

Index

- admissibility of scientific evidence
 - and discovery process, 441–42
 - DNA, 98–102
 - Federal Rules’ liberal thrust, 46; 49
 - gatekeeping function of trial judge, 14; 46; 49
 - and related procedural issues, 49–53
 - judicial (in limine) screening, 29–30; 50–51
 - statistical evidence, 441–43
 - surveys, 227–28
 - versus legal sufficiency, 51–53
 - visual evidence, 115–17
- antitrust
 - and use of survey research, 228
- appellate review of expert testimony, 53–54
- Bayesian approach, 386; 387
- Carnegie Commission on Science, Technology, and Government, 1–2
- case-control studies, 136–38
- case management
 - assessment, 13
 - issue definition, 15
 - considerations in disputes over scientific evidence, 16–17
 - disclosure under Fed. R. Civ. P. 26(a)(2), 17
 - narrowing the issues, 17; 33
 - and use of reference guides, 18–19
 - presentation of evidence, 35
 - trial procedures for efficiency, 34–35
- causation
 - general (*see under toxicology*)
 - specific (*see under toxicology*)
- census undercount cases and multiple regression analysis, 421
- clinical ecology, scientific validity of, 73–75
- cohort studies, 134–36
- collateral estoppel as limit on expert evidence, 20
- confidentiality (*see under discovery*)
- court-appointed experts
 - authority to appoint under Fed. R. Evid. 706, 22; 531–34
- compensation of
 - from public funds, 558; 562
 - in general, 547; 557–62
 - technical advisors, 561
 - when a party is indigent, 560–61
- ex parte communication with, 549–51; 567–68; 569
- in general, 21–22; 25; 529–34; 571
- initiation of appointment, 544–45; 566–67
- overlap with special master, 22
- reasons for appointing an expert
 - difficult technical issues, 536–37; 538; 541; 548; 550; 565
 - disputes between parties’ experts, 538–39; 542; 554; 564–65
 - failure of a party to present credible testimony, 538–39; 541; 554; 565–66
 - in general, 536–39; 541 fig. 2; 541–42; 563–66
 - involvement of children, 541–42; 561; 566
 - settlement, improved chances for, 537; 539; 566
- reasons for not appointing an expert
 - difficulty finding an expert, 540; 544–45
 - difficulty identifying need for expert at early stage, 543; 563
 - infrequency of extraordinary circumstances, 540

- court-appointed experts (*continued*)
 - reasons for not appointing an expert (*continued*)
 - in general, 532; 540–42
 - objection of parties, 542
 - payment of expert, 540; 557; 560
 - respect for adversarial system, 540; 542; 565
 - report of, 23; 24
 - selecting, 544–46; 567
 - special masters, employment by, 591–92
 - support for in Fed. R. Civ. P. 16(c)(12), 21
 - technical advisors, 534; 549; 550; 551; 558; 561–62; 568–69
 - testimony of
 - advising jury of court-appointed status, 552–53; 554–55; 570
 - effect of experts' testimony, 553–54; 570
 - in general, 551–55; 570
 - pretrial reports and depositions 551–52; 558; 570
 - timing of appointment, 543–44; 563–67
 - use of
 - in general, 535 fig. 1; 535–49; 567–70
 - judges' satisfaction with appointments, 537
- criminal cases, 53
- damages
 - antitrust damages, 511–14
 - causation, 512
 - exclusionary conduct, 513
 - lost profits, 511
 - scope, 511–12
 - “tying” arrangements, 513–14
 - apportionment, 500–01; 509–10; 510–11
 - avoided cost, 488–89
 - causal effect of injury, disputes over, 485–86
 - characterization of harmful event, 481–89
 - “but-for” analysis, 481–83
 - and costs, 488–89
 - disputes over economic effects, 483–85
 - compensation
 - stock options, 489
 - tax treatment of, 487–88
 - damages study, 477–78; 478 fig. 1; 517–19; 518 tables 4 & 5
 - double-counting, avoiding, 509; 511
 - earnings, what constitutes, 490
 - employment law, 501
 - expectation, 481
 - expert qualifications, 479
 - future earnings, projection of, 493–94
 - actual earnings of plaintiff after harmful event, 494
 - profitability of business, 493–94
 - future losses, discounting, 495–98; 495 table 2
 - appraisal approach, 499
 - capitalization factor, 497–98
 - interest rate, 495–96; 497
 - offset by growth in earnings, 496–97; 496 table 3
 - future losses, projection of, 494
 - in general, 477–78
 - intellectual property damages
 - apportionment of, 509–10; 510–11
 - in general, 507–11
 - market-share analysis (sales), 508–09
 - price erosion, 484; 509
 - “reasonable royalty” and designing around the patent, 510
 - liquidated damages, 515–16
 - lost profit, 488
 - measuring losses, tax considerations, 487–88
 - mitigation, 490–91; 504–05
 - patent infringement by public utility, 500–01
 - personal lost earnings, 503–07
 - benefits, 503
 - discounting, 506–07
 - mitigation, 504–05
 - projected earnings, 503; 505–06
 - retirement and mortality, 507
 - prejudgment interest, calculation of, 491–93; 492 table 1
 - price erosion, 483; 484; 509
 - and regression analysis, 479
 - reliance, 481
 - restitution, 481
 - securities damages, 514–15
 - market effect of adverse information, 515
 - turnover patterns in ownership, 515
 - subsequent unexpected events, 499–500; 507

- and surveys, 479
- Daubert v. Merrell Dow Pharmaceuticals*, 2; 14; 29; 30; 43, n.1; 44; 45–47; 47–54; 69; 70–78; 82–89; 91–92; 101; 103–05; 111–12; 113
- court-appointed experts and, 534; 565
- forensic DNA evidence and, 278; 285–86; 300; 305–06; 307
- special masters and, 585
- death penalty
 - and multiple regression analysis, 421
 - observational studies of, 350
 - statistical studies of, 342
- disclosure (*see under discovery*)
- discovery
 - confidentiality, 26–27
 - control and management, 23–26
 - data and methodology of multiple regression analysis, 441–42
 - depositions, videotape, 27–28
 - disclosure and expert witnesses, 49–50
 - nonretained experts, 27
 - preservation of documents, order for, 24
 - protective orders, 26–27
 - surveys, 236
- DNA (*see forensic DNA identification analysis*)
- ecological studies, 132–33
- economic losses (*see damages*)
- employment discrimination
 - and multiple regression analysis, 419–20; 421; 427
 - use of statistics in assessing disparate impact, 373
 - and use of survey research, 227
- epidemiology
 - association between exposure and disease
 - general causation, 157–66
 - confounding factors, 158–60
 - guidelines for determining, 160–64
 - types of, 164–66
 - specific (individual) causation, 167–70
 - admissibility of evidence, 167–68
 - sufficiency of evidence, 168–69
 - false results (erroneous association)
 - biases, sources of, 131–56
 - false negative error, 155–56
 - false positive error, 152–55
 - in general, 150–51
 - power, 156
 - random sampling error, 151–56
 - in general, 147–56
 - measurement of
 - attributable proportion of risk, 149–50; 161–62
 - in general, 147–50
 - odds ratio, 149
 - relative risk, 147–49; 161
 - putative agent, measuring exposure to, 143–46
 - in general, 125–28
 - research methods
 - animal studies (in vivo), 129–30
 - extrapolation, 130
 - health effects, defining and measuring, 146
 - in general, 129–31
 - observational methods, 129
 - research design, 131–38
 - study populations and samples, 138–43
- expert evidence
 - admissibility of, 29–31
 - and Fed. R. Civ. P. 16(c)(4), 19
 - lay opinion testimony, 64–67
 - legal sufficiency of, 51–53
 - limitations on, 19–20
 - presentation of, 35
- expert testimony
 - appellate review of, 53–54
 - and *Daubert v. Merrell Dow Pharmaceuticals*, 45–47
 - exclusion of, under Fed. R. Evid. 403, 45; 113–17
 - governed by Fed. R. Evid. 702–705, 43–44
 - limitations and restrictions, 63–64
 - opinion supported by reliable data
 - Fed. R. Evid. 703, 103–12
 - fit, 104
 - methodology, 104
 - “reasonably relied upon,” 106–12
 - standard of proof, 104–05
 - relevancy, or “fit”, 47–49
 - scientific validity, challenges to
 - and *Daubert v. Merrell Dow Pharmaceuticals*, 71–72

- expert testimony (*continued*)
 - scientific validity, challenges to (*continued*)
 - discipline, 73–82
 - clinical medicine, 80–82
 - clinical ecology, 73–75
 - forensic techniques, 75–76
 - and *Frye v. United States*, 70–71
 - probative value, 77–82
 - extrapolation problems (animal studies), 78–80
 - statistical estimates, 92–102
 - DNA, 98–102
 - theory, 82–91
 - psychological syndrome evidence, 87–88
 - skewed methodology, 88–91
 - social sciences, 84–87
 - scope, 63
 - sources of, 13–14
 - and survey research, 232–33
- expert witnesses
 - adversarial nature of, 15
 - availability of, 56
 - court-appointed (*see* court-appointed experts)
 - disagreement of, 16–17
 - disclosure of and their opinions, 17; 23–28
 - discretion of court in ruling on, 58
 - engineers, 61
 - physicians, 59–61
 - qualifications
 - availability, 56
 - determined by judge, 64
 - education or experience, 56–57
 - expertise (*see also* secondhand expert), 57
 - in general, 55–64
 - meaning of, 58
 - in multiple regression, 439
 - professional witness, 62–63
 - restrictions on (*see* expert testimony, limitations)
 - secondhand expert, 62
 - specialization, 58–61
 - actual knowledge more important than credentials, 61
 - “two-expert” cases (statistical evidence), 337
 - two-pronged test, 55–56
 - extrapolation
 - animal studies, 78–80; 130; 201–02
 - experiments in statistics, 349–50
 - Federal Courts Study Committee, 2
 - Federal Torts Claim Act, 109
 - forensic DNA identification analysis
 - amplified fragment length polymorphism (AMP-FLP) technique, 288
 - Daubert v. Merrell Dow Pharmaceuticals* and, 278
 - Frye* standard and, 278; 285
 - in general, 277–79
 - polymerase chain reaction (PCR) based analysis techniques, 277; 287–88
 - probability estimates, 297–307
 - proficiency testing, 101–02
 - sampling uncertainties, 98–101
 - sequence-specific oligonucleotide (SSO) probes, 288
 - see also* National Research Council report
 - see also* RFLP analysis
 - forensics, scientific validity of, 75–76
 - Frye v. United States*
 - and forensic DNA evidence, 75; 278; 285; 306; 308–09
 - need for test abolished, 43; 70
 - in-court demonstrations, 115
 - Lanham Act cases
 - and survey research, 228; 238; 251
 - lay opinion on scientific issues, 64–67
 - authentication testimony, 65–66
 - experience of lay witness, 65
 - hypothetical questions (prohibition of), 65
 - personal knowledge of lay witness, 65
 - testimony on causation, 66
 - testimony on economics, 66–67
 - local rules
 - limitations on expert evidence, 20
 - magistrate judges
 - in general, 21–22
 - implied authority for appointment under Fed. R. Civ. P. 16(c)(8), 21
 - special masters, use as, 595–96
 - masters (*see* special masters)

- medicine (clinical) and methodology, 80–82
- motion practice
 - motions in limine, 29–30
 - summary judgment, 30–31; 51–53
- multiparty litigation
 - and emerging scientific issues, 14
- multiple regression analysis
 - causality, 422
 - census undercount cases, questionable use in, 421
 - computer output of, 459–60; 459 table 1
 - correlation, 446; 446 fig. 3
 - death penalty cases, questionable use in
 - observational studies of, 350
 - statistical studies of, 342
 - dependent variable, choosing, 419; 424; 432
 - employment discrimination, 419–20; 421; 427
 - scatterplot, 445 fig. 2
 - use of statistics in assessing disparate impact, 373
 - and use of survey research, 227
 - expert, qualification of, 439
 - explanatory variables, 419; 424–26; 432–34
 - feedback, 432–34; 434 fig. 1
 - forecasting, 460–62
 - standard error of, 461–62; 462 fig. 9
 - in general, 419–22; 445–62
 - growth of use in court, 420
 - interpreting results, 429–38; 452
 - correlation versus causality, 421
 - error in measuring variables, 437–38
 - practical significance versus statistical significance, 429–32
 - regression slope, 453 fig. 6
 - robustness, 432–38
 - statistical significance, 429–31
 - linear regression model, 448–51
 - measurement error, 437–38
 - model specification (choosing a model), 423–28
 - errors in model, 435–36
 - nonlinear models, 451
 - patent infringement, 420
 - precision of results, 453–59
 - goodness-of-fit, 456–57
 - least-squares regression, 458–59; 458 fig. 8
 - standard error, 453–56; 457 fig. 7; 462 fig. 9
 - regression line, 448 fig. 4; 449–51
 - goodness-of-fit, 450 fig. 5; 456–57
 - regression residuals, 451
 - research design, 423–28
 - formulating the question for investigation, 423
 - spurious correlation, 421–22; 433
 - statistical evidence, 441–43
 - statistical significance
 - hypothesis test, 430–31
 - p -value, 431
- National Research Council report
 - and comparison of DNA profiles, 296
 - and modified ceiling principle technique, 99; 300; 301–02; 308–09
 - and probability estimation techniques, 100; 306–09
 - and proficiency-testing standards for lab procedures, 291
 - and quality-control standards for lab procedures, 291
 - and scientific validity and reliability of DNA analysis, 278–79
- nonexperts (*see* lay opinion)
- orders
 - court scheduling order, 25
 - final pretrial order, 33
 - order of reference to special master, 605–06; 608; 611; 614
 - preclusion order, 33
 - for preservation and nondestruction of documents, 24
 - remedial order, 590–92
 - umbrella order, 26
- patent infringement
 - and multiple regression analysis, 420; 421; 423
- post-traumatic stress disorder, admissibility in rape cases, 87
- power calculations
 - epidemiology, determining appropriate size for study population, 141–43
 - statistics, 381–82

- pretrial conference
 - and adversarial expert witnesses, 15
 - final conference, 33–35
 - initial conference, 13–20
 - to manage expert evidence, 13
 - and settlement, 34
- pretrial management
 - magistrate judge versus trial judge, 21
- prosecutor's fallacy and presentation of statistical evidence, 97
- protective orders (*see under* discovery)
- psychological evidence (*see under* social sciences evidence)

- rape trauma syndrome, admissibility of, 87
- reference guides, purpose and use of, 119
- relevance ("fit"), 47–49
- remedial orders, 590–92
- res judicata as limit on expert evidence, 20
- RFLP analysis
 - coincidental DNA profile match,
 - estimating probability of fixed-bin method, 298; 305
 - modified ceiling principle technique, 99; 301–02; 307–309
 - product rule technique, 300–01; 304–06
 - Daubert v. Merrell Dow Pharmaceuticals* and, 285–86; 300; 305–06; 307
 - and expert testimony, 297
 - Frye* test and, 306; 308–09
 - in general, 297–98
 - National Research Council report and, 301–02; 304–09
 - and population substructure, 305
 - and selection of appropriate comparison population, 303–09
 - Fed. R. Evid. 702, admission of probability estimates under, 306; 307
 - population genetics, 304
- comparison of DNA profiles
 - DNA profile match, declaration of, 295–96
 - measurement standard used to declare match, objectivity of, 296
- DNA crime sample, suitability of
 - sample quality, 288
 - sample size, 287–88
 - sources of DNA, 288–89
- in general, 281–84
- laboratory procedures
 - and admissibility, 294
 - appropriate documentation, 291–92
 - crime sample, 293
 - Daubert* test and, 285–86
 - deviations from standards, 294
 - Frye* test and, 285
 - proficiency-testing programs,
 - laboratory's participation in, 292–93
 - reliability test and, 285
 - Technical Working Group on DNA Analysis Methods (TWGDAM) Guidelines, 291; 292; 294; 315–21
 - validity and reliability of, 285–86; 292
- molecular biologists, 285; 286
- population geneticists, 286
- relevant scientific communities, 286
- steps in, 282–84; 311
- theory underlying, validity of, 285

- settlement, 34
- social sciences evidence
 - hard versus soft science, 85–86
 - and jury, 85–87
 - psychological evidence, scientific validity of, 84–87
 - psychological syndrome evidence, 87–88
- special masters
 - advantages of using, 621
 - appellate courts' view of, 21
 - appointment of
 - appealing, 598–99
 - arguments for and against, 580–81
 - authority for, 21; 595–99
 - conflict-of-interest problems in,
 - avoiding, 603–05
 - delegation, limits on, 596–98
 - ethical problems in, avoiding, 603–05
 - "exceptional condition" requirement, 579–80; 596; 597; 598
 - issues to consider, 601–15
 - liability stage, 588–90
 - objections to, 604
 - preliability stage, 584–88

- reasons for, 583–84
- remedial stage, 590–93; 611; 615
- termination date, specifying, 614–15
- time limit on, establishing, 614–15
- authority of, 605–06
- avoiding delay and inertia, 614–15
- case management, providing, 585–86
- compensation of, 611–14
- damages assessment, providing, 593
- Daubert v. Merrell Dow Pharmaceuticals* and, 585
- discovery, use in, 584
- ex parte communications
 - in general, 606
 - with the judge, 608–09
 - with the parties, 607–08
- expenses of, 613
- expert testimony
 - determining admissibility of, 585
 - handling proffers of, 585
- experts
 - employing, 591–92
 - overlap with, 22
- Federal Judicial Center study of, 581–82
- Fed. R. Evid. 104(a) hearings,
 - conducting, 585
- fees, 611–14
- in general, 21–22; 579–82
- hearings, type of, 610–11
- history of use, 579
- judicial ethics, applicability of, 603
- judicial immunity and, 610
- liability for malfeasance, 609–10
- magistrate judges used as, 595–96
- mediation function, 597; 608; 609
- orders of reference, 605–06; 608; 611; 614
- parties' approval of, 601–02; 604
- powers under Fed. R. Civ. P. 53, 598
- pretrial proceedings, assisting in, 584–85
- qualifications, 601–02
- referrals from other judges or scientific community, 602
- reports, 608; 617–19
- scientific and technical issues, advising judges on, 585–86
- scope of authority, 605–06
- selection of, 601–02
- settlement, facilitating, 586–88
- staff, expenses of, 613

- statement of fees and expenses, 613
- statistics
 - association
 - income and education, 360 fig. 5
 - average, 360–61
 - Bayesian approach, 386; 387
 - confidence intervals, 376–78
 - confounders (third variables), 367
 - correlation coefficients, 365–67
 - data, collection of
 - censuses, 343
 - experiments, 346–50
 - individual measurements, 341–43
 - observational studies, 349; 350–52
 - proper recording, 342–43
 - reliability, 341–42
 - surveys, 343–46
 - validity, 342
 - data, inferences drawn from
 - estimation, 374–78
 - in general, 373–74
 - hypothesis tests, 378–85
 - p -values, 378–85; 391; 392 fig. 13
 - posterior probabilities, 374; 386–87
 - data, presentation and analysis of
 - association between two variables, 362–71
 - center of distribution, 360–61
 - completeness, 353–55
 - crime statistics, 353–54
 - graphs, 356–60
 - interpreting rates or percentages, 355–56
 - misleading data, 353–55
 - percentages, 363–65
 - variability, 361–62
 - discrimination cases, 364; 373
 - enhancing statistical testimony, 337–39
 - narrative testimony, 339
 - sequential testimony, 339
 - expertise in, 336–67
 - applied statistics, 336
 - probability theory, 336
 - theoretical statistics, 336
 - two-expert cases, 337
 - in general, 335–56
 - graphs
 - association, 359–60
 - distribution of batch of numbers, 356; 357 fig. 1

statistics (*continued*)
 graphs (*continued*)
 histograms, 356–57; 390 fig. 2
 scatter diagrams, 359 fig. 4; 360 fig. 5;
 365 fig. 6; 366 fig. 7
 trends, 357–58
 linear association, 365–66
 mean, 360–61
 median, 360–61
 mode, 360
 normal curve, 390 fig. 12; 391; 392; 393
 odds ratio, 364
 outliers, 366; 367 fig. 8
 pass rates, 378–80; 384; 389
 percentages, 363 table 1; 364 table 2
 power, 381–82
 calculation of, 392–93; 393 fig. 14
 random error, 373
 range, 361
 regression lines, 368–71; 368 fig. 9; 369
 fig. 10; 371 fig. 11
 intercept, 368; 371
 slope, 368; 369–70; 371
 unit of analysis, 370–71
 and voting rights cases, 370; 371
 standard deviation, 361–62
 standard error, 375–78
 calculation of, 391–92
 statistical significance, determining, 374;
 380–81
 interval estimates, 384–85
 multiple testing, 383–84
 surveys
 convenience samples, 344
 probability sampling, 345
 sampling frame, 343–44
 trends, 357–58; 358 figs. 2 & 3
 sufficiency, legal, versus admissibility of
 scientific evidence, 51–53
 summary judgment (*see* motion practice)
 survey research
 admissibility, 227
 advantages of, 225–26
 attorney participation in survey, 232
 causal inferences, 249–52
 comparing survey evidence to individual
 testimony, 228–29
 confidentiality
 ethical obligation of survey research
 organization, 265
 professional standards for survey
 researchers, 265
 protecting identities of individual
 respondents, 265–66
 surveyor-respondent privilege, not
 recognized, 266
 consumer impressions, 249–50
 data entry, 261
 design of survey, 231–33
 disclosure of methodology and results,
 263–64
 in general, 225–27
 in-person interviews, 252–53
 interviewer surveys, 257–59
 objective administration of survey
 procedures to minimize error and
 biases, 259
 sponsorship disclosure, 258–59
 selecting and training interviewers,
 257–58
 mail surveys, 254–55
 objectivity of, 232
 pilot testing, 265
 population definition and sampling, 235–
 41
 bias, 239; 240–41
 confidence interval, 237–38; 239
 nonresponse, 239–40
 probability sampling, 237–38
 random sampling, 237
 representativeness of sample, 239
 response rates, 239–40
 sampling frame (or universe), 235–37
 screening potential respondents, 241
 selecting the sample population, 237–
 39
 target population, 235
 purpose of survey, 231–33
 questions, 243–55
 ambiguous responses, use of probes to
 clarify, 248
 clarity of, 243–44
 consumer impressions, 250
 control group or question, 249–52
 filter questions to reduce guessing,
 244–46
 open-ended versus closed-ended
 questions, 246–47
 order of questions, effect of, 248–49
 pretests, 243–44

- relevance of survey, 231
 - reporting, 264–65
 - responses, grouping of, 261
 - survey expertise, 232–33
 - telephone surveys, 253–54
 - and torts, 228
 - use of surveys in court, 227–28
- Toxic Substances Control Act, 203; 205
- toxicology
- acute toxicity testing, 188
 - additive effect, 211
 - animal research, extrapolation from, 191–92
 - antagonism, 211
 - association (*see* general and specific causation in this entry)
 - chemical structure of compound, 203
 - confounding factors, 210
 - dose-response relationship, 188
 - and epidemiology, 194–95
 - expert qualifications
 - advanced degree, 197–98
 - basis of toxicologist's expert opinion, 197
 - board certification, 198–99
 - other indicia of expertise, 199–200
 - physician, 197–98
 - professional organization, membership in, 198–99
 - in general, 185–95
 - general causation, 201–04
 - animal testing, extrapolation from, 201–02
 - biological plausibility, 204
 - chemical structure of compound, 203
 - in general, 201
 - in vitro tests of compound, 203
 - organ specificity of chemical, 202–03
 - good laboratory practices, 192–93
 - patient's medical history
 - competing causes (confounding factors) of disease, 210
 - different susceptibilities to compound, 211–12
 - effect of multiple agents, 211
 - evidence of interaction with other chemicals, 211
 - in general, 209–12
 - laboratory tests as indication of exposure to compound, 210
 - when data contradicts expert's opinion, 212
 - potentiation, 211
 - regulatory proceedings, 186
 - research design
 - in general, 186–91
 - in vitro, 191
 - in vivo, 187–91
 - maximum tolerated dose, 189–91
 - no observable effect level, 188–89
 - no threshold model, 189
 - safety and risk assessments, 192–94
 - specific causation, 205–08
 - absorption of compound into body, 206
 - excretory route of compound, 207
 - exposure, 206
 - metabolism, 207
 - no observable effect level, 208
 - regulatory standards, 205–06
 - synergistic effect, 211
 - torts, 186
- trademark litigation
- and survey research, 235; 236; 237; 263
- videotape evidence, exclusion of, 115
- visual evidence, admissibility of, 115–17
- witnesses (*see* expert witnesses; *see also* lay opinion)