

Stephen E. Fienberg  
Editor

# The Evolving Role of Statistical Assessments as Evidence in the Courts



Springer-Verlag

Stephen E. Fienberg  
Editor

# The Evolving Role of Statistical Assessments as Evidence in the Courts

Panel on Statistical Assessments as Evidence in the Courts

Committee on National Statistics and Committee on Research on Law Enforcement  
and the Administration of Justice

Commission on Behavioral and Social Sciences and Education

National Research Council



Springer-Verlag  
New York Berlin Heidelberg  
London Paris Tokyo

Stephen E. Fienberg, Department of Statistics, Carnegie Mellon University, Pittsburgh, PA 15213, USA

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine.

Library of Congress Cataloging-in-Publication Data

The Evolving role of statistical assessments as evidence in the courts

/ Stephen E. Fienberg, editor.

p. cm.

Bibliography: p.

Includes indexes.

1. Forensic statistics—United States. I. Fienberg, Stephen E.

KF8968.75.E96 1988

349.73'021—dc19

[347.30021]

88-31207

Printed on acid-free paper

© 1989 by Springer-Verlag New York Inc.

All rights reserved. This work may not be translated or copied in whole or in part without the written permission of the publisher (Springer-Verlag, 175 Fifth Avenue, New York, NY 10010, USA), except for brief excerpts in connection with reviews or scholarly analysis. Use in connection with any form of information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed is forbidden.

The use of general descriptive names, trade names, trademarks, etc. in this publication, even if the former are not especially identified, is not to be taken as a sign that such names, as understood by the Trade Marks and Merchandise Marks Act, may accordingly be used freely by anyone.

Camera-ready copy prepared by the editor using T<sub>E</sub>X.

Printed and bound by R.R. Donnelley and Sons, Harrisonburg, Virginia.

Printed in the United States of America.

9 8 7 6 5 4 3 2 1

ISBN 0-387-96914-4 Springer-Verlag New York Berlin Heidelberg

ISBN 3-540-96914-4 Springer-Verlag Berlin Heidelberg New York

PANEL ON STATISTICAL ASSESSMENTS  
AS EVIDENCE IN THE COURTS

STEPHEN E. FIENBERG (Cochair), Departments of Statistics and of  
Social and Decision Sciences, Carnegie Mellon University  
SAMUEL KRISLOV (Cochair), Department of Political Science, University  
of Minnesota  
MICHAEL O. FINKELSTEIN, Lord Day & Lord, Barrett Smith, New York  
\*JAMES J. HECKMAN, Department of Economics, University of Chicago  
+WILLIAM G. HUNTER, Departments of Statistics and Industrial  
Engineering, University of Wisconsin  
RICHARD O. LEMPert, Law School and Department of Sociology,  
University of Michigan  
ELIZABETH F. LOFTUS, Department of Psychology, University of  
Washington  
PAUL MEIER, Department of Statistics, University of Chicago  
SAM C. POINTER, JR., U.S. District Court, Northern District of  
Alabama  
RICHARD D. SCHWARTZ, College of Law, Syracuse University  
JACK B. WEINSTEIN, U.S. District Court, Eastern District of New York  
SANDY ZABELL, Department of Statistics, Northwestern University  
  
MIRON L. STRAF, Study Director  
GORDON J. APPLE, NRC Fellow  
ALBYN C. JONES, Research Associate  
LEE R. PAULSON, Staff Associate

*Consultants*

THOMAS J. CAMPBELL, Law School, Stanford University  
JOHN H. LANGBEIN, Law School, University of Chicago  
DANIEL L. RUBINFELD, Law School, University of California, Berkeley  
NEIL VIDMAR, Department of Psychology, University of Western Ontario;  
School of Law, Duke University

\*Served through March 1985

+Deceased

COMMITTEE ON RESEARCH ON LAW ENFORCEMENT  
AND THE ADMINISTRATION OF JUSTICE  
1986-1987

NORVAL MORRIS (Chair), School of Law, University of Chicago  
RICHARD LEMPERT (Vice Chair), School of Law and Department of  
Sociology, University of Michigan  
ANTHONY V. BOUZA, Chief of Police, Minneapolis Police Department  
JONATHAN D. CASPER, Department of Political Science, Northwestern  
University  
JACQUELINE COHEN, School of Urban and Public Affairs, Carnegie  
Mellon University  
SHARI DIAMOND, Department of Psychology, University of Illinois at  
Chicago Circle  
DAVID P. FARRINGTON, Institute of Criminology, Cambridge University  
CHARLES F. MANSKI, Department of Economics, University of Wisconsin  
ALBERT J. REISS, JR., Department of Sociology, Yale University  
JOHN ROLPH, The Rand Corporation, Santa Monica, Calif.  
JAMES F. SHORT, JR., Social Research Center, Washington State  
University  
KURT L. SCHMOKE, State's Attorney, Baltimore, Md.  
PATRICIA MCGOWAN WALD, U.S. Court of Appeals, District of Columbia  
STANTON WHEELER, Amateur Athletic Foundation of Los Angeles, on  
leave from School of Law, Yale University  
SAMUEL KRISLOV (ex officio), Cochair, Panel on Statistical  
Assessments as Evidence in the Courts  
ANN WITTE (ex officio), Chair, Panel on Taxpayer Compliance  
Research; Department of Economics, Wellesley College  
  
JEFFREY A. ROTH, Study Director

## COMMITTEE ON NATIONAL STATISTICS

1986–1987

STEPHEN E. FIENBERG (Chair), Departments of Statistics and of  
Social and Decision Sciences, Carnegie Mellon University

JAMES O. BERGER, Department of Statistics, Purdue University

SEYMOUR GEISSER, School of Statistics, University of Minnesota

JERRY A. HAUSMAN, Department of Economics, Massachusetts  
Institute of Technology

F. THOMAS JUSTER, Institute for Social Research, University of Michigan

GRAHAM KALTON, Institute for Social Research, University of Michigan

NAN M. LAIRD, Department of Biostatistics, Harvard School of  
Public Health

JANE A. MENKEN, Office of Population Research, Princeton University

JOHN W. PRATT, Graduate School of Business, Harvard University

S. JAMES PRESS, Department of Statistics, University of California,  
Riverside

COURTENAY M. SLATER, CEC Associates, Washington, D.C.

JUDITH M. TANUR, Department of Sociology, State University of New  
York, Stony Brook

KENNETH W. WACHTER, Department of Statistics, University of  
California, Berkeley

EDWIN D. GOLDFIELD, Executive Director

MIRON L. STRAF, Research Director

# Preface

With increasing frequency, the proof of facts in legal proceedings entails the use of quantitative methods. Judges, lawyers, statisticians, social scientists, and many others involved in judicial processes must address issues such as the evaluation and interpretation of quantitative evidence, the ethical and professional obligations of expert witnesses, and the roles of court-appointed witnesses. The Panel on Statistical Assessments as Evidence in the Courts was convened to help clarify these issues and provide some guidance in addressing the difficulties encountered in the use of quantitative assessments in legal proceedings.

This report is the culmination of more than three years of research and deliberation. In it, we address a variety of issues that arise in federal and state court proceedings when statistical assessments such as quantitative descriptions, causal inferences, and predictions of events based on earlier occurrences are presented as evidence. We appraise the forms in which such assessments are presented, aspects of their admission into evidence, and the response to and evaluation of them by judges and juries.

Our recommendations include several innovations to improve the comprehension of statistical evidence by judges and juries. In addition to jurists, who must evaluate statistical testimony, our report is addressed to lawyers, who may have occasion to draw on statistical testimony or to present factual arguments that incorporate statistical assessments; to statisticians, social scientists, and others who may serve as expert witnesses presenting statistical arguments; and to the research communities in law, statistics, and the social sciences that seek to understand how courts cope with unfamiliar and technically complex information. Our ultimate goal is to improve the legal process.

Our study was a joint effort of the Committee on National Statistics and the Committee on Research on Law Enforcement and the Administration of Justice. We benefited greatly from the suggestions and advice provided by the members of these committees, especially from their diverse areas of expertise and experiences, which they also ensured was well represented on the panel.

Some who have read drafts of this report have asked why the scope of the report is limited to statistical assessments as evidence when many of the same issues arise when courts in general are faced with complex scientific testimony. The sponsoring committees debated this point in developing

the study and agreed that statistical evidence was sufficiently rich to cover the important issues in a variety of applications, especially in the social sciences, without being so broad a topic as to be intractable of study by a small panel. We acknowledge, however, that, had the members of the sponsoring committees not been jurists, social scientists, and statisticians, another focus for the study might have been chosen. We have attempted to indicate some of the points where the results of our study extend to scientific or complex evidence in general, but the reader may still justifiably feel that other topics discussed primarily in the context of statistics and statistical evidence are applicable more broadly to science and scientific evidence.

The study was funded by the National Science Foundation. We are grateful to Felice Levine, head of the NSF Law and Society Program, and Jerome Sacks and the NSF Division of Mathematics for their valuable advice. The West Publishing Company graciously donated use of WESTLAW for computer-assisted searching of legal research. A special leasing arrangement was made by direct aid for us to have software to access WESTLAW. The Federal Judicial Center, especially through Joseph Cecil, provided valuable advice and access to legal resources. The Center for Advanced Study in the Behavioral Sciences hosted the panel for one of its meetings and also provided resources that aided the preparation of this report, while one of us was a Center fellow.

We also benefited greatly from the thoughtful and scholarly work of several consultants: Thomas J. Campbell, John H. Langbein, Daniel L. Rubinfeld, and Neil Vidmar. Appendix H, which reviews the impact of statistical evidence in the legal system, was prepared for the panel by Neil Vidmar after the main text was completed in order to supplement the report's discussion of relevant social science literature on the topic. While the panel had previously reviewed some of the materials cited in this appendix and had chosen not to discuss or reference them, the alternative perspective provided by this supplemental material should prove valuable to many readers. Gordon J. Apple, National Research Council fellow and Albyn C. Jones, research associate—both with the Committee on National Statistics—served as staff on the study and made important contributions to the preparation of this report. A number of other Committee on National Statistics staff, including Edwin D. Goldfield, Roberta R. Pirosko, Anne M. Sprague, Kristine L. Smith, Eleanor M. Bateman, and Michele Zinn, provided highly competent administrative and secretarial assistance. Jeffrey A. Roth, study director of the Committee on Research on Law Enforcement and the Administration of Justice, provided valuable input at several stages in the panel's deliberations. Christine L. McShane, in the Commission on Behavioral and Social Sciences and Education, through careful editing of our report, made many improvements. Eugenia Grohman of the Commission provided valuable assistance in the review of the report, as well as in its editing and production. To all we are very grateful.



Our special appreciation goes to Margaret L. Smykla of the Department of Statistics, Carnegie Mellon University, and to Lee R. Paulson and Miron L. Straf of the Committee on National Statistics. Margaret Smykla typed innumerable drafts of the panel report and supervised the computer-based photo-typesetting of the final version on equipment at Carnegie Mellon University. Lee Paulson helped in the editing of the report and provided research and library assistance that was crucial in the completion of our work. Finally, we thank Miron Straf, who, as research director of the Committee on National Statistics, guided the development of the study from its inception as an idea, through the preparation of a proposal and appointment of the panel, to the development of this report. By serving as study director for this project, he participated in and guided our work. In addition to planning our meetings and coordinating our investigations, deliberations, and drafts, he also organized presentations at professional societies and even the development and production of a mock trial, which illustrated many of the issues discussed in this report.

May 30, 1988

Stephen E. Fienberg  
Samuel Krislov  
Cochairs, Panel on Statistical Assessments  
as Evidence in the Courts

# Contents

<b>Preface</b>	<b>xi</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Overview . . . . .	1
1.2 The Field of Statistics and Statistical Assessments . . . . .	3
1.3 Methodology . . . . .	5
1.4 Early Uses of Probability and Statistics in the Law . . . . .	6
1.5 The Increasing Volume of Statistical Argument . . . . .	7
1.6 Cost and Benefits Associated with Increased Use of Statistics . . . . .	9
1.7 Outline of Report and Summary of Principal Recommendations . . . . .	10
<b>2 Case Studies</b>	<b>17</b>
2.1 Introduction . . . . .	17
2.2 Vuyanich v. Republic National Bank . . . . .	19
2.3 Carter et al. v. Newsday . . . . .	26
2.4 E.E.O.C. v. Federal Reserve Bank of Richmond . . . . .	35
2.5 Gulf South Insulation v. U.S. Consumer Product Safety Commission . . . . .	46
2.6 U.S. ex rel. DiGiacomo v. Franzen . . . . .	60
2.7 Corrugated Container Antitrust Litigation . . . . .	67
2.8 Some Lessons: The Institutional Competence of Courts . . . . .	72
<b>3 Review of the Use of Statistics in Selected Areas of     Litigation</b>	<b>85</b>
3.1 Introduction . . . . .	85
3.2 Title VII Employment Discrimination Litigation . . . . .	86
3.3 Statistical and Economic Assessment in Antitrust Litigation . . . . .	104
3.4 Statistical Assessments as Evidence in Environmental Law . . . . .	118
<b>4 Statistics, Law, and Expert Testimony</b>	<b>139</b>
4.1 The Methodologies of Law and Statistics . . . . .	139
4.2 Major Differences Between Legal and Statistical Thinking . . . . .	140

4.3	The Meeting of Two Cultures . . . . .	143
4.4	Working Relationships Between Scientists and Lawyers . . .	146
4.5	Psychological Problems with Statistical Testimony . . . . .	149
<b>5</b>	<b>Some Partial Solutions to the Problems Arising from Expert Statistical Testimony</b>	<b>155</b>
5.1	Introduction . . . . .	155
5.2	The Expert Witness: Advocate or Impartial Evaluator and Educator? . . . . .	156
5.3	Statistics and Pretrial Discovery . . . . .	164
5.4	The Role of Court-Appointed Experts . . . . .	169
5.5	Enhancing the Capability of the Fact Finder . . . . .	172
5.6	The Role of Statistical Education in the Presentation of Evidence . . . . .	176
5.7	Implications for a Research Agenda . . . . .	183
<b>Appendices:</b>		
<b>A</b>	<b>Statistical Approaches, Probability Interpretations, and the Quantification of Standards of Proof</b>	<b>191</b>
A.1	Relevance Versus Statistical Fluctuations . . . . .	191
A.2	Views on Statistical Inference . . . . .	193
A.3	Standards of Proof . . . . .	198
A.4	Pascalian Versus Baconian Probability . . . . .	202
A.5	Annotated Bibliography on Selected Topics in Statistical Methodology . . . . .	206
<b>B</b>	<b>Brief Historical Survey of the Legal Uses of Probability and Statistics Prior to 1970</b>	<b>211</b>
<b>C</b>	<b>The Federal Rules of Evidence</b>	<b>219</b>
C.1	The Role of the Rules . . . . .	219
C.2	Selected Rules . . . . .	221
<b>D</b>	<b>Expert Witnesses in Other Fields</b>	<b>231</b>
D.1	Expert Testimony in Psychology . . . . .	231
D.2	Expert Testimony in Psychiatry . . . . .	233
D.3	Standards for Expert Opinions in Engineering . . . . .	234
<b>E</b>	<b>Excerpt from Federal Rules of Civil Procedure</b>	<b>239</b>
<b>F</b>	<b>Recommendations on Pretrial Proceedings in Cases with Voluminous Data</b>	<b>245</b>

<b>G</b>	<b>A Comparative Perspective on the Role of Experts in Legal Proceedings</b>	<b>273</b>
G.1	Overview of a Continental System . . . . .	273
G.2	The Role of Experts in the West German System . . . . .	275
G.3	Differing Roles for American and Continental Experts . . .	277
<b>H</b>	<b>Assessing the Impact of Statistical Evidence, A Social Science Perspective</b>	<b>279</b>
<b>I</b>	<b>Biographies of Panel Members and Staff</b>	<b>321</b>
	<b>References</b>	<b>325</b>
	<b>Index of Cases</b>	<b>341</b>
	<b>Author Index</b>	<b>347</b>
	<b>Subject Index</b>	<b>353</b>

# 1

## Introduction

### 1.1 Overview

This report addresses a variety of issues arising from the use of statistical evidence and analysis in federal and state court proceedings in the United States. The panel has examined these issues from the perspectives of statistics, of law, and of the behavioral and social sciences. This report states the assumptions and limitations of the inquiry, specifies the methods and findings, and makes recommendations aimed at improving the use of statistical knowledge in court settings.

In addressing the law-statistics nexus, the panel has assumed that statistical knowledge will continue to be needed and used in litigation. This use will include quantitative descriptions, causal inferences, and predictions of future events based on earlier occurrences.

The effectiveness with which statistical knowledge can address issues in litigation depends on the type of statistical usage. In general, statistical analysis is most widely accepted when the question is confined to descriptive statistics. Greater uncertainty emerges in causal inference, since real-world conditions rarely provide the equivalent of experimental control. Finally, projections of future outcomes based on earlier events compound the uncertainties of causal inference with the additional problems of changing conditions and factors over time.

In recent years statisticians and others who use statistical methods have participated in the legal process with increasing frequency, both as consultants and as expert witnesses. This trend can be attributed in part to the increasing amount of information relevant to legal cases that requires statistical interpretation. Use of statistical experts also rests on the belief, among legal decision makers and others in the society, that both statistical knowledge and its applicability to real problems involving inferences have increased. This belief reflects the evolution of statistics as a body of knowledge and as a professional activity, especially over the past 85 years.

The increasing use of statistics in legal proceedings creates the need for a critical appraisal of how this body of information and expertise is in fact used. Are good statistical demonstrations being rejected by courts because they are not properly understood? Are defective demonstrations given credence because their defects have not been noticed or understood? Are these problems with the use of statistical testimony more severe than in other areas of specialized knowledge used in the law? This report addresses these questions and, through a series of case studies and reviews of

areas of litigation, suggests ways in which settled statistical knowledge and methodological issues can be more accurately and effectively used by the courts.

One of the special features of statistics as a field of knowledge is its use by those in a broad spectrum of fields, e.g., in biology, in medicine, and in the behavioral and social sciences. As a language for analyzing data and drawing inferences, statistics is used by professionals in a variety of disciplines, and experts from these disciplines often use statistical methods as part of their presentations to the court. The use of statistical arguments in the legal setting thus allows for introduction of inter- as well as intradisciplinary disputes between statistical experts.

Moreover, experts employing statistical analyses for causal inferences frequently reach different conclusions depending on the method employed to handle aspects of sampling variability, model specification, the choice of explanatory variables, and so on. Legitimate bases of disagreement cannot be banished by judicial fiat, nor can a panel such as this one attempt to resolve them. But knowledge of the origins of these expert differences can and should be available to triers of fact and to appellate judges to help explain the opposing views of the experts. This report suggests ways in which the courts can be more effectively informed on the bases of these differences and how they can best be handled.

This report is intended to serve several audiences: (1) jurists who must evaluate statistical testimony and occasionally preside over a battle of expert witnesses, (2) lawyers who may have occasion to draw on expert statistical testimony in a case or to present statistical evidence in a form understandable to courts, (3) statisticians who are called on to serve as expert witnesses or to prepare expert testimony, (4) the researchers in law, social science, and related fields who seek to understand how courts do and can cope with unfamiliar and technically complex information. In particular, many of the issues examined in this report have implications for basic research in statistics and in law and social science, in which the concern is with understanding the legal process and its broader relationship to society. Our ultimate goal is improvement of the legal process.

All members of the panel concur in the formal recommendations presented in the report. The material incorporated in it, however, is the product of compromise. The report is intended for a wide spectrum of readers—sophisticated lawyers who know little about statistics, sophisticated statisticians who know little about law, both well-informed and little-informed laypersons, as well as a few who are familiar with both law and statistics. As a consequence, there is wide variation in the depth and the width of the discussions. Nevertheless, much of the information and analysis embodied in this report will, we believe, be useful to all of these audiences and provide a basis for helpful work in the future as well as a better understanding of where we stand now.

## 1.2 The Field of Statistics and Statistical Assessments

The term *statistics* is often used to mean data or information. Here we use statistics in a more specific sense. Statistics as a professional discipline is concerned with the systematic and efficient collection and accurate analysis of data and with the development of methods to make inferences from data. The collection of data may involve observational studies (studies in which the selection of data or conditions under which observations are made are not under the control of the investigator), sample surveys, censuses, or randomized controlled experiments. The analysis of data is the attempt to extract useful information from a set of data. Statistics is concerned both with the logic of scientific method and with how we learn from data.

For the purposes of this report a *statistical assessment* is an interpretation of statistical data—a reasoned judgment—informed by knowledge of and experience in statistics. Since a statistical assessment is based on data and statistical analyses of them, it must inevitably take into account how the data were collected. Statistical assessments may take a variety of forms including:

- (1) The presentation, analysis, and interpretation of descriptive statistics relating to the social, demographic, or economic characteristics of a population.
- (2) Statistical inferences, in particular those relating to cause and effect, from analyses of special sample surveys, censuses, controlled experiments, or observational studies.
- (3) Projections of future events or outcomes based on analyses of earlier events.
- (4) Theories, hypotheses, and opinions that are advanced and developed by experts based on personal inferences, interviews, observations, reviews of research, and other limited studies that provide support for opinions but that do not necessarily generalize to a population relevant to the case at hand.

Inferences regarding cause and effect in virtually all legal cases depend heavily on subject matter assumptions. Only when randomized controlled experiments have been done directly on the cause and effect of interest does statistical inference provide a vehicle for avoiding such substantive assumptions.

Most statistical evidence does not fall neatly into one or another of these four categories, but one can see general patterns of how statistical evidence is used. For example, in school desegregation cases, the first type of evidence, the interpretation of statistics describing a population, is primary;

for the most part, this form of evidence helps to describe (or to decide) the degree of racial segregation in residential neighborhoods and schools. In employment discrimination cases, the second type of evidence, involving statistical inference from observational studies, has generally been used in attempts to infer discriminatory practices in employee selection, promotion or remuneration, frequently through elaborate regression studies that seek to control for the effects of other factors on which hiring, promoting, and wage setting can be based. Description and inference are often combined with prediction, as in school desegregation cases in which experts project the impact of new policies. Finally, many assessments involve implicitly—or occasionally explicitly—expert opinions about the quality of the data collected, the measurement of nonresponse, the choice of a level of significance, and potential sources and effects of bias.

One school of statistical thought defines statistics as the science of decision making under uncertainty and, since courts deal with uncertainty in reaching decisions, this school argues formal statistical theory can provide a proper framework for improving judicial decision making. Indeed, terms and phrases such as “beyond a reasonable doubt,” “preponderance of evidence,” “more likely than not,” and “substantial probability of cause” are arguably subject to statistical representation and analysis. While the use of statistics has burgeoned in court cases, this use has almost never extended to quantifying and analyzing the uncertainty reflected in legal terms. Some courts have, in fact, resisted such application. For example, some judges in their instructions to juries still discourage them from referring to probabilities (*U.S. v. Clay*, 476 F.2d 1211 (9th Cir. 1973)), and equate “beyond a reasonable doubt” with moral certainty rather than with any probability value.

This report does not focus on the use of statistics and probabilistic thinking for judicial decision making, even though some of the panel members are advocates of such an approach. Appendix A contains a brief summary of the controversy surrounding suggestions for the formal use of probability for judicial decision making, and a description of attempts to quantify standards of proof in civil and criminal litigation. Although there are occasional references in the report to these issues, the primary focus remains on statistical experts and their more limited role in the legal process as expert witnesses presenting statistical assessments of data or as consultants preparing analyses for counsel but not actually testifying.

Throughout this volume we use the term *statistician* to refer to those with formal training in the field of statistics, and who in some form identify themselves as such, e.g., via membership in professional associations. Many professionals in other fields do statistical work and testify as *statistical experts* in courts on issues such as data collection, analysis, and inference. Such professionals often have considerable background in statistics and some belong to umbrella statistical organizations such as the American Statistical Association.



The panel recognizes the difficulty in measuring expertise in statistics, and in separating statistical and substantive expertise, especially when the statistical issues in actual litigation are almost always embedded in subject matter such as economic determinants of labor markets. The courts exercise considerable discretion in deciding what qualifications are appropriate for experts testifying on statistical issues, and the panel concluded that it would be inappropriate for it to recommend formal standards for the identification of statistical experts.

Many of the issues surrounding the role of statistical experts are similar to those related to the role of scientific experts in other fields (e.g. see Saks and Van Duizend, 1983, and Black, 1988). The panel would have liked to broaden the scope of its inquiry to explore whether it is possible to distinguish between those problems confronting most technical experts and those that appear to be distinctly statistical in nature. Unfortunately, this was too extensive a task given the limited funds available. Nonetheless, there are some points in the report where the panel tried to indicate that the issues or concerns raised in the context of statistical evidence are applicable more broadly to scientific evidence.

### 1.3 Methodology

In developing this report we, as panel members,

- (a) pooled our collective experiences,
- (b) searched for cases or opinions using statistical materials,
- (c) solicited information on cases through announcements in professional newsletters,
- (d) listened to presentations from invited experts,
- (e) commissioned background papers, and
- (f) engaged in discussions, often heated, of the ethical and professional obligations of statistical experts and lawyers working in this area.

The panel examined cases in which statistical evidence was introduced, but we did not attempt by interviews with decision makers to determine what influence such evidence had on the resolution of the case beyond that expressed in the formal opinion or decision.

The panel also attempted a systematic review of selected areas of litigation and, in the process, took note of the legal and statistical commentaries that have been published on actual and potential uses of statistical assessments in the legal process. In particular, the panel has examined treatises