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EFFECTS OF PASSIVE SMOKING ON RESPIRATORY HEALTH OF CHILDREN

– a systematic literature review

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“Children’s right” is a matter of global significance. In recent years, much attention has been focused on all forms of child abuse and as a result greater success has be attained.Nonetheless, the effects of passive smoking on the health of children continues to be a major problem. This bachelor thesis discusses the effects of passive smoking on the respiratory health among children worldwide.

A research question was set to investigate the possible effects of the menace through a systematic literature review on child’s respiratory health.Five articles selected for a review process answered the research question adequately. Four major effects namely; asthma, wheeze, reduced lung function and respiratory infections as well as two minor effects which entail common cold and nocturnal cough were found.

The study concluded that passive smoking has serious effects on the respiratory health of children. The research recommended an in-depth study to substantiate the links between passive smoking and each of the effects stated.

KEYWORDS:

Passive smoking, Cildren, Respiratory Health.

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LIST OF ABBREVIATIONS

Environmental Tobacco Smoke……ETS

Chronic Obstructive Pulmorary Disease…….CODP

Coronary Heart Disease……..CHD

N'Nitrosoanabasine……..NAB

N-Nitrosomorpholine N'Nitrosonornicotine……..NNN

4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanone……..NNK

Passive Smoke Exposure……PSE

Secondhand Smoke…….SHS

Sudden Infant Death Syndrome…….SIDS

1 INTRODUCTION

According to the World Health Organization (WHO) 2009 report on Global Tobacco Epidemic, Tobacco use is the leading cause of preventable death, and it is estimated to kill more than 5 million people each year worldwide. WHO estimated that almost one-half of the world's children (nearly 700million) are exposed to tobacco smoke from the 1.2 billion adults who smoke, and majority of exposures take place at home (Avsar el al.2008,969). 40% of children, 33% of male non-smokers, and 35% of female non-smokers were exposed to second-hand smoke in 2004 globally (Öberg et al. 2011, 139).

Children, exposure to secondhand smoke may lead to respiratory illnesses as a result of adverse effects on their immune system and on lung growth and development (US Surgeon General Report. 2006, 281). Passive smoking exposure was estimated to have caused 379 000 deaths from ischaemic heart disease, 165 000 from lower respiratory infections, 36 900 from asthma, and 21 400 from lung cancer. 603 000 deaths were attributable to second-hand smoke in 2004, which was about 1·0% of worldwide mortality (Öberg et al. 2011, 139).

Children are more vulnerable to the physiological effects of passive smoking and more sensitive to the adverse health effects of passive smoking than adults: physical development is ongoing with sensitivity in several organs, the immune system is less protective, and a child's breathing rate is higher than an adult's (Boldo et al. 2010, 479). Children have limited or no control over their indoor environments. They often sit near or on parents, family members, or caregivers, closer to the source of the pollutant than other passive smokers. (Boldo et al.2010, 479.) Only 7·4% of the world population lives in jurisdictions with comprehensive smoke-free laws at present, 92.4% of the world's population is still living in countries not covered by fully smoke-free public health regulations (Öberg et al. 2011, 139).

2 GENERAL OVERVIEW ON TOBACCO

Tobacco was introduced to Europe from the New World at the end of the 15th century. Despite some criticism from, amongst others, King James VI of Scotland and I of England who described it as 'a custom loathsome to the eye, hateful to the nose, harmful to the brain and dangerous to the lungs' smoking spread rapidly. However, it was not until the 20th century that it became a mass habit and the dangers of smoking were firmly established only after the publication of Doll and Hill's work in 1954.Currently, more than one-quarter of the adult population smoke (27% of men, 25% of women). This figure has dropped from nearly half the adult population in 1974, but there is still much concern as the individuals who are stopping smoking are predominantly from older age groups. Almost as many young people are taking up smoking as thirty years ago. Tobacco is the second major cause of death in the world. It is responsible for the death of 1 in 10 adults' worldwide (about 5 million deaths per year). Half the people who smoke (about 650 million worldwide) will eventually die as a direct result. Each year in the UK smoking kills about 106,000 people; six times the combined numbers of deaths from road traffic accidents, other accidents, poisoning, murder, manslaughter, suicide and HIV infection. In addition, for every one person who dies of a smoking-related disease there are 20 more people who suffer from at least one serious illness associated with smoking.(English & Spencer, 2007,89.)

Cigarette smoking is a serious health problem and most important avoidable causes of death in the world. Smoking has been strongly implicated as a risk factor for chronic obstructive pulmonary disease, cancer and atherosclerosis, etc. The World Health Organization predicts that tobacco deaths in India alone may exceed 1.5 million annually by 2020. In recent years, large household surveys have shown that in middle age, more than one third of men and a few percent of women smoke tobacco and that there are about 120 million smokers in India.The leading causes of death from smoking are cardiovascular diseases (1.69 million deaths), chronic obstructive pulmonary disease (0.97 million deaths) and lung cancer (0.85 million deaths). (Pasupathi et al. 2009, 120.)

Cigarette smoke harms nearly every system of the human body, thus causing a broad range of diseases, many of which are fatal (Polosa et al.2008, 1428). According to US Surgeon General 2006 report, people are exposed to secondhand smoke at home, in the workplace, and in other public places such as bars, restaurants, and recreation venues. It is harmful and hazardous to the health of the general public and particularly dangerous to children. It increases the risk of serious respiratory problems in children, such as a greater number and severity of asthma attacks and lower respiratory tract infections, and increases the risk for middle ear infections. It is also a known humancarcinogen; cancer-causing agent.(US Surgeon General Report. 2006, 154). Inhaling secondhand smoke causes lung cancer and coronary heart disease in nonsmoking adults. Tobacco smoke contains over 4000 chemicals that are potentially toxic to humans. (Henderson 2008, 21.)

2.1 Definitions

The inhalation of tobacco smoke by nonsmokers has been variably referred to as “passive smoking” or “involuntary smoking.” Smokers, of course, also inhale secondhand smoke. The smoke inhaled by nonsmokers that contaminates indoor spaces and outdoor environments has often been referred to as “secondhand smoke” or “environmental tobacco smoke”. (US Surgeon General Report 2006, 28.) Passive smoking involves inhaling carcinogens and other toxic components, and scientific evidence has unequivocally established that exposure to passive smoking causes death, disease, and disability in children (Boldo et al. 2010, 178). Passive (or involuntary) smoking also known as environmental tobacco smoke is exposure to secondhand smoke (Avsar et al. 2008, 969).

Passive smoke exposure (PSE) is a term used to refer to the mixture of side stream smoke and exhaled mainstream smoke that pollutes the air in locations where tobacco is being smoked, and it is associated with several detrimental effects on the respiratory system in children(Seyidov et al. 2011, 47).

Cigarette smoke contains both particles and gases generated by the combustion at high temperatures of tobacco, paper, and additives. The smoke inhaled by nonsmokers that contaminates indoor spaces and outdoor environments has often been referred to as “secondhand smoke” or “environmental tobacco smoke.” This inhaled smoke is the mixture of sidestream smoke released by the smoldering cigarette and the mainstream smoke that is exhaled by a smoker. Sidestream smoke, generated at lower temperatures and under somewhat different combustion conditions than mainstream smoke, tends to have higher concentrations of many of the toxins found in cigarette smoke.(US Surgeon General Report 2006, 28.)

2.2 General Effects of Tobacco

Tobacco use has extremely large effects on every fibre of human life, ranging from health, financial to environmental. For the purpose of this thesis, few out of immeasurable health effects of tobacco would be emphasized. Many serious and potentially fatal diseases are caused by smoking. It also increases the incidence of more minor complaints such as coughs and colds. Coronary heart disease (CHD) is the leading cause of death in the UK and smoking is a major factor in its development. Smokers are 2–4 times more likely to develop CHD compared with non-smokers. Also, smoking doubles an individual’s risk for stroke and increases by more than 10 times the risk of developing peripheral vascular disease. (English & Spencer, 2007,89.) Cigarette smoking is the predominant cause of lung cancer, with 80–90% of lung cancers that occur in the United States attributable to tobacco use. Cancer is the second leading cause of death in developing countries. Cancer is a public health problem worldwide. It affects all people the young and old, the rich and poor, men, women The risk of developing lung cancer increases with increasing intensity of smoking and with increasing duration of smoking. (Pasupathi et al. 2009, 123.)

Smoking is the most important cause of chronic obstructive pulmonary disease (COPD). Smoking is associated with a ten-fold increased risk of death caused by COPD, with 90% of all COPD deaths occurring in smokers. The adverse respiratory effects of smoking are caused by inducing persistent airway inflammation, which causes a direct imbalance in oxidant/antioxidant capacity and increases proteolytic enzyme release. However, some of these effects are reversible. (English & Spencer, 2007,89.)

2.3 Exposure Prevalence on Children

Estimates based on serum cotinine concentrations for the years 1999–2002 from the USA indicate that close to 40 million children and adolescents between the ages of 3 and 19 years were exposed to SHS (Tager 2008, 30). In bivariate analysis, children living in relative poverty, having marginally or unemployed parents or with a low parental education were more likely to be exposed to ETS. Exposure is more frequent when living in an apartment/high-rise building and experiencing crowding in the flat. (Bolte et al.2008, 53.)

Infants who did not attend day-care nursery are at increased risk from maternal smoking, perhaps because they have more prolonged exposure to maternal smoke (Hawamdeh et al. 2003, 443). Infants and children of parents who smoke inhale the same amount of nicotine as if they themselves smoked up to 150 cigarettes yearly (Shabib et al. 1995,43).

2.4 Children Exposure

Despite the torrent of public health warnings to the contrary, cigarette smoking is still quite common in many parts of the world. This is disturbing particularly in the case of pregnant women, whose cigarette smoking poses a health risk to the fetus and subsequent child as well as to the pregnant woman herself. (Tager 2008,29.)

Children's environmental tobacco smoke exposure occurs predominantly at home with parental smoking as the main source, but other indoor environments such as cars or hospitality venues may also be of relevance (Bolte et al.2008, 52). In countries where statutory mechanisms have been introduced to restrict workplace exposure to ETS, such as the smoking ban that became active in England in July 2007, there have been concerns this would increase smoking in the home, thus increasing children's exposure to tobacco smoke (Henderson 2008, 25).

3 CONSTITUENTS OF PASSIVE SMOKE

Most tobacco products are made from the species Nicotiana tabacum. Cigarette smoke is a complex mixture of chemicals containing more than 4000 different constituents. In the last 30–40 years, a large body of knowledge has accumulated identifying the exact chemical composition of cigarette smoke both qualitatively and quantitatively. Some of the compounds identified include different pyridine alkaloids such as nicotine, ammonia, acrolein, phenols, acetaldehyde, N-nitrosamine; polycyclic aromatic hydrocarbons such as benzopyrine; combustion gases such as carbon monoxide, nitrogen oxides, hydrogen cyanide; trace metals, a-emitter radioactive elements such as polonium, radium, and thorium. (Pasupathi et al. 2009, 121.)

The major constituents of tobacco smoke that affect respiratory health comprise gaseous elements, including carbon monoxide, nitrogen oxides, formaldehyde, hydrogen cyanide, sulphur dioxide and nitrosamines, and particulates, such as nicotine, heavy metals (lead, cadmium, nickel) and benzpyrene. Passive smoke exposure is a mixture of 15% mainstream smoke and 85% sidestream smoke from burning tobacco so its constituents differ from those of actively inhaled mainstream smoke. This is likely to contribute in part to differences in the strength of association between active and passive smoking with adverse health outcomes in epidemiological studies. (Henderson 2008, 22.)

From detailed analysis, it was estimated that a single cigarette puff contains approximately, 1014 free radicals in the tar/mainstream phase, and 1015 radicals in the gas/sidesteam phase. A carcinogen is defined as an agent that causes a series of genetic alterations to occur, leading to the formation of cancerous growth. Tobacco smoke has long been recognized as a chemical carcinogen. Tobacco smoke contains some deadly carcinogenic chemicals. Some of these cancer-causing chemicals, such as the tobacco-specific nitrosamines,N-Nitrosomorpholine,N'-Nitrosonornicotine(NNN),4 (Methylnitrosamino)-1-(3-pyridyl)-1-butanone(NNK),N'-Nitrosoanatabine(NAT) and N'-Nitrosoanabasine(NAB),are formed from natural components of the tobacco plants. (Pasupathi et al. 2009, 121.)

Carbon monoxide decreases hemoglobin transport and saturation. Nicotine decreases prostacyclin synthesis and aggregation of thrombocytes in blood vessels, which leads to the narrowing arteria of the foetus, as well as neonates and infants (Gryczynska et al.1999, 276). Tager 2008,further explains that nicotine crosses the placenta freely and, in animal models that include primates, has profound effects on fetal lung development that range through altered glucose metabolism, inhibition of fibroblast proliferation, damage to type I epithelial cells, increased proliferation of type II cells, disruption of the elastin network and alterations in cell signalling with resultant decreases in apoptosis in the developing lung. All of these result in decreased numbers and enlargement of alveoli, emphysema-like changes and alterations in lung function. (Tager 2008, 35.)

Table 1. Selected cigarette smoke composition (Pasupathi et al. 2009, 121).

SUBJECT	**EFFECTS**
Particulate phase	
Tar	Carcinogen
Polynuclear aromatic hydrocarbons	Carcinogen
Nicotine	Neuroendocrine stimulant and depressant; addicting drug
Phenol	Co-carcinogen and irritant
Cresol	Co-carcinogen and irritant
b-Naphthylamine	Carcinogen
N-Nitrosonornicotin	Carcinogen
Benzopyrene	Carcinogen
Trace metals (e.g., nickel, arsenic, polonium 210)	Carcinogen
Indole	Tumor accelerator
Carbazole	Tumor accelerator
Catechol	Co carcinogen
Gas phase	
Carbon monoxide	Impairs oxygen transport and utilization
Hydrocyanic acid	Ciliotoxin and irritant
Acetaldehyde	Ciliotoxin and irritant
Acrolein	Ciliotoxin and irritant
Ammonia	Ciliotoxin and irritant
Formaldehyde	Ciliotoxin and irritant
Oxides of nitrogen	Ciliotoxin and irritant
Nitrosamines	Carcinogen
Hydrazine	Carcinogen
Vinyl chloride	Carcinogen

3.1 Effects of Passive Smoking on Children's Health

When most of us think of child abuse we usually think of sexual, physical, or emotional abuse and neglect. But there is another kind of abuse that occurs before the child is even born. And one of such abuses is exposing a child to passive or secondhand smoking. (Bell et al. 2008, 155.) Children are more heavily exposed to second-hand smoke than any other age-group, and they are not able to avoid the main source of exposure — mainly their close relatives who smoke at home. Another group of children at potential excess risk of ETS exposure are those with chronic respiratory diseases, including cystic fibrosis. Surprisingly, there is a paucity of evidence that passive ETS exposure in this situation has deleterious consequences for disease progression. (Henderson 2008, 24). In terms of years of life in good health lost due to passive smoking, children are most affected. This is a result of pneumonia and other acute respiratory illnesses that are much more common amongst children living with adults who smoke. (Bell et al. 2008, 155.)

Passive smoke affects children's health in many ways by predisposing them to cancer, cardiovascular disease, asthma, lower respiratory tract infections, neurological disorders and has even be found to affect the child's cognitive abilities (Avsar et al. 2008, 969). In a recent study in the USA, maternal smoking was associated with an increased health care expenditure of $120/year for children under age 5 years and $175/year for children under 2 years of age. Exposure to tobacco smoke was responsible for 19% of all expenditures for childhood respiratory conditions. (Peat et al. 2001, 211.) Children exposed to environmental tobacco smoke have lower respiratory illness, more middle ear effusion and more viral respiratory illness than unexposed children. Persistent middle ear effusion (glue ear) is the most common cause of deafness in children and an important cause of delayed language development. Many factors influence the prevalence of middle ear effusion, but studies have found that parental smoking was the only home environmental factor that influences the prevalence of middle ear effusion. (Hawamdeh et al. 2003, 443-444.)

Children of smokers are more likely to be hospitalized for lower respiratory infections, are more likely to have a tonsillectomy/adenoidectomy, and have more asthma-related emergency department visits compared with children of nonsmokers (Emmons et al. 2001, 18). Furthermore, children who are exposed to passive smoke have more days of restricted activity and bed confinement and more days of school absence per year, compared with children who are not exposed to passive smoking (Emmons et al. 2001, 18). Children exposed to environmental tobacco smoke and who are scheduled to undergo general anesthesia have increased respiratory adverse events in the postoperative period (Seyidov et al. 2011, 51). It has been estimated that passive smoke exposure among children results in direct annual medical expenditures in the United States of 4.6 billion dollars (Emmons et al.2001, 18).

3.2 Respiratory Effects of Passive Smoking on Children

Both utero and postnatal exposure to tobacco smoke have been identified as risk factors for subsequent altered lung function. Effects on airway development are likely to contribute significantly to the observed increased susceptibility to wheezy respiratory infections. Infants exposed to maternal tobacco smoking in utero have been noted to have airways of smaller calibre relative to somatic size, with thickened airway walls, more compliant airway walls, increased airway smooth muscle tone and decreased pulmonary elastic recoil, and are also more likely to show inflammatory changes. (Prescott et al. 2008, 4.) Although, pregnancy and early infant life are the most critical periods during which children should be protected from exposure to tobacco smoke, there is evidence that ETS in later childhood has independent effects on respiratory health (Henderson 2008, 25).

Secondhand smoking exposure is causally associated with a wide range of developmental and respiratory effects in children: low birth weight, sudden infant death syndrome (SIDS), lower respiratory tract infections such as bronchitis and pneumonia, middle-ear infections, symptoms of upper respiratory tract irritation, small reductions in lung function, asthma onset, and additional episodes and increased severity of symptoms in children with asthma (Boldo et al 2010, 178). It is also possible that inhalation of tobacco smoke in early life can cause direct damage to the naso-pharyngeal mucosa and can alter cell-mediated immunity and epithelial function (Peat et al. 2001, 211). Emmons et al. 2001, highlighted that, children exposed to passive smoke are at greater risk for otitis media, asthma, bronchitis and pneumonia, compared with those whose parents do not smoke (Emmons et al. 2001,18). There is also a suggestion that ETS-exposed children have a greater chance than non-exposed children of developing pulmonary tuberculosis following contact with Mycobacterium tuberculosis (Henderson 2008, 24).

3.3 Prevention of Child Passive Smoking

Identifying parental household smoking practices is the first step in smoking control interventions. Nurses and other health professionals have many opportunities to meet parents in clinical settings when caring for children, but parental household smoking behaviour has not previously been included in routine health assessments. It is recommend that identification of the smoking behaviour and practices of parents and other family members should be made routine in children's health assessments, and that health professionals should take every opportunity to provide advice to smoking parents to quit or at least not to smoke at home. (Mak et al.2008,1207.) Since most mothers who smoke during pregnancy have taken up the habit in early life and continue to smoke after the baby is born, preventive strategies need to target smokers well before they become parents. To this end, community norms may need to shift further in favour of protecting children from tobacco smoke exposure before interventions can be successful. (Peat et al. 2001, 212.)

Smoking parents who are mothers, daily smokers, have a high level of nicotine dependency or who are living with smoking partners are less likely to restrict smoking at home. Effective intervention strategies are urgently needed to help them quit smoking or refrain from smoking at home. These should be targeted, in particular, at helping smoking parents to overcome the physiological problems related to smoking (e.g. withdrawal, cravings and nicotine dependence), and nicotine replacement therapy would be particularly useful. (Mak et al.2008, 1207-1208.) To reduce early respiratory illness, infants must be protected from maternal smoking and also from smoke from other family and non-family members. Thus, strategies to reduce smoking in the entire community rather than strategies to reduce smoking in parents will be most effective. Significant reductions in the prevalence of smoking in this generation are essential for improving the health of the next generation. (Peat et al. 2001, 212.)

Banning of smoking in public places needs to be implemented in parallel with strong campaigns to encourage quitting and smoke-free homes, together with adequate provision of easily accessible services aimed at helping people to quit (Mak et al. 2008, 1207). Moreover, legislation may be needed to control tobacco advertising that is specifically directed at young people (Peat et al. 2001, 212).

4 PURPOSE AND AIM

The purpose of this project is to find out the effects passive smoking has on the respiratory health of children. And the aim is to produce an evidence based material to be published on Turku University of Applied Sciences' Hoitonetti.

5 RESEARCH QUESTION

What are the effects of passive smoking on the respiratory health of children?

6 SYSTEMATIC LITERATURE REVIEW

6.1 Review Method

It was been considered that systematic literature review would be the best method to analyze and scrutinize the huge information already existing on the topic of this thesis. This is because, systematic review uses existing primary research for secondary data analysis, eliciting common themes and results, and providing good evidence base to inform policy-making and practice. (Neale 2009, 63.) Moreover, the purpose of a literature review is to objectively report the current knowledge on a topic and base this summary on previously published research. A literature review provides the reader with a comprehensive overview and helps place that information into perspective. (Green et al.2006,102.)

Systematic reviews place an emphasis on judging the quality of evidence and minimize bias (Allsop & Saks 2007, 34-35). In addition to that, it's important to identify questions to be addressed in future studies (Egger et al. 2007, 23). Lage Junior et al. 2010, stressed that literature review is a usual method to investigate thoroughly different approaches of the topic to be studied (Lage Junior et al. 2010, 15).

In creating a literature review, the author searches through the literature, retrieves numerous sources of information and synthesizes the findings of all relevant sources into one article. Thus, a vast amount of information is brought together and written in a manner in which the reader can clearly understand the topic. Additionally, reviews of the literature provide a basis for validating assumptions, provide insight into the dynamics underlying the findings of other studies and may offer more conclusive results than a single primary research study. Depending on the variety of literature review, they may provide a very high level of evidence for making clinical practice decisions. (Green et al.2006,102.)

Systematic literature review aims to answer a particular question or test a hypothesis. It attempts to be as exhaustive as possible, identifying all known references and studies include in the review as chosen as a result of explicit inclusion and exclusion criteria. It's assessment of evidence and syntheses of results are based on the thoroughness of a study's research method (Saks & Allsop 2007, 34-35).

6.2 Search Strategy

The initial motive was to find five to seven articles discussing different parts of the effects of passive smoking on the respiratory health of children from as many different aspects as possible in order to answer the research question posed. The process of finding these articles was exhausting; numerous articles have been written concerning smoking and for that matter passive smoking.
However, only few of the huge number of articles seemingly answer the research question raised in this thesis. A detailed process of finding the needed articles had been outlined. The search for articles took place between October, 2010 and November, 2010 as well as January, 2011 and February, 2011.In the search, many databases were sorted for but two of them were used. Namely, CINAHL (EBSCO host) and MEDLINE (Ovid) through the Turku University of Applied Science's library web page. These databases were chosen because they had been proven to be easy to used, and above all provide free full-text articles. The searches were conducted in English and the results were limited to include those written only in English language. The results were further limited by inclusive and exclusive criteria. Inclusion criteria for the accepted research articles were:

1. Written in English.
2. Published in academic journal between 2006 -2011.
3. Full-text and abstract available.
4. Articles based on research study.
5. Peer reviewed articles.

Exclusion criteria for the research articles were:

1. The search was primarily focused on children.
2. The research excluded children active smoking and its effects.

To accomplish the aim of finding good research articles that fulfill the inclusive and exclusive criteria while providing some answers to the research question prompted a series of search terms that were combined and recombined in both databases. Terms such as ‘smoking’ yielded hundreds and thousands of hits on individual database. Going forward, similar terms that have direct association with the topic were used such as ‘passive smoking’ ‘secondhand smoke’ ‘environmental, tobacco, smoke’ ‘passive smoking, respiratory health’ ‘child passive smoking’ ‘passive smoking effects’ and many other other related terms were paired as depicted in Apendixes I and II.

When all the search words were combined, CINAHL database produced a less greater number of 467 articles as compared to MEDLINE database that rendered a sizable outcome of 2523 articles. In total, there were 2990 research articles that could provided some excellent few for the review process. A limitation was set to articles with full-text and that weeded out a huge number of 2093 articles remaining 897 full-text ones. The full-text articles were sceened in two different approaches. First, the publication date was limited from 2006 to 2011 in order to obtain latest and current information on the topic and that reduced the number down to 130 articles sceening out 767 articles. A second phase of the screening subjected the 130 full-text articles published from 2006 to 2011 into further scruitiny and by virtue of their relevant headings to the topic, 30 articles were considered to be eligible for the review. Among the 30 favourable articles, 15 provided tangible abstracts in consonance with the thesis topic. Although, 10 articles were to be eliminated, they were deemed to have good headings that could provide vital information on the central idea of the study. Based on the inclusion and exclusion criteria, only 5 articles were selected for the review purpose. A graphical representation of how the articles were searched has be outlines on a flow chat in figure 1.

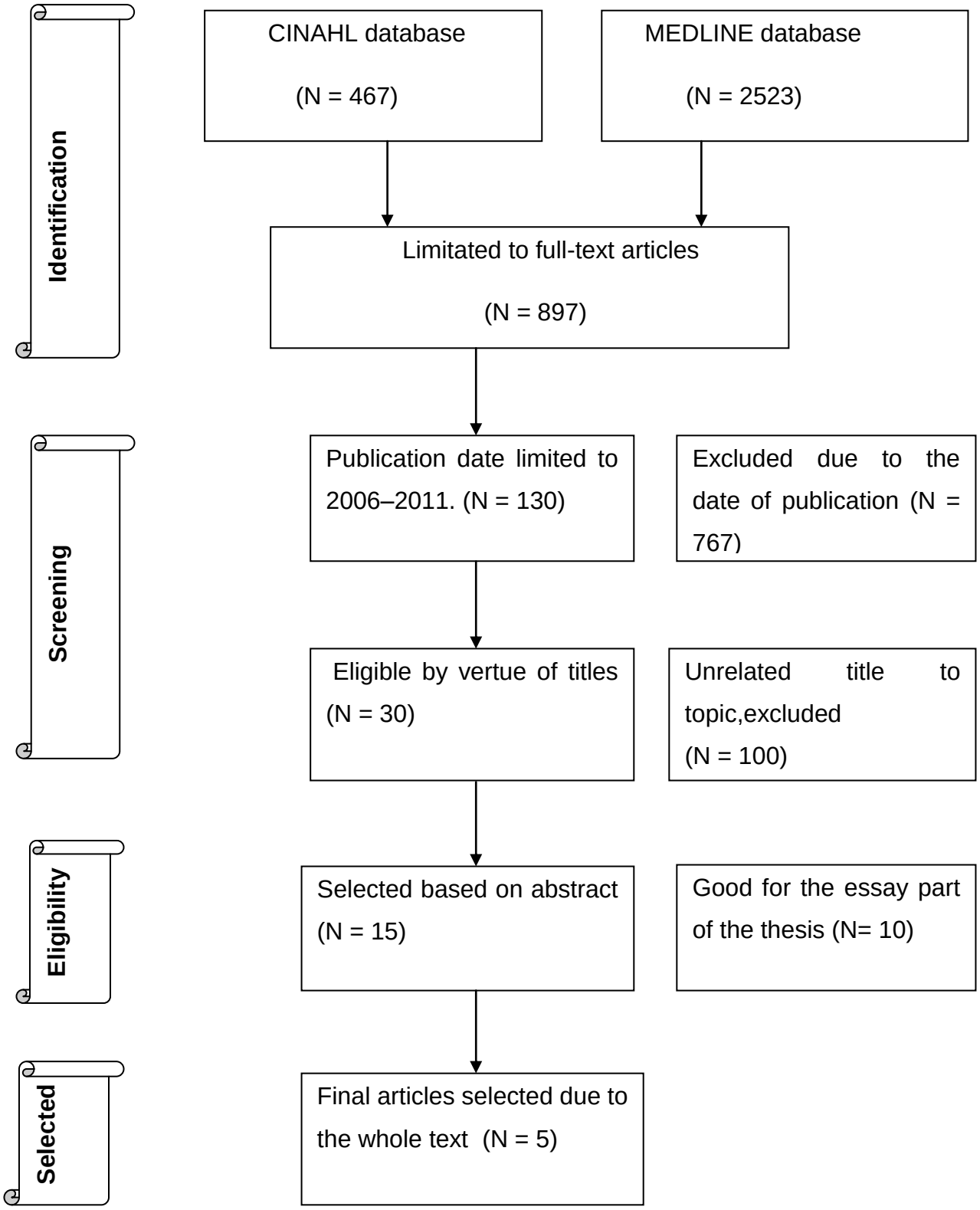

Figure 1. Flow chat of article search

Interestingly, the oldest article was published in 2006 as stipulated by the criteria and the latest was published in 2010.Table 2 shows the various years of publications and the number of research articles obtained for the literature review.

Table 2. Numbers and publications of articles.

Year of publication	2006	2007	2009	2010
Number of articles	1	1	2	1

Two of the articles (Gonzalez Barcala et al. 2007) and (Friguls et al. 2009) were published in different years but in the same scientific journal whereas the remaining three (Moshammer et al. 2006), (Tanaka et al. 2007) and (Halterman et al. 2010) were published in three different ones. These journals were American Journal of Respiratory and Critical Care Medicine (2006), Ann Epidemiol (2007), Arch Bronconeumol (2007) & (2009) and Patient Education and Counseling (2010). The salient features of the articles which include authors, journal name, titles of the article, method of the research, samples sizes, target groups and a brief findings of individual articles have been summarized in Table 3.

Table 3. Summary of articles analysis

Author(s)/ Journal	Title & Year	Aim & Purpose	Research Method	Sample &Place	Main results
Moshammer, H. et al/ American Journal of Respiratory and Critical Care Medicine	Parental Smoking and Lung Function in Children (2006)	To study the relative impact of pre- and postnatal passive smoking exposure on respiratory functions of primary school children in a wide range of geographic settings	Passive smoke exposure information was obtained by comparing questionnaire and spirometry from American Thoracic Society/European Respiratory Society.	More than 20,000 children from nine countries in Europe and North America.	Maternal smoking in utero and exposure to passive smoking after birth, is a risk factor of lung reduced function.
Gonzalez Barcala, F.J. et al. Arch Bronconeumol	Parental Smoking and Lung Function in Healthy Children and Adolescents (2007)	To evaluate the effect of parental smoking on the lung function of children	A cross-sectional study conducted in Galicia-Spain. Subjects were selected by means of 2-stage cluster sampling groups by sex and age	2408 Children and Adolescents selected from Galicia-Spain	Parental smoking has considerable effects on the lung function of children and adolescents. Smoking by either by the mother or the father has a decisive influence.

Table 3. Summary of the articles contd.

Tanaka, K. et al./ Ann Epidemiol	Prevalence of Asthma and Wheeze in Relation to Passive Smoking in Japanese Children (2007)	Diagnostic study criteria from the International Study of Asthma and Allergies in Childhood	23,044 children from Ryukyus Child Health Study (RYUCHS). Okinawa-Japan	Passive smoking might be associated with an increased prevalence of wheeze and asthma in Japanese children
Friguls, B. et al. / ArchBronconeumol	Perinatal Exposure to Tobacco and Respiratory and Allergy Symptoms in First Years of Life (2009)	Prospective and multicentred cohort study that included subjects belonging to AMICS (Asthma Multicentred Infant Cohort Study)	1611 children from Ashford (England), Barcelona and Minorca (Spain).	Passive smoke exposure during pregnancy and childhood has very distinct clinical respiratory effects in children
Halterman, J.S. et al. / Parent Education and Counseling	Motivation to quit smoking among parents of urban children with asthma (2010)	Data analysis from parents who smoke and had a child enrolled in the School-Based Asthma Therapy(SBAT) trial	209 parents who are regarded as primary care givers in Rochester-New York	Parents perception of the risks of smoking to their child with asthma is associated with motivation to quit

6.3 Results of the review

Research tools such as interview, questionnaires and spirometry were used in the various researches (Moshammer et al. 2006), (Gonzalez et al. 2007), (Tanaka et al. 2007), (Friguls et al. 2009) and (Halterman et al. 2010). In four out of the five researches conducted (Moshammer et al. 2006), (Gonzalez et al. 2007), (Tanaka et al. 2007) and (Friguls et al. 2009), questionnaires were employed to gain knowledge and materials for the studies. In one of the studies, (Halterman et al. 2010) the information was obtained directly from the parents as well as their children under a School-Bases Asthma Therapy (SBAT) trial, a study involving the promotion of medication adherence among 3-10 year-old urban children. Two of the researches used spirometry to evaluate lung function of their samples.

Three of the studies (Moshammer et al. 2006), (Gonzalez et al. 2007) and (Friguls et al. 2009) analyzed the effects of passive smoking on lung function in children. Two of them (Moshammer et al. 2006) and (Gonzalez et al. 2007) considered prenatal and postnatal effects whiles the other gave preference to children from 6-18.It is also worth pointing out that all the articles indicated a significant effects of passive smoking on the lungs function of children. One of the three studies (Friguls et al. 2009) affirms the decrease in airway size at prenatal stage that in turn contribute to pulmonary changes which apparently results in respiratory infections during the first years of life. Not forgetting another one (Moshammer et al. 2006) which even concluded that smoking during pregnancy has lasting effect on the lung function of children.

It was found in all the studies (Moshammer et al. 2006), (Gonzalez et al. 2007), (Tanaka et al. 2007), (Friguls et al. 2009) and (Halterman et al. 2010) that parental smoking which includes “caregivers” serve as the primary source of passive smoking for all children.

Four of the researches (Moshammer et al. 2006), (Gonzalez et al. 2007), (Tanaka et al. 2007) and (Friguls et al. 2009) considered 'in utero' exposure-(exposure during pregnancy) and postnatal exposure. Three of the studies (Moshammer et al. 2006), (Gonzalez et al. 2007) and (Friguls et al. 2009) put much attention on exposure of passive smoke to frequent hospitalization of children during the first 2 years of life due to high incidence of respiratory infections.

7 DISCUSSION

The purpose of this bachelor thesis was to find answers to the research question posed. The question was about the "effects of passive smoking on the respiratory health of children". Diverse views have been projected in all the 5 research articles. (Moshammer et al. 2006), (Gonzalez et al. 2007), (Tanaka et al. 2007), (Friguls et al. 2009) and (Halterman et al. 2010). However, there were some convergent views outlined clearly among the 5 articles as well. Collectively, these themes of views provided by the research articles could be captured in the follow headlines as some of the effects of passive smoking on the respiratory health of children.;

1. Asthma
2. Wheeze
3. Reduced lung function
4. Respiratory infections
5. Common cold
6. Nocturnal cough

From all the five research articles . (Moshammer et al. 2006), (Gonzalez et al. 2007), (Tanaka et al. 2007), (Friguls et al. 2009) and (Halterman et al. 2010) selected for the review, the most common mentioned effect of passive smoking on children's respiratory health was asthma. In fact, it was associated in all the five individual studies whereas some of the studies (Moshammer et al. 2006) and (Halterman et al. 2010) explained that passive smoking exposure serve as a trigger for asthma, others squarely linked it to the problem.

Starting from gestation period, one study explained that exposure to tobacco smoke to early childhood can be linked to high risk of being diagnosed with asthma. This same study associated asthma with postnatal tobacco consumption and asserted that children exposed to postnatal tobacco smoke were diagnosed of asthma in the fourth year. Another study rated asthma prevalence level higher among younger children as a result of household smoking than older children (Tanaka et al. 2007, 1008). This could be explained from the fact that older children spend less time in the presence of their parents as they progress from childhood to adolescence, meaning exposure to passive smoking in the household declines with age or because of maturation of the respiratory system in the older children.(Tanaka et al. 2007, 1008.) On a positive note, one of the studies (Halterman et al. 2010) revealed how parents recognized the risks posed to their children with asthma as a result of their smoking habits and were motivated to quit smoking.

Wheeze was the second common effect connected to the effects of passive smoking on children's respiratory health. In one of the research articles (Moshammer et al. 2006), it was much linked to passive smoking exposure than asthma despite the fact that it could be found only in two out of the five articles. One of the studies (Gonzalez et al. 2007) identified a stepwise increase in the prevalence of wheeze and asthma in relation to smoking status in the household; prevalence was highest among children exposed to ETS from at least 15 cigarettes a day.

Likewise asthma, this study conducted in Japan (Tanaka et al. 2007), concluded that exposure to ETS in the household is associated with an increased prevalence of wheeze in Japanese schoolchildren, especially in the following two subgroups: children 6 to 10 years of age and children with a positive parental history of allergic history. (Tanaka et al. 2007, 1008). Nevertheless, another study found no association between prenatal exposure to tobacco and wheezing but accepted that consumption of tobacco during the postnatal period only was associated with the appearance of late onset wheezing (Friguls et al. 2009, 588).

Reduced lung function was the most detailed discussed theme in three of the five articles and was somewhat had the most scientific search into it. In one of the studies, a comparison was done on the effects of passive smoking on the lung function of animals and that of human. The animal studies had established that secondhand smoke reduces endothelium dependent relaxation of the pulmonary artery by reducing the activity of nitric oxide synthase and the arginine content of the endothelium. The weight and volume of the lungs have also been shown to diminish significantly following prenatal exposure to nicotine. (Gonzalez et al. 2007, 82.) Similarly, another study ascertained that early (pre- and postnatal) ETS exposure might exert its effects especially on the small airways, whereas current exposure (at school age) seems to also lead to obstruction of the large airways. The study confirms prior findings of the lasting effect of smoking during pregnancy on the lung function of children. (Moshammer, et al. 2006, 1262.) One study (Moshammer et al. 2006), linked one effect to another even though it deviated from the target group ‘children’. It stated that poor lung function in childhood has lasting effects because it predicts a worse prognosis of asthma in adulthood (Moshammer et al. 2006, 1262).

On respiratory infections, one study affirms that tobacco use during pregnancy can affect the development and maturation of the pulmonary immune system. What is more? Foetal development is a critical moment of pulmonary vulnerability, which is why smoking during pregnancy is associated with decreased pulmonary function during the neonatal period. (Friguls et al. 2009, 588.) Moreover, the study continued and suggested that the effect of prenatal exposure to tobacco on respiratory function may be indirect, by means of a negative effect on anthropometric parameters, which would lead to a decrease in airway size. All of these pulmonary changes in the newborn would contribute to the appearance of respiratory infections during the first years of life. (Friguls et al. 2009,588.) The same study conveyed in its findings the frequency of infections (probably viral) in children exposed to tobacco smoke during the prenatal period can be explained by their decreased ability to neutralize viruses. It further indicated that tobacco use during pregnancy increases the prevalence of hospitalisation due to lower respiratory infections, particularly during the first two years of life, and this effect does not depend on postnatal exposure to tobacco. (Friguls et al. 2009, 588.)

Besides the four major effects of passive smoking on children's respiratory health unfolded by the various research articles, there are other minor effects that were equally acknowledge briefly in one or two of the studies which worth pinpointing in this review. One of the studies insinuated in its findings that former, but not current, smoking in the household was associated with an increased prevalence of atopic eczema (Tanaka et al. 2007, 1009). On the contrary, another study depicts that tobacco smoke exposure is not related to most allergic symptoms unless there is a maternal history of atopy (Friguls et al. 2009, 589).

It is significantly important to acknowledge that the adverse effect of tobacco use during pregnancy has on new borns' birth weight has been known about since 1957.It is believed that this effect is caused by tobacco temporarily decreasing blood flow in the uterus, with the resulting decrease in oxygen provided from the uterus to the placenta, on the other hand, carbon monoxide in the tobacco smoke leads to the formation of carbonxihaemoglobin. All of the aforementioned factors lead to decreased oxygenation of foetal tissues and a decreased foetal development rate. The study observed that all anthropometric parameters at birth are smaller in children whose mothers are persistent smokers. (Friguls et al. 2009,589.)

Finally, it was mentioned briefly in one of the studies (Friguls et al. 2009) that permanent exposure to tobacco smoke from the gestation period to early childhood is also associated with increased prevalence of persistent rhonchus, nocturnal cough and common cold episodes per year.

8 LIMITATION

Limitations regarding this literature review are affiliated with the language, broadness of the topic, literature search and demographical coverage. Considering language as a form of restraint in this literature review, there are three areas that could be brought into focus. Fundamentally, the search for current and scientific research articles for the review was conducted in English Language and in that sense, any good article written in any other language goes abortive from the database. Secondly, the topic is a global type that deserves sources of information to extensively carry out a better review. But unfortunately, language serves as an impediment to access all research conducted worldwide about this topic.

Lastly on language, out of the five studies for the review, only one was conducted solely in English native country whiles the remaining ones were partly or wholly done in a different language and then translated. This implies that there may be some translational errors that could alter or distort some information in the studies. Effects of passive smoking and for that matter effects of tobacco use is one of the greatest public health discourse worldwide, hence enormous research continue to be conducted on the issue. Therefore, selecting articles for such a topic from oceans of databases could be cumbersome task.

The limitation relating to literature search has to do with the search terms. In this bachelor thesis the search terms concerning the topic where chosen without much expertise or technique. Perhaps, a better knowledge on how to select search terms could have yielded a better outcome for the literature review. In addition to that, the literature search process involves a series of limitations in order to screen a great number of articles to quite a sizable number. Probably, such process might have also sieved out some wonderful articles for the review.

Concerning demographical coverage, limitation could be seen from the research articles selected and where those researches were done. As broadly as they cover, none of them was conducted in a third world country where the greater number of the world’s children population reside. More to that, those countries have weaker or no legal regulations which seek to protect children from passive smoking. It is absolutely certain that research from these demographical areas could have immensely contributed towards this review process.

9 CONCLUSION

This bachelor's thesis employed the method of systematic literature review to explore the effects of passive smoking on the respiratory health of children. Asthma, wheeze, reduced lung function, respiratory infections, common cold and nocturnal cough evolved from the review conducted. These results were based on the five article (Moshammer et al. 2006), (Gonzalez et al. 2007), (Tanaka et al. 2007), (Friguls et al. 2009) and (Halterman et al. 2010) reviewed. Asthma was the most frequent mentioned effect among them. Although, an extensive research was done on reduced lung function.

The quantity of reasonable research studies for this review was inadequate considering the number of modern and recent research conveyed on the topic. This inadequacy is due to the inclusion and exclusion criteria which sort of diminished the size of suitable researches. Beyond that, limiting the search to comprise only full text articles published within the present five years span did eliminate a lot of possible articles. Although, the review answered the research question fairly well, it would be quite beneficial if an in-depth study could be done to substantiate on how passive smoking is affiliated to each of the effects aforementioned with all the modern know-how available.It would be very commendable if this study area could also be investigated in the third world countries where the impact of passive smoking on the health of children is underestimated due to poor legislations protecting children.

10 RELIABILITY

Reliability of the literature review was given a great deal of consideration with respect to how valid and reliable the information sources were, because that could have dire consequences on the entire findings of this bachelor thesis. As Long & Johnson, 2000 simply put it. Ambiguous or meaningless findings may result in wasted time and effort, while findings which are simply wrong could result in the adoption of dangerous or harmful practices (Long & Johnson 2000, 30).

Relatively, reliability of this literature review could be evaluated by examining the process involved in selection of research articles through: Assessing the worth of the study- the soundness of its method, the accuracy of its findings, and the integrity of assumptions made or conclusions reached (Long & Johnson 2000, 30).

During the selection of the articles for the review, the author was very vigilant about the sources of the research work, the credibility of the individual authors and the kind of publishing journal to ensure that data collection was undertaken in a consistent manner free from undue variation. In essence, we must trust that the investigators have eliminated, or at least minimized, human error through data reliability safeguards and thus only true values were recorded, analyzed and presented (Baerlocher et al.2010, 40). Regardless of few research articles selected for the review, the findings could be said to be highly reliable and valid. Because, an account is valid or true if it represents accurately those features of the phenomena that it is intended to describe, explain or theorise. In qualitative terms, validity is taken to mean 'the determination of whether a measurement instrument actually measures what it is purported to measure'. (Long & Johnson 2000, 31.) In conclusion, the results found from the review undoubtedly unveiled the effects of passive smoking on the respiratory health of children.

11 ETHICAL CONSIDERATION

Cigarette smoking is an unnecessary habit that causes significant health and economic problems among smokers and non-smokers (Rivero et al. 2006, 5). Smoking imposes financial "social cost" because of smokers' medical care, absenteeism, facilities maintenance, and fire risks and secondhand smoke endangers nonsmokers (Landman et al. 2007, 970). Internationally, there are many cultural examples of tobacco use. The popularity of imitating western culture by other cultures based on media images and the barrage of tobacco advertising by tobacco companies, make the acceptance of smoking more likely. (Rivero et al. 2006, 8.)

Common pro-tobacco arguments that divert the focus away from health, like civil rights, puritanism, economic doom, class warfare, prohibition, excessive government intrusion, tyranny and creeping totalitarianism can indicate the presence of industry influence (Landman et al. 2007, 972).

A huge number of studies have stressed the public health importance of anti-smoking programmes for young people and for prospective parents and, as a result, most mothers are aware of the risks of smoking during pregnancy. However, tobacco companies continue to develop advertising that is attractive to young people and more sophisticated advertising continues to dilute the effects of public health campaigns. Thus, interventions to date have not halted the growth in the proportion of young women who smoke regularly. Until advertising ploys are curtailed and greater resources are invested in health promotion, preventable respiratory infections that often result in hospitalisation or the need for medical management will continue to be prevalent in the next generation of children. (Peat et al.2001, 212.)

Furthermore, tobacco industry used its resources to influence intellectual elites' knowledge construction to slow the declining social acceptbility of smoking, including developing a network of biomedical scientists secretly managed by industry lawyers to develop an alternative body of scientific and popular literature supporting its contention that secondhand smoke was not dangerous. Just as the industry developed networks of nominally independent biomedical scientists, it developed networks of social scientists to produce a competing body of literature in an attempt to influence the construction of knowledge regarding smoking and transform the culture to see smoking as a social benefit, rather than the dominant ideology that smoking is a health hazard. (Landman et al. 2007, 972.)

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Appendix 1

Database: CINAHL & MEDLINE. Limitation on the search: full text articles, publication date 2006 -2011, Advance search and Peer Review

Search terms	**CINAHL: Hits**	**MEDLINE: Hits**
Smoking	293	1846
Tobacco	80	6030
Cigarette	38	2004
Tobacco use	44	1028
Tobacco Smoking	11	3225
Cigarette Smoking	22	401
Passive Smoking	15	382
Secondhand Smoke	6	518
Environmental Tobacco Smoke	5	371
SHS	4	1419
ETS	3	6
Child, SHS, Health	2	33
Child, Passive Smoking	37	50
Children, SHS, Health	3	51
Children, ETS, Health	2	7
Children, Passive Smoking, Health	69	0
Passive Smoking, Respiratory Health	57	10
Children, SHS, Respiration, Health	3	23
Children, ETS, Respiratory Health	3	32
Children, Passive Smoking, Asthma	36	42
Children, Passive Smoking, Pneumonia	36	1
Children, Passive Smoking, Bronchiolitis	1	1
Children, Passive Smoking, Common Cold	16	0
Children, Passive Smoking, Wheezing	2	16
Passive Smoking, Prevention	4	18
Child, Respiratory Health	84	22
Passive Smoking, Effects	2	101
Secondhand Smoke, Effects	6	84
Smoking, Effects	9	47
Child, SHS, Exposure	3	51