Contents

	Preface .i Authors and Acknowledgements .v Executive Summary .ES-1 Attachment I: Scientific Review Panel Findings .ES-10
1	Introduction
	1.0 Impact of ETS on the Health of Californians.11.1 Organization of the Report.31.2 Definition of ETS.31.3 Methodology.31.4 Weight-of-Evidence Evaluations.7References.9
2	Exposure Measurement and Prevalence
	2.1 Introduction.112.2 Properties of ETS and Its Constituents.122.3 Exposure Measurement: ETS Concentrations in Indoor Environments.182.4 Exposure Measurement: Biological Markers.252.5 Exposure Measurement: Use of Questionnaires.412.6 Exposure Prevalence and Determinants.452.7 Chapter Summary and Conclusions.66References.68
3	Developmental Toxicity I: Perinatal Manifestations
	3.1 Introduction.753.2 Fetal Growth.753.3 Spontaneous Abortion and Perinatal Mortality.1063.4 Congenital Malformations.1123.5 Chapter Summary and Conclusions.119References.130

Developmental Toxicity II: Postnatal Manifestations
4.1 Introduction.1254.2 Sudden Infant Death Syndrome.1264.3 Cognition and Behavior in Children.1404.4 Postnatal Physical Development.1554.5 Respiratory Development and Function.1624.6 Chapter Summary and Conclusions.162References.163
Reproductive Effects
5.1 Introduction.1695.2 Female Fertility and Fecundability.1695.3 Other Female Reproductive Effects.1785.4 Male Reproductive Toxicity.1795.5 Chapter Summary and Conclusions.181References.181
Respiratory Health Effects
6.0 Introduction.1856.1 Acute Health Effects.1856.2 Chronic Health Effects.2196.3 Susceptible Populations.2466.4 Chapter Summary and Conclusions.253References.255
Carcinogenic Effects
7.0 Introduction

8 Cardiovascular Effects

8.0	Introduction	59
8.1	Description of Epidemiologic Studies	62
8.2	Discussion of Epidemiologic Studies	98
8.3	Other Supportive Evidence	03
8.4	Chapter Summary and Conclusions	25
References		

List of Tables and Figures by Chapter

Executive Summary

Table ES.1	Health Effects Associated with Exposure to Environmental Tobacco Smoke
Table ES.2	Estimated Annual Morbidity and Mortality in Nonsmokers Associated with ETS Exposure

1 Introduction

Table 1.1 Estimated Annual Morbidity and Mortality in Nonsmokers Associated with ETS Exposure

2 Exposure Measurement and Prevalence

Program

List of Figures:

Figure 2.1	Plasma Cotinine Concentrations in Self-Reported Smokers and Nonsmokers
Figure 2.2	Urinary Cotinine of Breast-Fed Infants in Relation to Maternal Cigarette Smoking
Figure 2.3	Percent of Nonsmokers in California Reporting ETS Exposure
Figure 2.4	Reported Average Daily ETS Exposure Duration in California
Figure 2.5	Relative Person-Minutes of ETS Exposure in Different Environments
Figure 2.6	Adult Smoking Prevalence: California and the United States (1965-1995)
Figure 2.7	Linear Trend in Per Capita Consumption of Cigarettes in California Before and After Proposition 99 and Taxation

List of Tables: Table 2.1 Influence of Puff Volume and Filter Ventilation on Deliveries of Particulate Matter and Carbon Monoxide in Mainstream and Sidestream Smoke Table 2.2 Chemical Constituents of Tobacco Smoke that Have Been Classified or Identified as to Their Carcinogenicity, Reproductive Toxicity or Other Health Hazard Table 2.3 Mean Concentrations of Nicotine and Cotinine in the Saliva, Plasma, and Urine of ETS-Exposed Volunteers Table 2.4 Comparison of Biomarkers in Unexposed and ETS-Exposed Nonsmokers, and Active Smokers Table 2.5 Cut-Off, Sensitivity, and Specificity of Biomarkers for Discriminating True Smoking Status Table 2.6 Studies of Cotinine Measurements in Self-Reported Nonsmokers and Criteria Used to Distinguish Smokers From Nonsmokers Table 2.7 Concentrations of Nicotine and Cotinine in Mothers' Milk Table 2.8 Studies with Information on ETS Exposure Prevalence in California and the U.S.: Adults and Adolescents Table 2.9 Studies with Information on ETS Exposure Prevalence in California and the U.S.: Infants and Children 3 Developmental Toxicity I: Perinatal Manifestations List of Figures: Summary of Differences in Mean Birthweight and 95% Figure 3.1 Confidence Intervals Between ETS Exposed and Unexposed Pregnancies, by Definition of ETS and Study Size Odds Ratio (Log Scale) and 95% Confidence Interval for the Figure 3.2

List of Tables:

Table 3.1 Studies of Birthweight and ETS Exposure Defined by Paternal Smoking Status

ETS and Study Size

Table 3.2 Studies of Fetal Growth and ETS Exposure at Home Defined by Paternal Smoking Status

Association of Low Birthweight and ETS, by Definition of

Table 3.4	Studies of Fetal Growth and ETS Exposure Determined by Biomarkers	
Table 3.5	ETS Exposure in Relation to Spontaneous Abortion and Perinatal Death	
Table 3.6	ETS Exposure and Congenital Malformations	
Table 3.7	Animal Studies of Tobacco Smoke Exposure and Fetal Growth	
4 Developm	nental Toxicity II: Postnatal Manifestations	
Table 4.1	Sudden Infant Death Syndrome (SIDS): Studies that Assessed Some Source of Postnatal ETS Exposure	
Table 4.2	Cognition in Children: Studies that Assessed Some Source of Postnatal ETS Exposure	
Table 4.3	Behavior in Children: Studies that Assessed Some Source of Postnatal ETS Exposure	
Table 4.4	Height Growth in Children: Studies that Assessed Some Source of Postnatal ETS Exposure	
5 Reproduc	etive Effects	
Table 5.1	ETS Exposure and Infertility or Fecundability: Adult Exposure	
Table 5.2	ETS Exposure and Infertility or Fecundability: Childhood Exposure	
6 Respirato	ory Health Effects	
List of Figures:		
Figure 6.1	Reported risk ratios and 95% confidence intervals for studies that used clinically recognized asthma as an outcome	
Figure 6.2	Reported risk ratios and 95% confidence intervals for studies that used "wheezing bronchitis" or "chronic wheezing/ whistling in the chest" as an outcome	

Studies of Fetal Growth and ETS Exposure of Maternal Non-Smokers from Multiple ETS Sources

Table 3.3

List of Tables:

Table 6.1	Studies Cited by U.S. EPA (1993) as Evidence Supporting a Causal Relation Between ETS Exposure and Increased Episodes and Severity of Asthma in Children
Table 6.2	Controlled Exposures of Asthmatic Subjects to ETS
Table 6.3	Studies of Middle Ear Effusion (MEE) and Otitis Media (OM) vs. ETS Exposure Reviewed by the Surgeon General (1986), NRC (1986), or U.S. EPA (1992).
Table 6.4	Studies of Middle Ear Effusion (MEE) or Otitis Media (OM) vs. ETS Exposure Not Reviewed by the Surgeon General (1986), NRC (1986), or U.S. EPA (1992).
Table 6.5	Studies Excluded from Meta-Analysis of ETS and Childhood Asthma Induction
Table 6.6	ETS Exposure Relationship with Pulmonary Function, Hospitalizations and Disease Severity in Children with Cystic Fibrosis

7 Carcinogenic Effects

List of Tables:

Table 7.1	Exposure to Spouse's Smoking and Relative Risk (RR) of All Cancers in Adults
Table 7.2A	Hair Concentrations of Nicotine and Cotinine in Women and Their Newborn Infants
Table 7.2B	4-Aminobiphenyl Hemoglobin Adduct Concentrations in Pregnant Women and Fetuses by Exposure to Tobacco Smoke
Table 7.2C	Cotinine and PAH-Albumin Levels in Mothers and Their Preschool Children
Table 7.3	Maternal Smoking During Index Pregnancy and Risk of All Childhood Cancers Combined
Table 7.4	Study Characteristics of the Four U.S. Case-Control Studies of Lung Cancer and ETS Published Since 1991
Table 7.5	Association Between Risk of Lung Cancer in Lifetime Nonsmoking Females and Exposure to Spousal Smoking

Table 7.5B	Risk of Lung Cancer in Nonsmoking Women and Men: A Cohort Analysis
Table 7.6	Association Between Risk of Lung Cancer and ETS Exposures From Parentsand Other Household Members
Table 7.7	Studies on ETS Exposure at the Workplace and Lung Cancer Among Lifetime Nonsmoking Subjects
Table 7.8	Association Between Passive Smoke Exposure and Risk of Nasal Sinus Cancer in Nonsmokers
Table 7.9	Relationship Between Active and Passive Smoke Exposure and Risk of Cervical Cancer
Table 7.10	Nicotine and Cotinine Measured in the Cervical Mucus of Smokers, Passive Smokers, and Nonsmokers
Table 7.11	Passive Smoking and Bladder Cancer Among Nonsmokers
Table 7.12	Mean Levels of Hemoglobin Adducts of 4- and 3- Aminobiphenyls in Nonsmokers
Table 7.13	Mean Levels of 4-ABP Hemoglobin Adducts (PG/G of Hemoglobin) Among Smokers and Nonsmokers by Acetylator Phenotype
Table 7.14	Brain Tumors in Children and Exposure to Parent's Smoking
Table 7.15	Maternal or Parental Smoking During Pregnancy and Childhood Leukemia
Table 7.16	Association Between Exposure to Passive Smoking and Risk of Non-Hodgkins Lymphoma and Lymphoma in Children
8 Cardiovas	scular Effects
List of Tables:	
T 11 0 1	

Table 8.1	Cohort Studies on ETS Exposure and Heart Disease
Table 8.2	Case-control Studies on ETS Exposure and Heart Disease
Table 8.3	Risks of Heart Disease and Active Smoking in Women
Table 8.4	Risks of Heart Disease and Active Smoking in Women By Age

Table 8.5	Effect of Exposure to ETS on Exercise Tolerance
Table 8.6	Effect of Exposure to ETS on Lipid Profile in Children
Table 8.7	Platelet Sensitivity to Antiaggregatory Prostaglandins Before and After Exposure to ETS
Table 8.8	Measures of Platelet Function in Relation to Exposure to Active Smoking and Passive Smoking
Table 8.9	Carotid Artery Intimal-Medial Thickness (IMT) as Measured by B-mode Ultrasound in Current Smokers, Ex-smokers, and Never-Smokers
Table 8.10	Endothelium-Dependent Arterial Dilatation in Active Smokers, Never-Smokers exposed to ETS, and Never-Smokers Not Exposed