

Cancer Incidence and Survival among Children and Adolescents: United States SEER Program 1975-1995



This publication was prepared by:

Cancer Statistics Branch
Cancer Surveillance Research Program
Division of Cancer Control and Population Sciences
National Cancer Institute
6130 Executive Blvd.
Executive Plaza North, Room 343J
Bethesda, Maryland 20892-7352

Fax: 301-496-9949

SEER web address: http://www-seer.ims.nci.nih.gov

Suggested citation for the monograph:

Ries LAG, Smith MA, Gurney JG, Linet M, Tamra T, Young JL, Bunin GR (eds). Cancer Incidence and Survival among Children and Adolescents: United States SEER Program 1975-1995, National Cancer Institute, SEER Program. NIH Pub. No. 99-4649. Bethesda, MD, 1999.

Citation for a chapter should also include the chapter authors and chapter title.

This publication and additional data available on the SEER web site: http://www-seer.ims.nci.nih.gov

Copyright information:

All material in this report is in the public domain and may be reproduced or copied without permission; citation as to source, however, is appreciated.

Cancer Incidence and Survival among Children and Adolescents: United States SEER Program 1975-1995

Editors

Lynn A. Gloeckler Ries, M.S.

Division of Cancer Control and Population Sciences, National Cancer Institute

Malcolm A. Smith, M.D., Ph.D.

Division of Cancer Treatment and Diagnosis, National Cancer Institute

James G. Gurney, Ph.D.

Division of Epidemiology / Clinical Research, Department of Pediatrics, University of Minnesota

Martha Linet, M.D.

Division of Cancer Epidemiology and Genetics, National Cancer Institute

Thea Tamra, M.D.

Visiting Scientist, Division of Cancer Control and Population Sciences, National Cancer Institute

John L. Young, Jr., Dr. P.H.

Rollins School of Public Health, Emory University

Greta R. Bunin, Ph.D.

Division of Oncology, University of Pennsylvania School of Medicine and The Children's Hospital of Philadelphia

Additional Editors

Leslie Bernstein, Ph.D.

Department of Preventive Medicine, University of Southern California/Norris Cancer Center

Charles R. Key, M.D., Ph.D.

New Mexico Tumor Registry

Charles F. Lynch, M.D., Ph.D.

State Health Registry of Iowa

Joseph Simone, M.D.

Utah Cancer Registry

Jennifer Stevens, B.S.

Information Management Services, Inc.

Technical Assistance

Timothy B. Clark, B.A.

Information Management Services, Inc.

Sandra F. Kline

Information Management Services, Inc.

Maureen K. Troublefield

Information Management Services, Inc.

TABLE OF CONTENTS

	Page
Foreword	iii
Acknowledgments: Risk Factor Tables	iv
Acknowledgments: SEER	v
Chapter Contributors	vi
Introduction Lynn A. Gloeckler Ries, Constance L. Percy, Greta R. Bunin	1
Chapter I Leukemia	17
Chapter II Lymphomas and Reticuloendothelial Neoplasms	35
Chapter III CNS and Miscellaneous Intracranial and Intraspinal Neoplasms James G. Gurney, Malcolm A. Smith, Greta R. Bunin	51
Chapter IV Sympathetic Nervous System Tumors	65
Chapter V Retinoblastoma John L. Young, Jr., Malcolm A. Smith, Steven D. Roffers, Jonathan M. Liff, Greta R. Bunin	73
Chapter VI Renal Tumors Leslie Bernstein, Martha Linet, Malcolm A. Smith, Andrew F. Olshan	79
Chapter VII Hepatic Tumors Marc Bulterys, Marc T. Goodman, Malcolm A. Smith, Jonathan D. Buckley	91
Chapter VIII Malignant Bone Tumors James G. Gurney, Andrine R. Swensen, Marc Bulterys	99
Chapter IX Soft Tissue Sarcomas James G. Gurney, John L. Young, Jr., Steven D. Roffers, Malcolm A. Smith, Greta R. Bunin	111

TABLE OF CONTENTS

Page 1
hapter X Germ Cell, Trophoblastic and Other Gonadal Neoplasms
hapter XI Carcinomas and Other Malignant Epithelial Neoplasms
hapter XII Cancer Among Infants
hapter XIII Cancer Among Adolescents 15-19 Years Old
hapter XIV Childhood Cancer Mortality
hapter XV Other NCI/NIH Resources 171
ternational Classification of Childhood Cancer (ICCC)
dex

FOREWORD

Cancer among children is a substantial public concern. Each year in the United States, approximately 12,400 children and adolescents younger than 20 years of age are diagnosed with cancer. Approximately 2,300 children and adolescents die of cancer each year, which makes cancer the most common cause of disease-related mortality for children 1-19 years of age. This monograph assembles under one cover the most detailed information available on the incidence of childhood cancer in the United States. These population-based data will be extremely important in furthering our understanding of the variations in childhood cancer by histologic type and primary site and the variations in incidence of these cancers over time. The monograph provides information about childhood cancer incidence and mortality rates that can enhance the level of public discourse, and it can be used in planning research that will help us to better understand these cancers and their causes.

Unlike adult cancers that are usually tabulated by primary site, the childhood cancers are more meaningfully grouped by histologic type and primary site based on the recently developed International Classification of Childhood Cancer (ICCC). The monograph details incidence for 1975-1995 and survival by ICCC group and by patient demographic characteristics. For each of the major ICCC groups, information on known risk factors is also presented.

The monograph emphasizes not only ICCC group but also age as important factors in childhood cancer incidence. The cancers discussed include those occurring in children younger than 15 years of age as well as those occurring in adolescents up to age 19 years. Some cancers such as neuroblastoma and hepatoblastoma have highest rates among infants and young children, while others such as Hodgkin's disease, germ cell tumors (e.g., testicular cancer) and bone cancers have higher rates among adolescents. It is important that different distributions of cancer types by age be considered when research programs are developed to improve outcomes for children and adolescents with cancer.

I would like to thank and congratulate the scientists at the National Cancer Institute (NCI) and at the various universities and institutions across the United States who collaborated to make this monograph possible including the Epidemiology and Cancer Control Strategy Group of the NCI-supported Children's Cancer Group, which provided the review of risk factors. I would also like to thank all of the individuals who make the SEER Program a reality: staff members of the SEER population-based registries, Information Management Services, Inc., and NCI. It is through their diligence that these data have been collected, analyzed, and interpreted. The monograph highlights the importance of the SEER Program as a national resource. I believe that this document will prove to be a seminal reference work on childhood cancer for scientists, policy makers and the public. All of us look forward to the extensive use of this information and the stimulation of scientific thought that it will engender and ultimately, the reduction of cancer incidence and mortality in children.

Richard D. Klausner, M.D. Director National Cancer Institute

Acknowledgments: Risk Factor Tables

The individuals listed below from the Epidemiology and Cancer Control Strategy Group, of the NCI-supported Children's Cancer Group, provided the review of risk factors for selected cancers. Dr. Greta R. Bunin provided editorial oversight of this effort.

Jonathan D. Buckley, MBBS, Ph.D. Greta R. Bunin, Ph.D. Debra L. Friedman, M.D. Seymour Grufferman, M.D. Andrew Olshan, Ph.D. Leslie L. Robison, Ph.D. Julie Ross, Ph.D.

Acknowledgments: SEER

The editors wish to thank the Principal Investigators and the staffs of the contract organizations who provided the cancer incidence data for this report. These organizations, funded through National Cancer Institute (NCI) contracts, include:

Contracting Organization	Principal Investigator
Northern California Cancer Center	Dr. Dee W. West
Connecticut State Department of Health	Dr. Anthony P. Polednak Mr. Daniel Savino
Emory University	Dr. John L. Young. Jr. Dr. J. William Eley Dr. Jonathan M. Liff
University of Hawaii	Dr. Laurence N. Kolonel Dr. Marc T. Goodman
The Fred Hutchinson Cancer Research Center	Dr. David B. Thomas Dr. Beth Mueller
University of Iowa	Dr. Charles F. Lynch Dr. Charles E. Platz
Wayne State University	Dr. Linda Weiss Dr. G. Marie Swanson
University of New Mexico	Dr. Charles R. Key
University of Southern California	Dr. Ronald K. Ross Dr. Dennis Deapen Dr. Leslie Bernstein
University of Utah	Dr. Joseph Simone

The production of this report would not have been possible without the efforts of the NCI staff who ensure the quality and completeness of the SEER data: Benjamin Hankey, Limin Clegg, April Fritz, Carol Johnson, Carol Kosary, Barry Miller, Constance Percy, Barbara Ravas, Lynn Ries, Gopal Singh, Thea Tamra (visiting scientist) and Elliott Ware of the Cancer Statistics Branch and Brenda Edwards of the Cancer Surveillance Research Program.

Computer support services were provided by Information Management Services (IMS), Inc.

Chapter Contributors

Leslie Bernstein, Ph.D.

Department of Preventive Medicine, University of Southern California/Norris Cancer Center

Jonathan D. Buckley, MBBS, Ph.D.

Department of Preventive Medicine, University of Southern California (Los Angeles)

Marc Bulterys, M.D., Ph.D.

University of New Mexico, currently at Centers for Disease Control and Prevention

Greta R. Bunin, Ph.D.

Division of Oncology, University of Pennsylvania School of Medicine and The Children's Hospital of Philadelphia

Dennis Deapen, Dr. P.H.

Department of Preventive Medicine, University of Southern California/Norris Cancer Center

Debra L. Friedman, M.D.

Division of Hematology / Oncology, Children's Hospital and Regional Medical Center, Seattle, WA

Marc T. Goodman, Ph.D.

Cancer Research Center of Hawaii

James G. Gurney, Ph.D.

Division of Epidemiology / Clinical Research, Department of Pediatrics, University of Minnesota

Jonathan M. Liff, Ph.D.

Rollins School of Public Health, Emory University

Martha Linet, M.D.

Division of Cancer Epidemiology and Genetics, National Cancer Institute

Lihua Liu, Ph.D.

Department of Preventive Medicine, University of Southern California/Norris Cancer Center

Andrew F. Olshan, Ph.D.

Department of Epidemiology, University of North Carolina

Constance L. Percy, M.S.P.H.

Division of Cancer Control and Population Sciences, National Cancer Institute

Lynn A. Gloeckler Ries, M.S.

Division of Cancer Control and Population Sciences, National Cancer Institute

Steven D. Roffers, PA, CTR

Rollins School of Public Health, Emory University

Julie A. Ross, Ph.D.

Department of Pediatrics and Cancer Center, University of Minnesota

Malcolm A. Smith, M.D., Ph.D.

Division of Cancer Treatment and Diagnosis, National Cancer Institute

Andrine R. Swensen, M.S.

Division of Epidemiology, University of Minnesota

John L. Young, Jr., Dr. P.H.

Rollins School of Public Health, Emory University