E. Winickoff J.P., McMillen R.C., Klein J.D., Rigotti N.A., Weitzman M., 2005).

This leads to a vital question: why aren't pediatricians promoting smoking cessation among their patients' caregivers? Pediatricians are confident in their ability to screen for SHSe, counsel caregivers to stop smoking and refer smoking caregivers to smoking cessation programs, such as the SCT (K. Hall, Kisely, S., Gastanaduy, M., Urrego, F, 2016). However, pediatricians are significantly less likely to report actually conducting these smoking cessation behaviors in practice (K. Hall, Kisely, S., Gastanaduy, M., Urrego, F, 2016).

Providing pediatricians with smoking cessation education, tools, and up-to-date resources may improve the rate in which these physicians promote smoking cessation. The objective of this study was twofold. This study aimed to determine if a short intervention implemented among pediatricians supported improvement in the promotion of smoking cessation to caregivers. Secondly, this study investigated if an intervention could increase pediatricians' awareness of the SCT.

### **7.3 Methods**

#### Study hypothesis

We hypothesized that an hour-long education session would lead to an increase in pediatricians' smoking cessation practices and their utilization of the resources of the SCT.

#### Subjects

The study population consisted of general pediatricians who practiced at one of six pediatric groups associated with Ochsner's Health System from December 1, 2015 to April 1, 2016. Of the 36 practicing general pediatricians, 27 participated in the study (75%). The primary investigator of the study contacted each pediatrician via email to notify them of the study and informed them that their clinic would be assigned at random to an intervention group or control group. All pediatricians were encouraged to participate. Inclusion criteria consisted of any pediatrician who practiced within the Ochsner Health System. No exclusion criterion was implemented. This study was reviewed by the Ochsner Institutional Review Board and met approval.

#### Study design

This study was a nested control trial in which six pediatric clinic sites were randomly assigned to either the specific intervention or as the control. All six clinics remained enrolled in the study until completion.

#### Pediatricians' intervention

Pediatricians in the intervention group received an educational lecture delivered by a physician (F.U.) during physicians' lunch hour and lunch was provided. During this time, pediatricians watched a PowerPoint presentation that discussed the effects of SHSe in children, reviewed guidelines in place to reduce SHSe and available resources that could be implemented to incorporate these guidelines into practice. The lecture was grounded in the CEASE theory, as outlined in chapter 2. In addition, pediatricians were educated on the various programs available to caregivers who do not qualify for the SCT. Those include the 1800-QUIT-NOW line, as well as American Lung Association resources.

Two months post intervention implementation the same pediatricians in the 6 clinics received a 12-question survey. The survey was completed anonymously to promote candor. Six questions assessed pediatricians' demographics, prior smoking cessation training, and familiarity with the SCT. The remaining six questions assessed pediatricians' confidence and behavior in promoting smoking cessation via a likert scale. Confidence was rated on the following likert scale: Definitely No, 2 = Not Really, 3 = Indifferent, 4 = Probably Yes, 5 = Definitely Yes. Behavior was rated on the following likert scale: 5 point likert scale: 1= Never, 2 = Rarely, 3 = Unsure, 4 = Often, 5 = Always.

## 7.4 Analysis

All categorical variables are presented as percentages; demographic differences (i.e. gender, years of practice, and familiarity with the SCT) were assessed using chi-square or Fisher exact tests.

Unpaired statistical testing was used to assess differences in physicians' pre and post intervention responses to likert scale questions. Statistical comparisons were made with a t-test with a two tailed significance level of  $p=0.05$ . All statistical analysis was performed using SAS version 9.4.

## 7.5 Results

Sample

Our study consisted of 36 general pediatricians who practiced in one of six Ochsner Clinic Foundation locations. Of these physicians, 27 completed the surveys for use in the analysis of this study. No significant differences were found in gender, years of practice, or past smoking cessation training between the intervention group and control at baseline (Table 6).

		Intervention	Control	
		n=17 (%)	n=10 (%)	P value
Gender	Male	2 (11.8)	3 (30)	0.315
	Female	15 (88.2)	7 (70)	
Years of Practice	0-5	4 (23.6)	4 (40)	0.778
	6 to 10	3 (17.6)	3 (30)	
	11 to 15	3 (17.6)	2 (20)	
	16 to 20	3 (17.6)	1 (1)	
	>20	4 (23.6)	0 (0)	
Previous Smoking Cessation Training	Yes	1 (5.9)	1 (10)	0.6931
	No	16 (94.1)	9 (90)	

**Table 6: Demographics of participant's baseline**

### The Smoking Cessation Trust

As seen in Table 7, pediatricians had no statistically significant difference in familiarity with the SCT or referrals made to the SCT at baseline.

		Intervention	Control	
		n=17 (%)	n=10 (%)	P value
Familiarity with the SCT	I am not familiar with the SCT	15 (88.3)	7 (70)	0.239
	I am very familiar with the SCT	2 (11.7)	3 (30)	
Referred caregivers to the SCT in the past 2 months	No	16 (94.1)	10 (100)	0.434
	Yes	1 (5.9)	0 (0)	

**Table 7: Familiarity and use of the SCT at baseline**

After the intervention, pediatricians did not demonstrate a statistically significant difference in familiarity with the SCT; however, the intervention group made more referrals to the SCT, compared to the control (table 8).

		Intervention	Control	P value
		n=17 (%)	n=10 (%)	
Familiarity with the SCT	I am not familiar with the SCT	15 (88.3)	7 (70)	0.239
	I am very familiar with the SCT	2 (11.8)	3 (30)	
Referred caregivers to the SCT in the past 2 months	Yes	9 (52.9)	1 (10)	0.048
	No	8 (47.1)	9 (90)	

**Table 8: Pediatricians familiarity and use of the SCT after intervention**

As shown in table 9, the intervention group reported making more referrals to the SCT after the intervention, compared to baseline. No statistically significant difference was seen in the control group, after the intervention when compared to baseline data.

		Intervention Group			Control Group		
		Baseline	Post Intervention	P value	Baseline	Post Intervention	P value
		n=17 (%)	n=10 (%)		n=17 (%)	n=10 (%)	
Referred caregivers to the SCT in the past 2 months	Yes	16 (94.1)	9 (52.9)	0.0065	10 (100)	9 (90)	.3049
	No	1 (5.9)	8 (47.1)		0 (0)	1 (10)	

**Table 9: Pediatricians use of the SCT baseline vs post intervention**

#### Pediatrician's Confidence in their Ability to Provide Smoking Cessation Promotion

Pediatricians in the intervention groups reported being more confident in recommending the use of NRT to help quit and schedule a follow up to discuss smoking cessation after the intervention, when compared to baseline (Table 5). Pediatricians in the control group stated that they were also more confident in providing educational materials on smoking cessation two months after study completion, compared to baseline data.

There were no statistically significant differences between baseline and post intervention for any of the remaining parameters of confidence in either the intervention or control group (Table 10).

	INTERVENTION (N=17)			CONTROL (N=10)		
	Baseline	Post Intervention	P value <sup>a</sup>	Baseline	Post Intervention	P value <sup>a</sup>
Confidence <sup>b</sup>						
Screen caregivers for smoking status	4.5	4.7	0.304	4.4	4.6	0.398
Counsel smoking caregivers about SC options	3.4	3.6	0.571	3.6	3.9	0.563
Refer caregivers to SC programs	3.2	3.6	0.593	3	3.5	0.386
Discuss a child's health risk from SHSe	4.7	4.8	0.434	4.5	4	0.330
Advise smoking caregivers to quit	4.5	4.7	0.223	4.6	4.6	0.790
Record smoking as a health problem in the medical chart	3.7	4	0.483	3.9	4.3	0.458
Provide educational materials on self-help SC	2.2	2.9	0.112	2.6	3.8	0.0385
Recommend the use of NRT to help quit	1.9	2.9	0.040	2.4	2.8	0.355
Schedule a follow up to discuss SC	1.2	1.9	0.029	2.1	2.2	0.818

SC= smoking cessation; SHSe= Second Hand Smoke Exposure; NRT = Nicotine Replacement Therapy.

a = Unpaired t-test, two tailed, significance level of  $p = 0.05$ .

b = Mean for group on 5-point likert scale: 1= Definitely No, 2 = Not Really, 3 = Indifferent, 4 = Probably Yes, 5 = Definitely Yes.

**Table 10: Physicians self reported smoking cessation confidence, baseline vs. post intervention**

### *Pediatrician's Smoking Behavior in Smoking Cessation Promotion*

Pediatricians in the intervention groups reported that they were more likely to refer caregivers to smoking cessation programs), discuss a child's health risk from SHSe, and recommend the use of NRT to help quit than they were at baseline (Table 6).

There were no statistically significant differences between baseline and post intervention for any of the remaining parameters of behavior in either the intervention or control group (Table 11).



	INTERVENTION (N=17)			CONTROL (N=10)		
	Baseline	Post Intervention	P value <sup>a</sup>	Baseline	Post Intervention	P value <sup>a</sup>
Behavior <sup>b</sup>						
Screen caregivers for smoking status	4.4	4.4	0.761	3.8	3.2	0.981
Counsel smoking caregivers about SC options	2.8	3.1	0.420	2.4	3.2	0.075
Refer caregivers to SC programs	2.0	2.9	0.027	1.8	3.4	0.058
Discuss a child's health risk from SHSe	4.1	4.6	0.031	3.5	4.1	0.213
Advise smoking caregivers to quit	4.2	4.4	0.511	3.5	3.8	0.569
Record smoking as a health problem in the medical chart	3.1	3.7	0.150	3.2	3.8	0.321
Provide educational materials on self-help SC	1.9	2.5	0.153	1.8	3	0.051
Recommend the use of NRT to help quit	1.8	2.7	0.047	1.7	2.6	0.101
Schedule a follow up to discuss SC	1.4	1.8	0.220	1.4	1.5	0.673

SC= smoking cessation; SHSe= Second Hand Smoke Exposure; NRT = Nicotine Replacement Therapy.

a = Unpaired t-test, two tailed, significance level of  $p = 0.05$ .

b = Mean for group on 5-point likert scale: 1= Never, 2 = Rarely, 3 = Unsure, 4 = Often, 5 = Always.

**Table 11: Physicians self reported smoking cessation confidence and behavior baseline vs post intervention**

## 7.6 Discussion

A one-hour education session was associated with a significant increase in pediatricians' confidence in recommending NRT to smoking caregivers and scheduling a follow up appointment to further discuss smoking cessation with caregivers. Pediatricians also had a self reported increase in the rate in which they referred smoking caregivers to smoking cessation programs, discussed the health risk the SHSe poses to the child, and recommended the use to NRTs to help stop smoking.

The results from this study are promising and demonstrate that a short intervention can influence pediatricians' confidence and behavior rates. The intervention may have given

pediatricians the tools to discuss smoking cessation with caregivers and the confidence to arrange future appointments to further discuss quitting smoking. It is of interest, however, that no other parameters assessed demonstrated a significant increase after intervention. This could be due to already high baseline scores in various measures, such as screening for SHSe. For instance, previous work shows that pediatricians are more comfortable screening for SHSe than counseling or referring caregivers (K. Hall, Kisely, S., Gastanaduy, M., Urrego, F, 2016).

Since our intervention method was simple and consisted of only a one hour lecture, it would be of interest to investigate the impact of a combination of methods on smoking cessation parameters, in particular, those we were unable to change in the course of this study. For instance, previous studies have demonstrated that the addition of smoking cessation materials given to pediatricians for distribution may lead to an increase in counseling rates (Beaty et al., 2013; Hymowitz et al., 2008; Hymowitz et al., 2001). Modifications to the electronic health care record to include smoking cessation prompts may also increase smoking cessation counseling (Sharifi et al., 2014). Future studies may wish to investigate the impact of a variety of intervention methods on various measures of smoking cessation promotion.

## **7.7 Limitations**

We must consider the possibility for self-report bias in this study. All parameters were assessed via self-reports without confirming results with an independent measure. It is possible that the control group may over-estimate their actual knowledge and behavior given that smoking cessation promotion may be viewed as a positive behavior. However, inflation may be expected to occur uniformly across all groups, as those physicians who underwent interventions may be subject to a social desirability bias. Furthermore, surveys were unidentified to moderate respondent bias. Nonetheless, the inherent errors associated with self-report questionnaires should be contemplated when examining our results.

A further limitation to this study is that although we changed some parameters, many did not improve. Of interest, our intervention group indicated no change with regards to familiarity with the SCT, pre or post intervention. This group, however, indicated that they had a significant increase in referrals made to the SCT post intervention. This leads us to believe that there is some reporting error in the survey.

We also found it interesting that the control group demonstrated a significant increase in providing educational smoking cessation materials, compared to their baseline results. We were concerned that the control group had undergone some form of smoking cessation training, independent of the intervention that we had provided. Survey question #3 (“have you undergone any formal smoking cessation training?”) was re-analyzed, comparing answers given by the control group pre and post intervention. The data indicated that the same percentage of pediatricians had undergone smoking cessation training (10%), leaving us to believe that no outside education had taken place during the course of our study. Although our data indicates that pediatricians did not participate in additional smoking cessation training, some change was implemented among the clinics comprising the control group to influence this smoking cessation parameter.

## **7.8 Conclusion**

The results from this study indicate that a short intervention can increase confidence and behavior in various parameters of smoking cessation promotion. It may be of interest to investigate how the lecture can be used in combination with other intervention methods to optimally increase smoking cessation promotion.

Our research has also demonstrated that a one-hour intervention can significantly improve the rate in which pediatricians report referring smoking caregivers to the SCT. The results of this study have the power to influence smoking cessation among thousands of Louisiana residents. Future research is needed to translate this study to widespread promotion of the SCT among all pediatricians practicing in the state of Louisiana.

## Chapter 8

### **8 The effect of a children's book on pediatricians' rate of screening for second hand smoke exposure and counseling caregivers to stop smoking**

*Based on the results from our previous intervention, a brief lecture can significantly increase the rate in which pediatricians refer smoking caregivers to smoking cessation programs, such as the SCT. This short intervention did not make a significant impact on screening or counseling rates. This next study was designed to increase screening rates in the pediatric setting. The literature supports the notion that concrete material can increase pediatricians' promotion of smoking cessation. In addition, the literature states health behavior change is best facilitated when interventions are family centered. Our next intervention, therefore, will incorporate a children's book to facilitate screening for SHSe in the pediatric clinic. If we find that this intervention leads to a significant increase in SHSe screening, further research may be initiated. Although beyond the scope of this thesis, it is our hope that our future studies will use this children's book to measure various parameters of smoking cessation promotion, such as pediatricians' rates of counseling and referring and smoking cessation discussions in the home.*

#### **8.1 Abstract**

**Introduction:** The rate in which pediatricians promote smoking cessation behavior in the clinic setting is low. The literature demonstrates that interventions paired with tangible materials may significantly increase screening rates in the pediatric office. The aim of this study was to investigate whether the addition of a children's book in the pediatric clinic could result in an increase in the rate in which pediatricians screened for SHSe. **Methods:** This study was an unblinded randomized control clinic study in which seven pediatric clinic sites were randomly assigned to either an intervention or control group. The control group did not receive a children's book, while pediatricians in the intervention group were given children's books to distribute to their patients. **Results:** At baseline, there was no difference between the control group and intervention group in rates in which pediatricians screened for SHSe ( $p=0.8728$ ). Screening for SHSe post intervention was statistically

significantly greater in the intervention group, when compared to control ( $p < 0.01$ ).

**Conclusions:** The results from this study advocate for the use of a children's book in the pediatric setting to increase the rate in which pediatricians screen for SHSe. Future research may examine the effect of the storybook on various parameters of smoking cessation and future smoking behaviors.

## 8.2 Introduction

Second hand smoke exposure (SHSe) is estimated to affect approximately 21 million children under the age of 18 in the U.S (CDC, 2011; Schuster, 2002). There is no safe level of SHSe ((US), 2006; Program, 2014; Winickoff et al., 2005). SHSe places children at an increased risk of immunological, respiratory, and cardiovascular issues, as well as behavioral problems and an increased risk of sudden infant death syndrome (Albuquerque CA, 2004; Anderson ME, 2005; Coddou C, 2009; Eppolito AK, 2010; Fabry, 2011; Gergen et al., 1998; Grigg, 2012; Maritz, 2008; Mitchell EA, 2006; Rylander, 1995; Singh GK, 2010; Zhang, 2013; Zhou, 2014).

As part of routine care, children make multiple visits to the pediatrician during the first few years of life. As a result, caregivers tend to see their child's pediatrician more often than their own PCP (Fiore et al., 2008; A.A.o Pediatrics, 1997). This places pediatricians in a unique position to promote smoking cessation among caregivers.

Recommended strategies for the reduction of SHSe among children include pediatricians' promotion of smoking cessation behaviors at every visit (AAP). Despite this, pediatricians are not optimally screening for SHSe (Klerman, 2004). Tanski et al (2003) demonstrated that smoking cessation discussions occur at a rate of 1.5% in ambulatory care visits 4.1% during well-child visits and 4.4% for asthma related consults (Tanski, 2003). These bleak results demonstrate the immediate need to improve smoking cessation promotion in the pediatric clinic.

Mixed results have been generated regarding the impact of an intervention on improving screening rates by pediatricians to smoking caregivers (Beaty et al., 2013; Collins et al., 2005; Hipple et al., 2013; Houston et al., 2006; Hymowitz et al., 2008; Hymowitz et al., 2001; Scal et al., 2004; Sharifi et al., 2014). The literature demonstrates that interventions paired with tangible materials significantly increase screening for SHSe during pediatric visits (Collins et al., 2005; K. Hall, Kisely, S., Urrego, F, 2016; Hipple et al., 2013; J. D. Klein et al., 1995). In addition, studies have shown that children respond well to narrative

stories to illicit behavioral changes (Branscum P, 2009; Branscum, 2013; Viardero, 2009). Although it was not the child's behavior that we were interested in modifying, their input may be invaluable to encouraging family discussions and smoking cessation in the home.

To the best of our knowledge, no prior study has examined the effect a children's book on screening and counseling rates in the pediatric clinic setting. Therefore, our objective was to determine if the addition of a children's book in the pediatric clinic could result in an increase in the rate in which pediatricians screened for SHSe.

## 8.3 Methods

### Study Setting and Dates

This randomized study was performed from April 15, 2016 to May 15, 2016, at seven pediatric groups associated with Ochsner's Health System. This study was reviewed by the Ochsner Health System Institutional Review Board and met approval.

### Recruitment

The primary investigator of the study (FU) contacted each clinic to discuss the study and assess interest in participation. Once clinic participation was confirmed, an email was distributed to inform each physician of the study purpose and design. Inclusion criteria consisted of any general pediatric clinic affiliated with the Ochsner Health System; no exclusion criterion was applied.

### Study design

This study was an unblinded randomized control clinic study in which seven pediatric clinic sites were randomly assigned to either an intervention or control group. The control group did not receive a children's book, while pediatricians in the intervention group were supplied children's books to distribute during clinic visits. The seven clinics remained enrolled in the study for the duration of the project.

Of note, six of the seven clinics had previously participated in Study 3 (and thus, half had received a lecture.

The children's book was written by K.H. and F.U. and illustrated by Mark Andersen, a local artist (Appendix J).

## Study hypothesis

It was hypothesized that distribution of a read-along children's book would lead to an increase in pediatricians' rate of screening for SHSe.

## Interventions

The intervention group received an email with information pertaining to the children's book. Pediatricians were informed that the children's book would be sent to their clinic for the purpose of distribution during office visits to any children exposed to SHS. Pediatricians were encouraged to contact the study's PI (FU) with any questions or concerns.

## Children's Book

This read-along children's book emphasizes the importance of SHSe reduction among children by following the story of a local boy and his grandfather (figure 1). The premise of the story is such that Alton (the protagonist) is best friends with his grandfather; they do everything together. We see Alton and his grandfather participating in activities that reflect the culture of Louisiana, such as playing Jazz music, fishing, boiling crawfish, and playing football together. In each of the scenarios, we see Alton's grandfather smoking a cigarette. As time goes on, Alton notices that his grandfather can no longer participate in their favorite activities together, which makes Alton sad. Alton also notices that his grandfather is coughing and wheezing. Alton tells his grandfather that he should stop smoking so that they can return to their favorite activities. Alton accompanies his grandfather to the physician's office, where the doctor explains the harms of smoking and provides the grandfather with contact numbers for SCT and other smoking cessation program. Alton helps his grandfather call a smoking cessation program. After the grandfather has stopped smoking, he and Alton return to their normal activities. Please see appendix I for more detail.



**Figure 8: Front cover of our children’s book “Best of Friends”.**

We chose to illustrate the characters as race neutral, so that all children in Louisiana could relate to Alton and his grandfather. Also, it was very important that we capture the culture of Louisiana in the story so that the story didn’t appear to be generic, but rather one targeted specifically to the families of Louisiana. We employed the services of a local artist, Mark Andersen, to convert our vision into illustration (Appendix J).

#### Data extraction

Electronic health record data was mined to extract information on all patient charts before (January 1 2016-April 1 2016) and after (April 15 2016-May 15 2016) the implementation of the intervention. We included data on the documentation of screening for SHSe by using the 10<sup>th</sup> revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) code (SHSEZ77.22).



## 8.4 Analysis

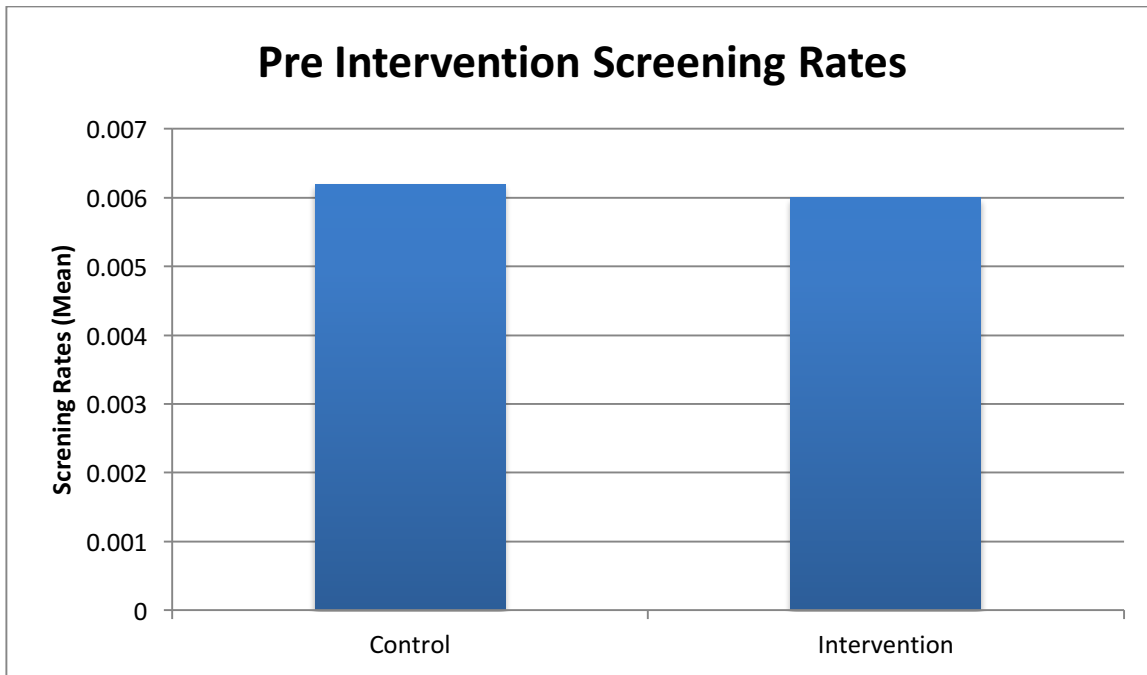
The differences between the two groups' screening for SHSe data was examined using an independent samples t-test at baseline and post intervention. Statistical significance was demined as  $p < 0.05$ .

## 8.5 Results

At baseline, there was no difference between the control group and intervention group in rates in which pediatricians screened for SHSe ( $p=0.8728$ ).

		<b>Control Group N=13275</b>	<b>Intervention Group N=13272</b>	<b>t- value</b>	<b>p-value</b>
Pediatricians' screening rate	mean	0.0062	0.006	-3.02	0.8728

**Table 12: Pediatricians' rates of screening for second hand smoke exposure (SHSe) pre intervention.**

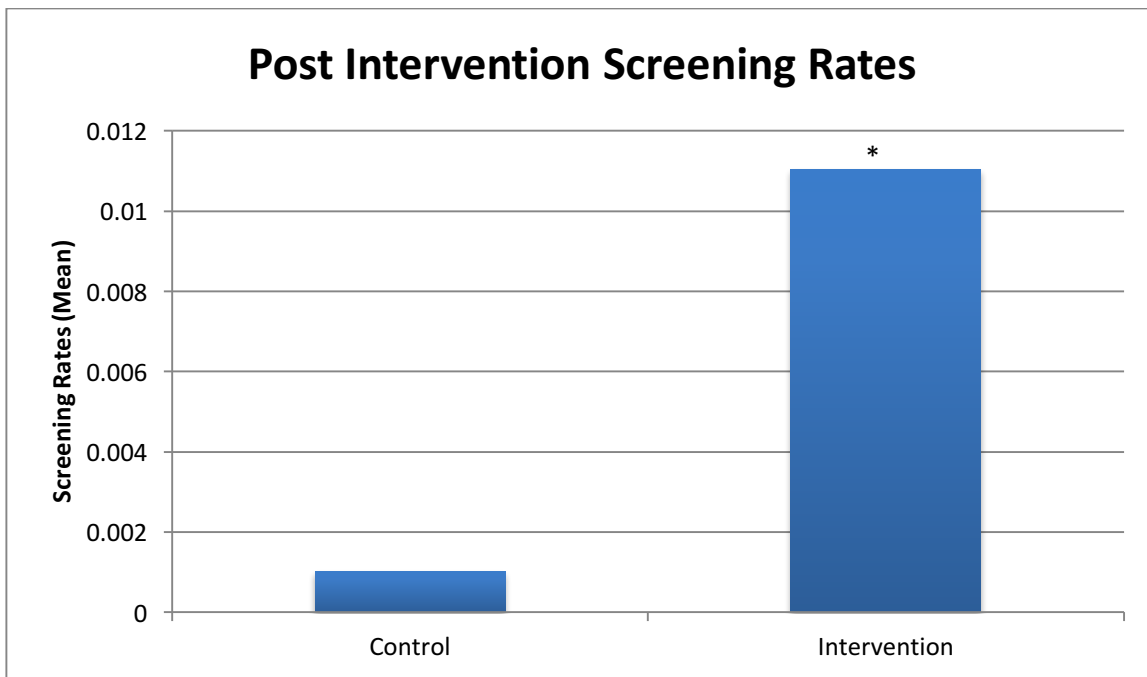


**Figure 9: Pre-intervention screening rates, expressed as a mean. No significant differences between control and intervention group ( $p=0.8728$ ).**

Screening for SHSe post intervention was statistically significantly greater in the intervention group, when compared to Control ( $p<0.01$ ).

	<b>Control Group N=13275</b>	<b>Intervention Group N=13272</b>	<b>t-value</b>	<b>p-value</b>
Pediatricians' mean screening rate	0.0036	0.0108	-3.02	0.0025

**Table 13: Pediatricians' rates of screening for second hand smoke exposure (SHSe) post intervention.**



**Figure 10: Documentation of second hand smoke exposure (SHSe), expressed as mean. G2 documented SHSe in the medical record significantly more Control ( $P < 0.01$ ), \*= Different than Control**

## 8.6 Discussion

Our study demonstrated that the distribution of a children's book during pediatric clinic visits may increase the rate in which pediatricians screen for SHSe.

Pediatricians may find broaching caregivers' smoking status to be uncomfortable; 25% of pediatricians reported that the expectation of negative reactions from parents is a significant barrier to discussing SHSe and smoking cessation with caregivers (Frankowski, 1993). However, the literature indicates that providing pediatricians with concrete materials can improve smoking cessation promotion. It is possible that having a physical item to hand to the caregivers may facilitate a conversation, alleviate the tension surrounding this topic, and make it easier for pediatricians to ask if there is SHSe in the home.

The physical presence of the children's book may have also impacted the pediatrician's rates of screening for SHSe. Pediatricians may have been reminded to screen for SHSe when seeing the book in their office or at their desk. Moreover, child may have been attracted to the book cover and began looking through it during the visit, prompting the pediatrician to discuss the book and ask about SHSe.

Of interest, screening rates decreased in the control group, when compared to pre intervention rates. A reason for this may have been that a portion of the control group had participated in our previous study and received a lecture. Perhaps the lecture content still resonated with these participants at the beginning of the current study; however, as time went on, the motivation to promote smoking cessation faded without a constant reminder. In contrast, the members of the intervention group who had received a lecture in our prior study had the children's book in this current study to continually remind them of the importance of smoking cessation promotion.

The unique aspect of this study was that it was the first randomized control study to use a children's book as the intervention to increase pediatrician's behavior in smoking cessation promotion. Additionally, the majority of previous studies focusing on pediatricians smoking cessation promotion have focused on how interventions change baseline behavior. Although this type of research is important, one of the major limitations is that the results do not take into consideration the effect of secular trends. We felt that the addition of a control group would allow for confounding variables to be better accounted. Lastly, the majority of studies that utilize a children's book is focused on behavioral change in the child (Branscum P, 2009; Branscum, 2013; Mack, 1990; Viardero, 2009; Whitehurst, 1994). For example, various studies have shown the benefit of using a narrative children's story to decrease BMI in overweight and obese children (Branscum P, 2009; Branscum, 2013; Viardero, 2009). A key component to these materials is the use of simple texts and pictures that provide visual cues to what is happening in the story. In addition, an illustrated book can help child grasp difficult to explain concepts, such as the benefits of smoking cessation. As previously mentioned, we were not interested in changing children's behavior. Nevertheless, we wished to utilize these same principles that make a story successful in facilitating health behavior change in our children's book. We believed that actively involving the child in their caregivers smoking cessation journey could help motivate the entire family, thus the book may have served a dual purpose: increase screening in the pediatric setting and facilitate discussions in the home. Unfortunately we were unable to measure the latter.

It would be of interest to investigate the effect of the children's book on various parameters of smoking cessation. Although these investigations are beyond the scope of this research project, further studies may wish to follow up with those families that received the book to determine if caregivers stopped smoking.

Also, future studies may wish to determine if the children's book led to more referrals to smoking cessation program referrals and subsequent enrollments. It would be of interest to follow the caregivers who received the book to determine if they were more likely also stop smoking.

Unfortunately, children who grow up in a home with a smoker are significantly more likely to become smokers in adolescence (Couriel, 1994). It would be of interest to implement a longitudinal study to determine if the use of our smoking cessation storybook and involvement of the child in their caregivers smoking cessation journey led to a reduction in future smoking rate in children.

## **8.7 Limitations**

A limitation of this study is that although there is a significant difference in mean screening, the overall rate is quite low. This may be due to pediatrician's documented screening for SHSe in an alternative location. Documentation in the designated location is important so that future care can be initiated based on this diagnosis. For example, if referrals to a smoking cessation program were to be issued based on results generated from the screening process, patient's whose smoking status was indicated in the notes section would not receive a referral.

In addition, 6 of the seven clinics in had previously participated in Study 3 and thus half of the participants had already received a lecture. This may have created a booster effect; however, we randomly assigned these 6 clinic to receive the children's book or not receive the children's book. Although this randomization would theoretically equalize the prior exposure to the lecture and minimize the confounding effect of being exposed to the lecture (ie: previous treatment group), it is important to consider this limitation when examining this data.

## **8.8 Conclusion**

The results from this study advocate the use of a children's book in the pediatric setting to increase the rate in which pediatricians screen for SHSe. Future studies may wish to investigate the effect of a children's book on various parameters of smoking cessation and future smoking behaviors.



## Chapter 9

### 9 Increasing pediatricians' promotion of smoking cessation among caregivers

*Chapter 7 has demonstrated that brief lectures can significantly increase the rate in which pediatricians refer smoking caregivers to smoking cessation programs. Unfortunately, screening for SHSe and counseling caregivers to stop smoking was not significantly impacted.*

*As a result, we have designed and implemented changes to our hospital electronic health record (EHR) to provide prompts to pediatricians to screen for SHSe and counsel caregivers to stop smoking. It is our hope that these changes will increase parameters that a lecture alone failed to significantly impact.*

#### 9.1 Abstract

**Introduction:** The American Academy of Pediatrics (AAP) recommends that pediatricians promote smoking cessation among caregivers at every visit. Currently, there are inconsistencies between recommendations and clinical practice. Interventions have been shown to increase pediatrician's adherence to the AAP tobacco prevention and control guidelines. This study aims to compare results generated from three intervention methods on the rate at which pediatricians screen for SHSe and counsel caregivers to stop smoking. **Methods:** Pediatricians were assigned to one of three intervention groups: no lecture, changes in electronic health record (EHR) (G1), lecture, no changes in the EHR (G2) or a lecture and EHR changes (G3). We included data on the documentation of screening for SHSe ICD-10 code SHSEZ77.22. The data on counselling caregivers to quit smoking was acquired by assessing the usage of Best Practice Alerts (BPA). Data between groups were compared using a one-way analysis of variance (ANOVA). When a significant interaction effect was found, Tukey's honest significant difference (HSD) test was performed. A significant level was set at  $P < 0.05$ . **Results:** Documentation of SHSe was statistically significantly greater in the G3, when compared to G1 and G2 ( $p < 0.01$ ). Documentation of SHSe was statistically significantly greater in the G1, when compared to G2 ( $p < 0.05$ ). There were no significant differences in providing counseling between

groups. **Conclusion:** A brief lecture with EHR prompts may be a simple way to increase screening for SHSe in the pediatric primary care setting.

## 9.2 Introduction

Second hand smoke exposure (SHSe) has deleterious effects on children (Barnoya J, 2005; DiFranza JR, 2004; Ezzati M, 2003; Winickoff et al., 2003; Winickoff et al., 2012). As a result, the American Academy of Pediatrics (AAP) has advocated the importance of promoting smoking cessation at every visit (Bunik et al., 2013; Fiore et al., 2008; A.A.o Pediatrics, 1997). Despite this, discrepancies between recommendations and clinical practice exist. For instance, a recent study conducted by our research team found that only a quarter of pediatricians reported counseling smoking caregivers to quit (K. Hall, Kisely, S., Gastanaduy, M., Urrego, F, 2016). Possible reasons include time constraints, comfort levels in providing this advice, and lack of formal training (Garg et al., 2007). Despite these potential barriers, having a protocol in place to help pediatricians screen, counsel, and refer smoking caregivers at every visit doubles caregiver cessation rates (Pbert L, 2003).

Previous studies have investigated the effect of various interventions on increasing smoking cessation promotion in the pediatric primary care clinic. Lectures alone have generated mixed results in regards to increasing screening for SHSe and counseling caregivers to stop smoking (Beaty et al., 2013; Collins et al., 2005; Hipple et al., 2013; Hymowitz et al., 2008; Hymowitz et al., 2001; J. D. Klein et al., 1995). In addition, although lectures do not require great financial resources, they can be time consuming for the busy pediatrician.

Studies have demonstrated that including relevant prompts in electronic health records (EHRs) can increase smoking cessation promotion in the pediatric clinic (Bunik et al., 2013; Jenssen BP, 2016; Sharifi et al., 2014). To the best of our knowledge, no study has directly compared the effects of a lecture plus EHR prompts, EHR prompts alone, and a lecture alone, on various parameters of smoking cessation promotion.

This study aims to compare results generated from three intervention methods on the rate at which pediatricians screen for SHSe and counsel caregivers to stop smoking. The results from this study will help to illicit the best intervention method to improve smoking cessation promotion in the pediatric clinic. It is necessary to determine if both a lecture and EHR prompts are integral components to increase smoking cessation promotion. If



only one condition proves to be equally or more successful than a combination, this research may spare the resources associated with implementing an additional, unnecessary condition.

### 9.3 Methods

The study population consisted of general pediatricians who practiced at one of five pediatric groups associated with Ochsner's Health System from December 1, 2016 to May 1, 2016. The primary investigator of the study contacted each pediatrician via email to notify him or her of the study. All pediatricians were encouraged to participate. Inclusion criteria consisted of any pediatrician who practiced within the Ochsner Health System. No exclusion criterion was implemented. This study was reviewed by the Ochsner Institutional Review Board (IRB) and met approval.

All five clinics remained enrolled in the study until completion. This study did not have random assignment; pediatrician group was assigned to either a group that received changes in the Electronic Health Record(EHR) (G1), (EHR) (G1), lecture, no changes in the EHR (G2) or a lecture and EHR changes (G3) based on previous group assignments. In studies 2,3 and 4, clinics that had not received a lecture or children's book (essentially serves as the controls for the previous studies) were to serve as G1. Clinics that had received a prior lecture but had not been assigned to distribute a children's book in clinic served as G2. G3 was comprised of a clinic that had not participated in either study.

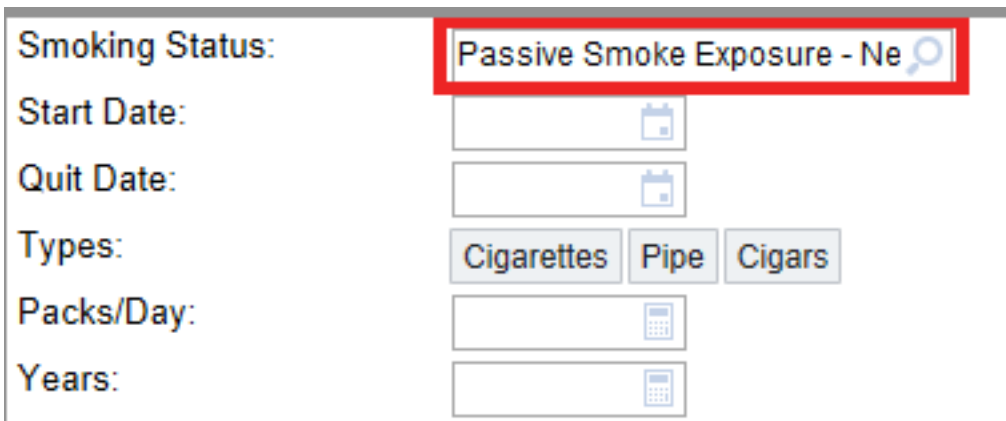
Group 1 (G1)	Group 2 (G2)	Group 3 (G3)
No Lecture	Lecture	Lecture
EHR prompts	No EHR prompts	EHR prompts

**Table 14: Treatment group assignment for Study 4**

The EHR used in this study was EPIC Systems. Pediatricians in G1 and G3 received an email alerting providers of the changes on the EHR to aid in screening, counseling and referring caregivers. Various drop down boxes were made available for providers to record any smoking cessation promotion distributed during the visit in the patient's EHR.

Changes made to the EHR. Pediatricians were encouraged to contact EHR helpdesk or the study's PI with any questions.

Pediatricians G3 received an educational lecture delivered by a physician (F.U.) during physicians' lunch hour and lunch was provided. During this time, pediatricians watched a PowerPoint presentation that discussed the effects of SHSe in children, reviewed guidelines in place to reduce SHSe and available resources that could be implemented to incorporate these guidelines into practice.



Smoking Status: **Passive Smoke Exposure - Ne**

Start Date:

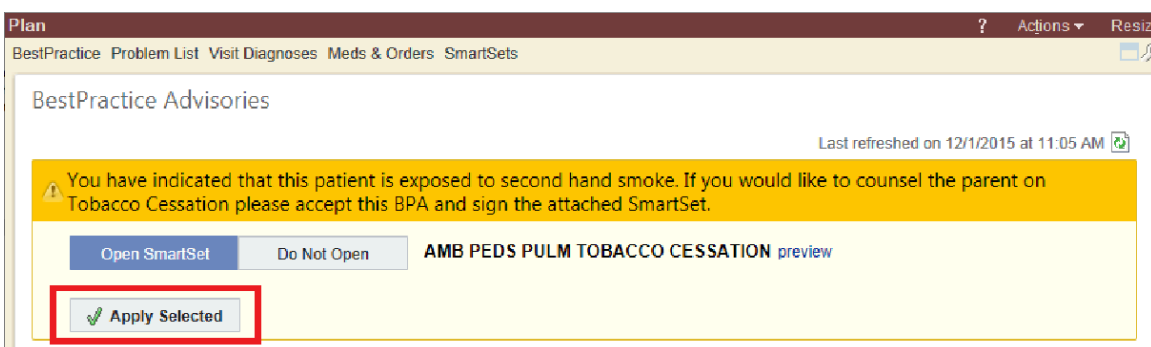
Quit Date:

Types:

Packs/Day:

Years:

**Figure 11: EPIC screenshot demonstrating pediatricians' ability to record screening for SHSe in the patient's chart via a drop down box.**



Plan ? Actions ▾ Resize

BestPractice Problem List Visit Diagnoses Meds & Orders SmartSets

BestPractice Advisories

Last refreshed on 12/1/2015 at 11:05 AM

You have indicated that this patient is exposed to second hand smoke. If you would like to counsel the parent on Tobacco Cessation please accept this BPA and sign the attached SmartSet.

**AMB PEDS PULM TOBACCO CESSATION** [preview](#)

**Figure 12: EPIC screenshot demonstrating pediatricians' ability to open SmartSet to aid in counseling caregivers to stop smoking.**

▼ AMB PEDS PULM TOBACCO CESSATION Add Order

*From BestPractice:*  
 You have indicated that this patient is exposed to second hand smoke. If you would like to counsel the parent on Tobacco Cessation please accept this BPA and sign the attached SmartSet.

▼ Progress Note 1 of 1 selected

▶ Tobacco Cessation Note  
 Tobacco Cessation Counseling Note Edit

▼ Diagnosis 1 of 1 selected

▶ Diagnosis  
 Second hand tobacco smoke exposure [Z77.22] Edit

▼ Patient Instructions 1 of 1 selected

▶ Patient Instructions  
 AMB SMOKING CESSATION AVS Edit

▼ Additional SmartSet Orders Add Order

Click the Add Order button to add an order in this section

Associate Providers Next

Pharmacy Remove Pend Sign

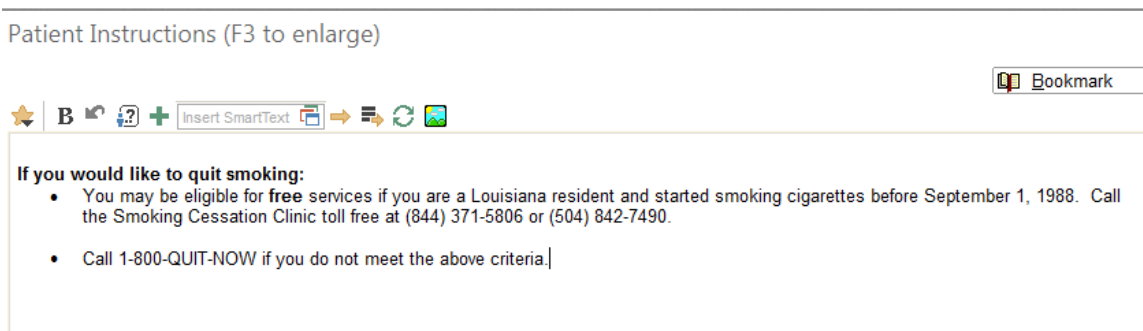
**Figure 13: EPIC screenshot of SmartSet displaying resources available to pediatricians to aid in counseling caregivers to stop smoking.**

Additional Progress Notes - Test, Chantilly

Parental Tobacco Counseling Outcome: [AMB PEDS PULM TOBACCO COUNSELING OUTCOME:24127]

- Counseled parent about tobacco smoke exposure
- Cessation Recommended and parent verbally referred
- Cessation recommended and parent declined
- Smoking Cessation Storybook provided
- Did not council about tobacco smoke exposure

**Figure 14: EPIC screenshot demonstrating pediatricians' ability to record their counseling outcomes in the patient's chart.**



**Figure 15: EPIC screenshot demonstrating resources available to pediatricians to aid in counseling caregivers to various smoking cessation programs (including the Smoking Cessation Trust and the Louisiana Tobacco Quit line).**

EHR data were obtained in a single extraction on all patients who had presented to an Ochsner clinic for a pediatric visit. A one-month period was allocated for intervention completion and data was extracted over a three-month period of time (January 1 2016 to April 1 2016).

We included data on the documentation of screening for SHSe ICD-10 code SHSEZ77.22). The data on counseling caregivers to quit smoking was acquired by assessing the usage of Best Practice Alerts (BPA).

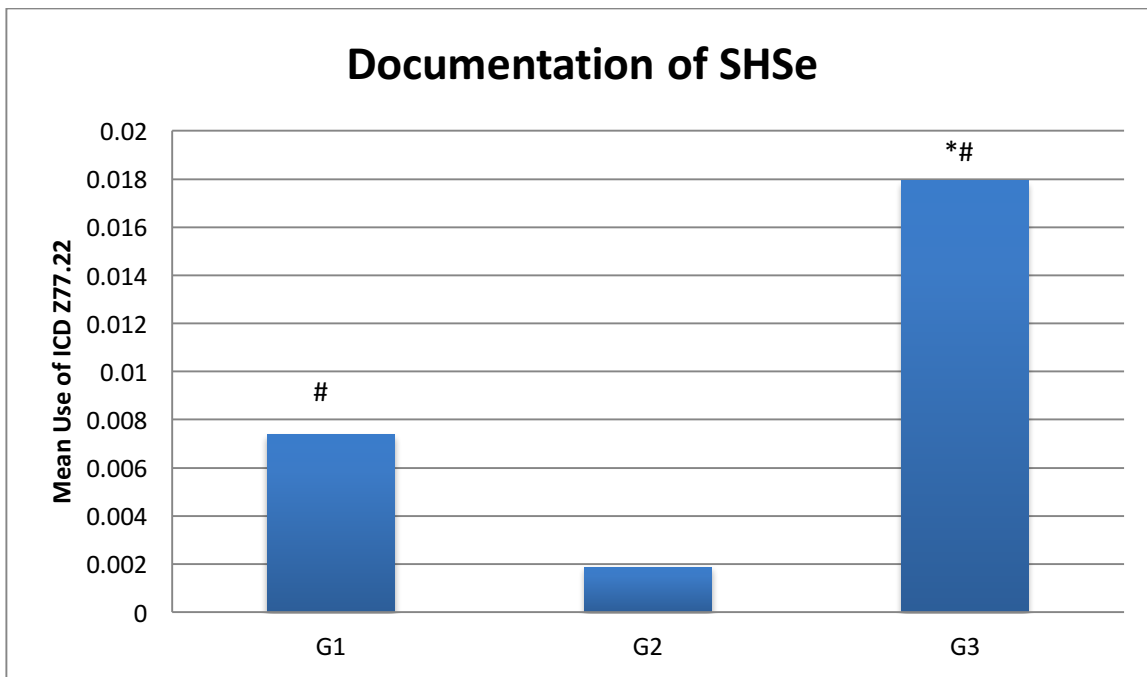
Screening for SHSe and SHSe counseling were compared using a one-way analysis of variance (ANOVA). When a significant interaction effect was found, Tukey's honest significant difference (HSD) test was performed. A significant level was set at  $P < 0.05$ .

Once SHSe status was confirmed, pediatricians were encouraged to distribute the SCT's smoking cessation pamphlet or 1-800-QUIT-NOW hotline, depending on SCT eligibility.

## 9.4 Results

### Screening for SHSe

Documentation of SHSe was statistically significantly greater in the G3, when compared to G1 and G2 ( $p < 0.01$ ). Documentation of SHSe was statistically significantly greater in the G1, when compared to G2 ( $p < 0.05$ ) (Figure 13).



**Figure 16: Documentation of second hand smoke exposure (SHSe), expressed as mean. G3 documented SHSe in the medical record significantly more than G2 and G1 ( $P<0.01$ ). G1 documented SHSe in the medical record significantly more than G2 ( $P<0.05$ ). \*= Different than G1; # = Different than G2**

Counseling caregivers to stop smoking

None of the groups utilized the BPA to report having provided counseling to caregivers. There were no significant differences in providing counseling between groups.

## 9.5 Discussion

Our study demonstrates that a lecture in combination with EHR changes is associated with the greatest change in the provision of smoking cessation promotion to caregivers.

Other studies have demonstrated the effectiveness of an intervention consisting of EHR prompts and a short lecture. Our study's intervention utilized the same core components of these studies; however, our research was novel in that participant groups received different treatment and group comparisons were utilized.

Sharifi et al. conducted a pre–post study examining the effects of an intervention consisting of EHR modifications and a brief lecture on pediatricians smoking cessation promotion(Sharifi et al., 2014). This study differed from ours in that all participants received the same intervention. Interestingly, Sharifi et al. found an increase in counseling and referral rates without a concomitant rise in screening rates; our study demonstrated an increase in screening rates, without an change in counseling(Sharifi et al., 2014). Reasons for this may lie in the design of the EHR modifications. Sharifi et al. implemented specific counseling questions in the EHR, such as “is the patient interested in quitting in the next 6 months” (Sharifi et al., 2014). This may have forced the pediatrician to discuss timelines and facilitate a smoking cessation conversation. Our EHR modifications prompted the pediatrician to check a box, indicating that they had counseled the patient’s caregiver. Perhaps without a concrete question to facilitate the start of this conversation, pediatricians chose to ignore this step.

Jenssen et al. conducted a prospective study also consisting of a lecture and EHR prompts. This study revealed that pediatricians found this intervention feasible, acceptable, and usable in promoting smoking cessation(Jenssen BP, 2016). However, this study differed from ours in primary purpose (which was to assess the acceptability, feasibility and usability of the intervention), study design (a prospective study in which all participants received the same treatment) and data collection (assessed via self-reports).

It is interesting that EHR changes alone or in combination with a lecture produce significant changes in screening, when compared to a single lecture intervention. Our lecture intervention may have provided the initial motivation for promoting smoking cessation, while the continuous EHR prompts served as a constant reminder to the pediatricians. These continued EHR cues might have been necessary to ensure that lecture’s message remained in the pediatricians’ mind. As a result, a one-time lecture may not have had enough impact to change pediatrician’s behavior in a setting of competing demands.

A recent study has shown that pediatricians are significantly more confident in their ability to promote smoking cessation than actually performing such behaviors (K. Hall, Kisely, S., Gastanaduy, M., Urrego, F, 2016). Our study may support the hypothesis that this discrepancy might be due to pediatricians not being reminded to screen for SHSe at every visit. The use of EHR prompts may therefore be a solution to this issue. These cues have been shown to be a realistic and a cost effective way to promote smoking cessation in the

adult primary care setting (Bentz CJ, 2006). Also, EHR prompts may eliminate other barriers to smoking cessation education. For example, promoting smoking cessation through the EHR does not require a concentrated time commitment from the pediatricians, unlike an education lecture or workshop.

Previous studies have shown interventions accompanied by materials may increase the rate in which pediatricians counsel caregivers to stop smoking (Hipple et al., 2013; Hymowitz et al., 2008; Hymowitz et al., 2001). A national cluster-randomized trial found that an intervention consisting of paper-based materials resulted in a 12-fold increase in the delivery of smoking cessation promotion to caregivers (Winickoff et al., 2013). Our results in the previous chapter demonstrate that a children's book significantly increases screening rates. Like the EHR prompts, the tangible materials may serve as a continual reminder to the pediatricians to screen caregivers. However, unlike the EHR prompts, the materials open the door for a discussion with the caregivers and can facilitate smoking cessation counseling and referring caregivers to various quit programs. Our future studies may incorporate a tangible material to the current curriculum to determine the effect on various parameters of smoking cessation promotion.

## 9.6 Limitations

We found it interesting that none of our interventions promoted a change in counseling rates. We believe that these results are a reflection of BPA utilization, rather than actual counseling rates. A particular problem may be preventing pediatricians from using these alerts. The BPA is set up to fire during every clinic visit. Perhaps pediatricians find this mechanism distracting and intrusive, causing them to close the BPA before they have time to go through it and check the boxes to record what smoking cessation services they provided. It would be prudent for us to investigate this issue further to assess the best way to record pediatricians counseling rates.

Optimally, we would have included a control group in our study design in order to account for secular trend and regression to the mean. In addition, the short nature of this study did not allow us to measure longer-term changes in behaviour. In addition, there was no beta test of the BPA before implementation. Lastly, solely relying on EHR documentation may not provide an accurate account of pediatricians behavior during clinic visits. Studies have documented discrepancies between physicians' self reported behaviors and EHR reports (Collins et al., 2005; Conroy MB, 2005); therefore, physicians may have under-recorded

their smoking cessation promotion.

## **9.7 Conclusions**

The implementation of a one-time lecture with EHR prompts may be a simple way to increase widespread screening rates in the pediatric clinic setting. Future studies may wish to consider the addition of smoking cessation materials to increase the rate in which pediatricians counsel caregivers to stop smoking.



## **Chapter 10**

### **10 Grand Discussion**

*The thesis involved the culmination of five studies that examined the need for and effect of an intervention geared at pediatricians to increase their rate of promoting smoking cessation in caregivers. Each chapter's study design has been built from the findings generated from the subsequent chapter. The current chapter provides a summary of the findings of the thesis and the clinical impact of these results. In addition, this chapter will explore future directions and limitations of the studies.*

#### **10.1 Summary of main findings**

Our first study (Chapter 5) was conducted to assess if caregivers of children attending the Ochsner Children's Health Center were eligible and utilizing services provided by the Smoking Cessation Trust. Our findings demonstrated that smoking prevalence in our cohort is higher than the national average (31% vs. 18%). We found that of the 31% of caregivers who smoked, 44% were eligible for the SCT. In addition, 33% of SCT eligible caregivers were interested in smoking cessation. Over all, this pilot study shed light on the need to deliver smoking cessation services and disseminate information about the SCT to our pediatric patients' caregivers. Taken together, these results demonstrated that pediatricians might play a vital role in screening for SHSe, counseling caregivers to stop smoking, and referring caregivers to the SCT.

The results from our pilot study motivated us to conduct our second study (Chapter 6), in which we assessed and compared pediatricians' confidence and behaviors in screening for SHSe, counseling caregivers to stop smoking, and referring caregivers to smoking cessation programs. Additionally, we aimed, to determine pediatricians' knowledge and comfort level with the SCT. This study was conducted to determine where our efforts should be focused. We already knew from our pilot study that parents are eligible but not using the SCT. If pediatricians were performing smoking cessation promotion optimally, then our efforts should lie in motivating caregivers to use such services. If our study found that pediatricians are not disseminating the information to our caregiver population, efforts should be targeted at physicians. Our study confirmed our hypothesis: pediatricians have

little formal training in smoking cessation and the vast majority had never referred caregivers to the SCT (92.59%). Interestingly, pediatricians stated that they were confident to screen, counsel, and refer caregivers; however they were significantly less likely to report actually screening for SHSe, counsel, and refer caregivers. These results confirmed the need for an intervention geared specifically at pediatricians to increase their delivery of smoking cessation promotion to patients' caregivers.

Our next study (Chapter 7) aimed to reveal if a brief intervention for pediatricians could increase their knowledge, attitudes and behaviors in various smoking cessation parameters. In addition, this study investigated which type of intervention on its own or in combination is best to elicit significant change in smoking cessation promotion among pediatricians. Our hypothesis stated that the group that received the lecture would yield significant increases in knowledge, confidence and behaviors. Our results did not show this, as insignificant differences in screening and counseling rates were generated. However, pediatricians who received the lecture reported a significant increase in referring smoking caregivers to smoking cessation programs. The intervention group made more referrals to the SCT after the intervention, compared to baseline and compared to the control post intervention. These results motivated us to try to increase screening and counseling rates in the pediatric setting.

Our next study (Chapter 8) aimed to increase the rate in which pediatricians screen for SHSe in the pediatric clinic. The literature demonstrates that having a tangible material increases pediatrician's promotion of smoking cessation to smoking caregivers (Beaty et al., 2013; Hipple et al., 2013; Hymowitz et al., 2008; Hymowitz et al., 2001; J. D. Klein et al., 1995). As a result of this, our aim was to investigate if a children's book given to pediatricians, with the intent of it being dispersed to patients and caregivers, could increase the rate of screening for SHSe. We found that screening rates significantly increased in the group that distributed the children's book. This study has laid the foundation to determine the impact of a children's book on various smoking cessation parameters in the pediatric clinic.

At this point, we had demonstrated that we could significantly increase screening and referral rates among pediatricians. Our next goal was to target counseling.

We appreciated from our study in Chapter 7 that a brief intervention could increase physicians' behavior in regards to referral rates. We aspired to investigate if a modification to the lecture curriculum could target the smoking cessation parameters that a lecture

alone could not increase: screening and counseling. As a result, we implemented EHR prompts and determined that a lecture in combination with EHR prompts could significantly increase screening rates but not counseling rates.

In summary, the results from this thesis indicate that our pediatric population was particularly vulnerable to SHSe, as caregivers smoking rates were much higher than the national average. In addition, just under half of our caregivers were eligible for the free services offered by the SCT. We also found that our pediatricians were not screening, counseling, and referring smoking caregivers. This created an ideal setting for the implementation of interventions to increase pediatricians' promotion of smoking cessation.

Taken together, the results from our interventions indicate that screening for SHSe can be increased using a brief lecture, a lecture in combination with EHR or distributing a children's book during clinic visits. Additionally, referring caregivers to smoking cessation programs can be increased using a brief lecture.

## 10.2 Implications

The current work has several clinical implications for increasing pediatrician's rate of promoting smoking cessation in the clinical setting. First, results from our research demonstrate the need for interventions to be implemented in our population. We have identified that more caregivers smoke in our population when compared to the national average. In addition, our pediatricians do not disseminate smoking cessation promotion at a rate consistent with their confidence to do so. Taken together, these results indicate that effort should be made to decrease SHSe through increasing pediatricians' involvement in smoking cessation efforts.

Second, we found that various interventions geared at pediatricians have the ability to increase the rate in which they screen for SHSe and refer caregivers to smoking cessation programs. Specifically, our intervention that consisted of a lecture and EHR prompts can generate results with low associated costs. The EHR prompts can be easily implemented in any office. In addition, the brief lecture does not require any financial resources (besides lunch, if provided) and or much time (albeit, a scarce commodity) to implement. Moreover, our children's book proved to increase screening rates. Based on our study's results, screening for other health behaviors may be facilitated through the use of

children's books. This book also has the potential to impact other smoking cessation parameters, such as counseling and referral rates.

Third, this work has demonstrated that pediatricians can significantly increase their promotion of the SCT. As previously mentioned, the SCT is unable to advertise its free services. Thus, many eligible caregivers are not utilizing this service due to a sheer lack of knowledge. The clinical implications of this work have the potential to be great. As previously mentioned in chapter 5, Ochsner has the potential to reach 8,729 SCT eligible caregivers. If all of these caregivers were referred to the SCT, the social impact of this would be massive; our community would be healthier due to a decrease in direct smoke exposure in caregivers and SHSe in children.

### 10.3 Limitations

There are several limitations of this research. The first lies in the way in which our data was generated for study 1 (Chapter 5), study 2 (Chapter 6) and study 3 (Chapter 7). All data in the aforementioned studies relied on self-reports. As a result, these studies are all subject to self-report bias. Future studies may wish to investigate these parameters using self-reports but confirming data with an independent measure.

Secondly, we acknowledge that a small sample size is a limitation present in study 1 (Chapter 5), study 2 (Chapter 6) and study 3 (Chapter 7). In our first study (Chapter 5), we generated data on 84 caregivers. Unfortunately, we did not keep track of how many caregivers were approached and refused study participation. In our second (Chapter 6) and third study (Chapter 7), 27 pediatricians participated each time, out of a possible 36. It would be ideal to know if these respondents were the same physicians in each study; however, gathering this information was impossible as each survey was filled out anonymously.

In addition, we lacked a control group in study 5 (Chapter 9). It was our intent to compare all groups to the intervention consisting only of a brief lecture to determine smoking cessation parameters could improve from this measure. The addition of a control group would account for secular trend and regression to the mean.

Lastly, studies 4 (Chapter 8) and 5 (Chapter 9) relied only on EHR documentation in specific spots within the medical record. As a result, pediatricians who documented their behavior in unconventional locations (such as the body of the note) may have been

missed. Therefore, the number of pediatricians promoting smoking cessation may be greater than reported in our research.

## 10.4 Future Direction

Future studies should focus on investigating the best way to increase all parameter of smoking cessation promotion: screening for SHSe, counseling caregivers to stop smoking and referring caregivers to the SCT (and other smoking cessation programs). Our future research may be centered on the combination of all components of our individual study methods. As such, we would implement a lecture, EHR prompts and supply pediatricians with a children book for distribution. After this intervention, we would assess screening, counseling, and referral rates pre and post, control versus intervention group. It would be beneficial to also assess these parameters using various measures, such as self-reports, EHR documentation, and caregivers' recall. It would be beneficial to determine if this combination could successfully increase all desired parameters of smoking cessation promotion.

Additionally, future studies may wish to determine if the presence of a children's book in the pediatric setting alone can impact counseling and referral rates. We did not have the means to measure counseling and referral rates when we undertook this study. However, the results that we generated call for us to investigate further software changes that can record referral rates and specific referrals the SCT and various programs.

Future research may also wish to implement software changes to link information obtained with SCT. This way, we have the capability to follow up with caregivers to see if they utilized the SCT services and successfully stopped smoking. In addition, permission may be obtained to contact the caregivers at various intervals of their smoking cessation journal. This would allow us to determine the long-term effects of our programs. By following the family, we would be able to gather information on the child's future smoking behavior. This may help determine if a family centered intervention (facilitated by our children's book) had an impact on future smoking rates in children of smoking caregivers.

Lastly, the results generated from this thesis demonstrate the difficulty in increasing our three desired parameters of smoking cessation promotion in pediatricians. Future studies may wish to incorporate other means of promoting smoking cessation in the pediatric setting. For example, the use of electronic tablets may be introduced to help promote smoking cessation. These tablets could be distributed to every caregiver in the waiting

room who accompanies their child to a pediatric clinic office. Smoking status would be obtained with a questionnaire provided via the tablet, brief electronic counseling provided, and a referral offered. If caregiver accepts and provides contact information, data is then linked to the smoking cessation call-center that would then contact caregivers to arrange an appointment. Screening, counseling, and referring in this manner guarantees that pediatric patients exposed to SHSe are identified and caregivers are provided referral to cessation services. Given that the tablet and EHR are linked, the pediatrician would be alerted to caregivers' smoking status and would be prompted to provide additional council during the clinic visit.

## **10.5 Conclusion**

Our pilot studies have demonstrated that our pediatric population was exposed to SHS at a rate higher than the national average. In addition, our pediatricians were in the position to benefit from an intervention to increase the rate in which they promoted smoking cessation in smoking caregivers. Concomitantly, our three main studies established that the implementation of an intervention among pediatricians significantly increased the rate in which they screen for SHSe and refer caregivers to the SCT (other smoking cessation programs). Our work has laid the foundations for further research to elucidate the best method to increase counseling in the pediatric setting.

## **Chapter 11**

### **11 Reference**

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**Appendix A: Pilot study –IRB approval**

**Appendix B: Pilot study – Questionnaire consent form**

**Appendix C: Pilot study – Caregiver questionnaire**

**Appendix D: Study 2 – IRB approval**

**Appendix E: Study 2 - Questionnaire for pediatricians**

**Appendix F: Study 3, 4 and 5 – IRB approval**

**Appendix G: Study 3, 4 and 5 – UQ ethics approval**

**Appendix H: Study 3 - Questionnaire for pediatricians**

**Appendix I: Study 4 – Children’s book**

**Appendix J: Study 4 – Art commission contract**