Cambridge University Press 978-1-108-76680-7 — Essential Epidemiology 4th Edition Index <u>More Information</u>

# Index

45 and Up Study, 104

absolute risk increase (ARI), 132-3 absolute risk reduction (ARR), 132-3 accuracy assessing in measurement, 179 cause of death. 75 diagnostic tests, 336 of measurements, 172 screening tests, 329 see also precision active surveillance, 268 acute laryngitis, and antibiotics, 246 administrative health systems, 68 adult mortality rates, 51 age and body mass index (BMI), 146, 148 distributions, 50 age-specific rates, 43-4 age-standardised rates, 45-6, 50 agents of infection, see infectious agents air pollution, and asthma, 149 airborne transmission, 289 alcohol, and lung cancer, 187-9, 190 alpha (a) errors, 147 alternative hypothesis, 147 American Institute of Cancer Research, 260 analogy, in evaluating causation, 241 analytic studies, 21, 93, 161, 173 antibiotics, and acute laryngitis, 246 ascertainment bias, 166 aspirin and colorectal cancer, 238 and endocarditis, 40, 124 associations aspects to consider, 238-42 between outcomes and exposure, 147 and chance, 147-8 in clinical epidemiology, 129 confounding, 192, 194 continuous measures, 139 looking for, 121-2 missed true, 151-3 strength of, 123, 151, 238 versus causation, 233-5 see also measures of association

asthma and air pollution, 149 and body mass index (BMI), 216 - 17and smoking, 32 atrial fibrillation, and statin use, 219 attack rates, 4, 36, 287 see also incidence proportion (IP) attributable burden of disease, 315 attributable fractions (AF), 131-2, 136-7,315 see also population attributable fractions (PAF) attributable proportion, see attributable fractions (AF) attributable risk percent, see attributable fractions (AF) attributable risks (AR) calculation, 131, 132 caution regarding, 138 clinical epidemiology, 132 interpreting, 132-3 measures, 129-38 population, 133-4 strengths and uses, 139 versus relative risks, 138-9 Australian National Health Survey, 80 Australian Ovarian Cancer Study, 107 autism spectrum disorders, and flea treatment, 217 autonomy and ethics, 113 autopsies, verbal, 72 Avon Longitudinal Study of Parents and Children (UK), 103 background rates, 130 background risks, 130 Beecher's Report, 114 Behavioral Risk Factor Surveillance System (BRFSS), 274 Belmont Report, 114 beneficence, 113 Berkson's bias, 166 β-carotene, 355-6 beta (β) errors, 147, 151-2 bias when evaluating screening programs, 341-5 with hospital controls, 108

and misclassification, 173 see also specific types e.g. selection bias bicycle helmets, and head injury, 137,207 big data, 86–7 bioaerosols, 289 biological plausibility, 240 BIOSIS database, 247 birth defects, and thalidomide, 107 birthweight, and breast cancer, 254-5 blinding, 97 blood pressure, and cardiovascular disease, 309-10, 312 blood transfusion, and Creutzfeldt-Jakob disease (CJD), 214 body mass index (BMI) and age, 146, 148 and asthma, 216-17 and diabetes, 313 and type-2 diabetes, 239-40 brain cancer, and mobile telephones, 254-5 breast cancer and birthweight, 254-5 cases at Toowong ABC, 298 control of, 305, 306 screening for, 261, 330, 341-2, 343, 348 British Doctors Study, 15, 21, 102, 103, 138-9 burden of disease, 135, 267, 305, 314-16 Canadian Task Force on Preventive Health Care (CTFPHC), 250cancer disease registries, 75 standardised mortality ratios (SMR), 84 see also specific types e.g. breast cancer cancer epidemiology, 4 cardiovascular disease (CVD) and blood pressure, 309-10, 312 and disability-adjusted life years (DALYs), 233-2 mortality rates, 319 risk factors, 307-8

interviewer or observer, 110, 178

Cambridge University Press 978-1-108-76680-7 — Essential Epidemiology 4th Edition Index <u>More Information</u>

#### 410 Index

cardiovascular disease (CVD) (cont.) standardised mortality ratios (SMR), 84 terms used, 45 see also ischaemic heart disease (IHD) case-cohort studies, 105 case-control studies, 106-10 attributable fractions (AF), 136-7 and confounding, 187-9 control selection, 108 detection bias, 166 eligibility and exclusion criteria, 168 estimating incidence, 126 and hospital controls, 108-9 interviewer or observer bias, 110 low response rates, 163-4 matching, 198, 199 measurement errors, 173, 181 nested, 105, 106 odds ratios, 126-7 recall bias, 110 and screening programs, 347 selection bias, 161, 169 case-crossover studies, 110 case definitions, 29, 276, 292 case fatality ratio (CFR), 50, 61 case-finding, 327 case-reference (or case-referent) studies, see case-control studies case reports, 67 case series, 67 categorical data, 139 causal diagrams, see directed acyclic graphs (DAGs) causal model for infectious diseases, 287 causal reasoning, 235 causation, 230 considering, 232 counterfactual (potential) outcomes model of, 236-7 definition, 230-1 evaluating, 235, 236, 238–42 evidence for outbreaks, 295-6 identifying, 16 models of, 231-2, 237 versus association, 233-5 cause of death accuracy, 72, 75 coding, 70, 72, 73, 75 census data, 68 Centers for Disease Control and Prevention (CDC), 291 cervical cancer, 346-7, 360 chance, 147-8, 220 chicken pox, 270 child mortality rates, 51 cholera, 12-14, 22-4, 233-5 cholesterol levels, and ischaemic heart disease (IHD), 310 ciguatera, 298 civil registration systems, 68, 70-1

clinical epidemiology, 5, 124, 128-9, 132 clinical significance, 155-6 versus statistical significance, 155-6 clinical trials, 40, 95, 162 see also randomised controlled trials (RCTs) cluster randomised controlled trials, 99 clusters definition, 284 historical, 297 investigation of, 297-8 non-infectious diseases, 296-9 and surveillance, 267 see also outbreaks Cochrane Central Register of Controlled Trials, 247 Cochrane Collaboration, 219, 256, 360 coherence, in evaluating causation, 241 cohort studies, 100-3 case-cohort studies, 105 compared to randomised controlled trials, 101 and confounding, 192 definition, 36 historical 103 loss to follow-up, 162, 166, 170 matching, 198 measurement errors, 173 notable examples, 101, 103 recall bias, 102 selection bias, 161 statin use, 219 colorectal cancer, and aspirin, 238 common-source outbreaks, 293 communicable diseases, see infectious diseases communication of risk, 291 community trials, 99 competing causes, 36 complex systems, 362-3 component causes, 230, 232 conditional logistic regression, 202 confidence intervals described, 148-50 formulae, 377-8 and p-values, 150-1, 153 confidentiality, 87 confounders characteristics of, 189-90 determining, 192-5 confounding, 24 and associations, 192, 194 and case-control studies, 187-9 checking for in reports, 217-20 and cohort studies, 192 control by data analysis, 200-6 controlling by matching, 198-200 controlling by randomisation, 197 controlling by restriction, 197 controlling by stratification, 200-2 definition, 186 effects of, 190-2 by indication, 197, 219

multivariable modelling, 202–4 and population attributable fractions (PAF), 134 residual, 204 and size of studies, 200 and study design, 195-200 versus effect modification, 201 consistency, in evaluating causation, 238, 256 contamination, 99 continuous measures, 139, 173 contraception, oral benefits versus harm, 308 and coronary heart disease (CHD), 192 - 4and ovarian cancer, 125-6 and thromboembolism, 166 control event rate (CER), 40, 129 control groups hospital controls, 108-9 population controls, 108 selection, 106, 108, 166 convenience samples, 77 coronary angiography, and pressure bandages, 128-9, 132 coronary heart disease (CHD) British Doctors Study 138-9 and contraception, oral, 192-4 disease registries, 76 see also ischaemic heart disease (IHD) correlation studies, see ecological studies counterfactual approach, 95 counterfactual (potential) outcomes model of causation, 236-7 Cox proportional hazards regression, 202 Creutzfeldt-Jakob disease (CJD), and blood transfusion, 214 critical appraisal, 211 critical point in disease process, 327 cross-level bias, 41 cross-sectional studies, 110-12 bias in. 162 definition, 36, 81 depression risk factors, 218 odds ratios, 128 reverse causality, 111 selection bias 111 crossover trials, 95, 98 crude rates, 42-3, 366 cumulative incidence, see incidence proportion (IP) data big, 86-7 experimental, 241 surveillance, 276 synthesis, 360 variety, 87 velocity, 87 veracity, 86

volume of, 86

see also health data

Cambridge University Press 978-1-108-76680-7 — Essential Epidemiology 4th Edition Index <u>More Information</u>

> data linkage, 104-5, 168 death competing causes, 36 establishing cause of, 72, 73, 75 see also mortality rates death registers, 71, 73 Declaration of Helsinki, 114 deduction. 235 demographic and health surveys, 68.81 demographic surveillance systems, 68,72 denominators, 32 density sampling, 127 depression risk factors, 217 descriptive epidemiology, 7, 35, 66, 359 descriptive statistics, 16 descriptive studies assessing, 223 by person, place and time, 7, 17-21,292 selection bias, 161 detection bias. 166 diabetes and body mass index (BMI), 239-40, 313 in China 80 gestational, 29 and obesity, 140-1 trends in mortality, 74 diagnostic studies, 112 diagnostic tests accuracy, 336 compared to screening tests, 335 predictive values, 336 sensitivity, 336-9 specificity, 336-9 diethylstilboestrol (DES) exposure, and vaginal cancer, 151 difference measures, 129-38 differential misclassification, 175-6, 181, 215, 216 digital surveillance, 271-3 direct standardisation, 45, 50, 366-7 direct transmission, 289 directed acyclic graphs (DAGs), 190, 191, 195-6 disability-adjusted life years (DALYs), 2, 58-9, 232, 233 disability-free life expectancy, 55-6 disease attributable and avoidable burden, 314 - 16burden of, 135, 267, 305, 314-16 control. 303, 305 diagnosis, 28, 326, 329 duration of, 34-5 elimination of, 268 endemic, 286 measures of, 28-30 natural history of, 16, 326 notifiable, 41, 76 process, 326-7 prognosis, 16

see also incidence; prevalence (P); prevention disease registries, 68, 75-6 Doll, Sir Richard, 14, 21 dose-response relationships, 239-40 dynamic simulation modelling, 362 Ebola virus outbreak, 266, 267, 291 eco-epidemiology, 4 ecological fallacy, 41, 86 ecological studies, 54, 85-6, 113 effect measures, see measures of association effect modification, 201 electronic medical records, 76 eligibility criteria, 167 endemic diseases, 286 endocarditis, and aspirin, 40, 124 epidemic curves, 13, 293, 294 Epidemic Intelligence Service (EIS), 291 epidemics definition, 6-8, 284, 286 point- or common-source, 293-4 propagative, 293 see also outbreaks epidemiology definition, 2-3 dimensions of, 16-21 historical beginnings, 10-15 purposes, 15-16 role of. 2 subdisciplines, 4-6 errors assessing effects of, 179-81 control of, 178-9 limiting, 357 random, 171-2, 176, 180 random sampling, 146-7, 161, 169 sources of, 160-1, 177-8 systematic, 161, 172-3, 175 type I or alpha (α), 147 type II or beta (β), 147, 151–2 see also measurement errors Escherichia coli infection, 283 ethics, 113-15, 152 event-based surveillance, 268-9, 271 - 2event rates, 129. see also incidence proportion (IP) evidence classification, 249, 256 excess rates, 130 excess risks, 130 exchangeability, 121, 131 exchangeable groups, 95, 96 exclusion criteria, 167 expected years of life lost (EYLL), 56 experimental data, in evaluating causation, 241 experimental event rate (EER), 40, 129

and screening, 328-9

Index

411

external comparisons, to assess selection bias, 169 external validity, 162, 222 see also generalisability false negative test results, 330 false positive test results, 330 Farr, William, 11, 66, 233 fetal death rates, 51, 52 fetal death ratios, 51, 52 flea treatment, and autism spectrum disorders, 217 fluoridation, 99 follow-up studies, see cohort studies fomites, 289 food frequency questionnaires, 174-5,179 force of morbidity, 38 forest plots, 250 Framingham Heart Study, 101-2 funnel plots, 248 Gapminder World, 81 generalisability (external validity), 103, 112, 162, 222 gestational diabetes, 29 Global Cancer Observatory, 81 global health indicators, 51-61 Global Health Observatory, 81 glossary, 381–92 Goldberger, Joseph, 14 GRADE (Grading of Recommendations. Assessment, Development and Evaluation) criteria, 256 Graham, Evart, 14 Graunt, John, 11 H1N1 influenza virus, 284 H5N1 avian influenza, 271 haemolytic uraemic syndrome, 283 harm from screening programs, 348, 349 hazard ratios, 198, 202 head injury, and bicycle helmets, 137.207 health-adjusted life expectancy (HALE), 2, 57-8 health data morbidity, 68, 75-87 mortality, 68-72 record linkage, 104-5, 168 use of existing, 81-6 health and demographic surveillance systems (HDSS), 68, 72 health expectancy measures, 56 health gap measures, 56 health records, 68, 76-7, 104 healthcare recorders, 268 HealthMap, 273 healthy worker effect, 163 heart disease, and energy intake, 191, 192, 194, 196

Cambridge University Press 978-1-108-76680-7 — Essential Epidemiology 4th Edition Index <u>More Information</u>

#### 412

Index

Helicobacter pylori, and stomach cancer, 85-6, 113, 212, 240, 241 - 2hepatitis A, and tomatoes, 296 hepatitis rates, 34 heterogeneity, assessing, 250-1 Hill, Sir Austin Bradford, 14, 21, 236.240 Hippocrates of Cos, 10, 113 historical cohort studies, 5, 102 HIV/AIDS prevalence and incidence rates, 30 - 3screening for, example, 332-5 hospital administrative systems, 68, 76,77 hospital controls, 108-9 hosts of infection, 288 human papillomavirus (HPV) infection, 360 human research ethics guidelines, 114 Hume, David, 235 hypothesis tests, 147, 148, 153, 154 inception cohort, 105 incidence, 33 estimating, 126 and prevalence, 30-3 standardised, 45-6 and treatments, 35 incidence density, see incidence rates (IR) incidence proportion (IP) calculation, 36, 39-40, 61, 129 in clinical epidemiology, 129 in clinical trials, 40 and incidence rates, 37, 38 and lifetime risk, 47 versus incidence rate, 38 incidence rates (IR), 41 age-specific, 43-4 calculation, 34, 37, 42, 61 crude, 42-3 estimating, 135 formulae for standard deviation, 378 and incidence proportion (IP), 37,38 and prevalence, 34-5 incident cases, 33 incubation periods, 288 indicator-based surveillance, 268, 270 Indigenous Australians, mortality rates, 17-18 indirect standardisation, 48, 50, 372-3 indirect transmission, 289 individual risk, versus population risk, 308-11 induction, in causation, 235 induction period, 327 infant mortality rates, 51, 53, 54 infection, 287

infectious agents, 287-8 hosts, 288 transmission, 288-9 infectious disease epidemiology, 4, 285 infectious diseases causal model, 287 challenges of, 286 definition, 285 distribution, 283 and environmental factors, 290 and epidemiology, 285-6 zoonotic origins, 286 see also outbreaks infectivity, 287 infestation, 287 influenza immunisation rates, telephoning patients, 124-5, 131 influenza vaccination, and narcolepsy in children, 274 informants, key, 202 information bias, see measurement bias information errors, 171-3 see also misclassification injury epidemiology, 4 injury risk, and child socioeconomic status (SES), 162 Institute for Health Metrics and Evaluation (IHME), 81 instrumental variables (IV), 205 intensity of infections, 287 intention to treat analysis, 197, 342 interaction, see effect modification intermediaries, 189 internal validity, 162, 212-13, 220-1 International Agency for Research on Cancer (IARC), 259-60 International Classification of Diseases, 70, 75 International Health Regulations (WHO), 271, 291 International Network for the Demographic Evaluation of Populations and their Health (INDEPTH), 72 International Studies of Infarct Survival, 96 interval case, 345 intervention studies, 21, 95-100. 162.166 interventions evaluating preventive, 319 evaluation, 16 preventive, 316-18 and surveillance, 267 interviewer bias, 110, 178 ischaemic heart disease (IHD) age-specific mortality rates, 43 age-standardised rates, 45 and cholesterol levels, 310 crude mortality rates, 42, 43, 45 lifetime risk. 370-1 mortality rates, 19 and sexual activity, 110

366-7 standardised mortality ratio (SMR), 372-3 and streptokinase, 153 terms used, 45 see also cardiovascular disease (CVD) kidney disease, and phenacetin, 107 Koch, Robert, 285 Koch's postulates, 285 laryngitis, and antibiotics, 246 latent periods, 288, 327 lead time, 329, 341, 343 lead-time bias, 343, 344 Legionnaires' disease, 290 length bias, 345 life expectancy, 54-5, 374 life table, 11, 55, 56, 374 lifecourse epidemiology, 6, 94, 362 lifetime risk, 47, 370-1 likelihood ratio (LR) test, 339 LILACS database, 247 Lind, James, 93 listeria 289 literature appraising, 249-50 searches, 247-8 logarithmic scale, 20, 251 longitudinal studies, see cohort studies loss to follow-up, 41, 97, 103, 162, 166, 170 Louis, Pierre Charles-Alexandre (1787-1872), 11 low response rates, 163-5 lung cancer age-standardised rates, 82-3 and alcohol, 187-9, 190 British Doctors Study, 15, 21, 102, 103, 138-9 control of, 305-6 lifetime risk, 47 mortality rates, 6, 83, 316 and smoking, 15, 21 mammographic screening, 261, 330, 341-2, 343, 348 Mantel-Haenszel method for calculating pooled odds ratios, 379 - 80mass gathering surveillance, 273 matched odds ratios, 199 matching, 198-200 maternal mortality ratios, 51 measurement bias, 97, 171, 181, 215 - 17measurement errors, 171-3 assessment of, 179-81 case-control studies, 181 checking for in reports, 215-17 control of, 178-9

standardised mortality rates,

Cambridge University Press 978-1-108-76680-7 — Essential Epidemiology 4th Edition Index <u>More Information</u>

> effects of, 173-7 overview, 180 reducing, 358-9 sources of, 177-8 see also misclassification measures of association difference measures, 129-38 ratio measures, 123-9 measures of disease, 28-30 in practice, 35-41 summary of, 61 using routine data, 41-7 see also incidence; prevalence (P) mediation analysis, 190 MEDLINE database, 247 Mendel, Gregor, 206 Mendelian randomisation (MR), 206 menopausal hormone therapy trial, 219 mesothelioma, 270 meta-analysis, 153, 252-3, 380 migrant studies, 84-5 Millennium Development Goals, 51,52 Million Death Study, India, 72 misclassification, 102, 171 and bias, 173 differential, 175-6, 181, 215, 216 non-differential, 173-5, 181, 215, 217 mobile telephones and brain cancer, 254-5 using for surveillance, 277 molecular epidemiology, 5 moral principles, 113 morbidity, force of, 38 morbidity data, 75-87 mortality, measures of, 41 mortality data, 68-72 challenges in using, 73-5 using, 42 mortality indicators, 51-4 mortality rates and age-specific incidence, 43-4 age-standardised rates, 45-6 all-cause, 7, 42, 46-7 cardiovascular disease (CVD), 319 crude, 366 and crude incidence, 42-3 Indigenous Australians, 17-18 ischaemic heart disease (IHD), 42, 43.45 lung cancer, 6, 83, 316 by person, place and time, 17-21 Russians, 7 standardised, 366-7 and standardised incidence, 45-6 trends in United States, 19-20, 74 tuberculosis (TB), 303-4 and veterans' health, 164 mortality ratios proportional, 50, 61 and standardised incidence, 48, 129

multiple logistic regression, 202 multivariable modelling, 202-4 n-of-1 trials. 98 narcolepsy in children, and influenza vaccination, 274 narrative reviews, 245 National Health and Nutrition Examination Surveys (NHANES), 79, 110 natural history of disease, 16 necessary causes, 198, 230 negative predictive values (NPV), 331 - 2negative test results, true and false, 330 neonatal mortality rates, 51 nested case-control studies, 105, 106 non-communicable disease reporting, 270 non-differential misclassification, 173-5, 181, 215, 217 non-infectious diseases, clusters, 296-9 non-maleficence, 113 non-randomised designs, 99, 346-8 non-responders, 165 notifiable disease systems, 68, 269 notifiable diseases, 41, 76 null hypothesis, 147 null values, 150 number needed to treat (NNT), 132 numerators, 32 Nuremberg Code, 113, 114, 115 Nurses' Health Study (US), 21, 102 nutritional epidemiology, 4, 355 obesity, and type-2 diabetes, 140-1 observational studies, 100-13, 206, 212 observer bias, 110, 178 occupational epidemiology, 5 occupational studies, 50 odds, 126 odds ratios (OR) approximating rate ratios, 127 approximating risk ratios, 127, 376 calculation, 125-7 case-control studies, 126-7 cross-sectional studies, 128 interpreting, 127 matched, 199 pooled, 188, 379 using 2×2 tables, 188 oesophageal adenocarcinoma, and smoking, 214-15 outbreaks common-source, 293 confirmation phase, 295 definition, 284 evidence of causation, 295-6 hypothesis-generation and testing phase, 294-5 identification phase, 292-4

#### Index

413

investigating steps, 291-2 management, 290-1 non-infectious diseases, 296-9 point-source, 293 propagative, 293 role of epidemiology, 284 and surveillance, 267 see also clusters ovarian cancer, and oral contraceptive pill, 125-6 p-values, 147 and confidence intervals, 150-1, 153 interpreting, 152-5 reliance on, 154 and statistical significance, 152, 154 pandemics, 284 parallel group trials, 98 participants, 102, 106, 162–3 see also selection bias passive surveillance, 268 pathogenicity, 287 pellagra, 14 per protocol analysis, 197 percentages, 32 perinatal epidemiology, 4 period prevalence, 32 person-time measures, 37 person-years, 37 pharmaceutical drugs, 268 pharmacoepidemiology, 108, 109 phenacetin, and kidney disease, 107 phenylketonuria, screening for, 328 philosophy, 235-6 Physicians' Health Study (US), 96 PICO (Participants, Interventions, Comparisons and Outcomes), 247 placebo, 97 placebo effect, 97 placebo groups, see control groups plausibility, in evaluation of causation, 240 point estimates, 148 point prevalence, 32 point-source outbreaks, 293 polio eradication, 277 poliomyelitis vaccine trial, 96, 224-5 pooled analysis, 253 pooled odds ratios, 188, 379 Popper, Karl, 235 population attributable fractions (PAF), 134-5, 136-7, 314 population attributable risk percent, see population attributable fractions (PAF) population attributable risks (PAR), 133-4 interpreting, 135 strengths and uses, 139 population risk, versus individual risk, 308-11

Cambridge University Press 978-1-108-76680-7 — Essential Epidemiology 4th Edition Index <u>More Information</u>

414

Index

populations at risk, 34, 39 defining, 166 standard, 46, 50, 368 stationary, 35 study, 50, 77 target, 77 whole, 133 positive predictive values (PPV), 331-2.340 positive test results, true and false, 330 post-test probability, 336 potential impact fraction (PIF), 315 potential years of life lost (PYLL), 56-7 power of studies, 146, 151-2 precision assessing, 179 and confidence intervals, 148 poor, 171, 172 predictive values diagnostic tests, 336 positive and negative, 331-2, 340 pressure bandages, and coronary angiography, 128-9, 132 pre-test probability, 336 prevalence (P) calculation, 33, 34, 39, 61 definition, 32 and incidence, 30-3 and incidence rates, 30, 34 prevalence odds ratios (POR), 128 prevalence ratios, 123, 125 prevalence surveys, 77 prevalent cases, 108, 112 prevention choosing strategy, 306 definition, 303 and epidemiology, 303, 305-7 evaluating interventions, 319 high-risk strategy, 311-12 interventions, 316-18 mass strategy, 312-13 'middle-road' strategy, 313 paradox, 320 and population attributable fractions (PAF), 314 population or individual level, 308-11 primary, 16, 303, 304 primordial, 304 scope of, 307-8 secondary, 303, 325 tertiary, 303 preventive trials, 95, 97 primary prevention, 16, 303, 304 primordial prevention, 304 privacy laws, 114 probability values, see p-values prognosis of disease, 16 prognostic studies, 105 Program for Monitoring Emerging Diseases (ProMED), 271

propagative outbreaks, 293 propensity scores, 205 proportional mortality ratios (PMR), 50.61 proportions, 48 prospective studies, see cohort studies PROSPERO register, 247 prostate cancer, screening for, 328 public health factors determining, 270 goals, 28 policy, 260-1 Public Health Emergency of International Concern (PHEIC), 271 public health epidemiology, 4 publication bias, 248 PubMed<sup>®</sup> database, 247 quality-adjusted life year (QALY), 57 quantitative bias analysis, 171, 180 random errors, 171-2, 176, 180 random sampling errors, 146-7, 161, 169 random selection, 96 randomisation, 96, 197, 206 randomised controlled trials (RCTs) compared to cohort studies, 101 follow-up, 97 interpreting results, 219 and interventions, 197 and screening programs, 346 selection bias, 98 study design, 95-8 translation of results, 319 rare disease assumption, 128 rate of change, 305 rate differences, 130-1 see also attributable risks (AR) rate ratios, 123, 127 rates, 48 ratio measures, 123-9 ratios, 48 reading reports assessing descriptive studies, 223 checking for confounding, 217-20 checking for measurement bias, 215 - 17checking role of chance, 220 checking for selection bias, 213 identifying research question, 212 internal validity, 212-13, 220-1 interpreting results, 219, 221-2 questions to consider, 211, 215, 217 study designs, 212 systematic approach, 211 see also systematic reviews recall bias, 102, 110, 175, 177 receiver operating characteristic (ROC) curves, 339 record linkage, 104-5, 168 recorders, 268

recruitment of participants, see selection bias reference groups, see control groups reference rates, 130 reference tests, 112 regression analysis, 202 relative measures, 123-9 relative risk increase (RRI), 124, 129 relative risk reduction (RRR), 129 relative risks, 4 in clinical epidemiology, 128–9 and confidence intervals, 150 and null value, 150 strengths and uses, 139 use of term, 128 versus attributable risks, 138–9 see also risk ratios relative survival rates, 50 reports guidelines for results, 224 see also reading reports research ethics, 114, 152 translation into practice, 354-62 research questions, 212, 247 reservoirs of infection, 287 residual confounding, 204 response rates, low, 165 restriction, to control confounding, 197 results graphing, 250 guidelines for reporting, 224 interpreting in reports, 221-2 translation to real world, 319 retrospective cohort study, see historical cohort studies reverse causality, 21, 102, 111 risk formulae for standard deviation, 378 lifetime, 47, 370-1 outbreak assessment tools, 291 population versus individual, 308-11 populations at, 34, 39 see also incidence proportion (IP) risk differences, 130, 131 risk factors, 19, 59, 101 risk ratios, 123-5 odds ratio as approximate, 127, 376 rounding, 33, 126 rumour surveillance, 271 sample size, 151 sampling, 78 sampling error (random), 146-7 see also chance; sample size SARS epidemic (2003), 50, 271, 286 screening, 325-50 aims of. 325-6 for bowel cancer, 329, 347 for breast cancer, 261, 330, 341-2, 343, 348

Cambridge University Press 978-1-108-76680-7 — Essential Epidemiology 4th Edition Index <u>More Information</u>

> for cervical cancer, 346-7 critical point, 327 definition of, 325 and disease, 328-9 and epidemiology, 326 for HIV, 332-5 negative consequences, , 348-9 for phenylketonuria, 328 for prostate cancer, 328 relationship to the disease process, 326 - 7versus case-finding, 327 see also screening programs; screening tests screening programs disease suitability, 328-9 evaluating, 340-1 lead-time bias, 343, 344 length bias, 345 negative consequences, 348-9 potential sources of bias in evaluation, 341-5 requirements, 328-36, 338 study designs for evaluation, 345-8 test requirements, 329-30 volunteer bias, 341-2 screening tests accuracy, 329 compared to diagnostic tests, 335 negative predictive values, 331-2 positive predictive values, 331-2, 340 requirements, 329-30 sensitivity, 329, 330-1 specificity, 329, 330-1 true and false negatives, 330 true and false positives, 330 scurvy, 93 secondary attack rate, 287 secondary prevention, 303, 325 see also screening selection bias (systematic sampling error) assessing effects of, 168-71 case-control studies, 161, 169 checking for in reports, 213 clinical trials, 162, 166 cohort studies, 161 control of, 166-8 cross-sectional studies, 111 definition, 161 descriptive studies, 161 evaluation of screening programs, 341-3 healthy worker effect, 163 and loss to follow-up, 162, 166 low response rates, 163-4 and random sampling errors, 146 randomised controlled trials (RCTs), 98 sources of, 162-6 sensitivity analysis for, 170 volunteer bias, 162-3 self-controlled case series, see case-crossover studies

sensitivity, of screening tests, 174. 329, 330-1, 336-8 sensitivity analysis, 170, 180, 213, 217 sentinel surveillance, 273 sexual activity, and myocardial infarction (heart attack), 110 shoe-leather epidemiology, 20 significance, see statistical significance Simpson's paradox, 186, 190 smallpox, 20 smoking and asthma, 32 and lung cancer, 14-15, 83, 138-9, 188, 190, 204, 233, 305-6, 316 and oesophageal adenocarcinoma, 214 - 15response rates, 165 and stroke incidence, 121-2, 130, 132, 133, 135 Snow, John, 12-14, 22-4 social epidemiology, 4, 94 socioeconomic status (SES), and child risk of injury, 162 specificity as factor in evaluating causality, 240 - 1of screening tests, 174, 329, 330-1, 336-8 standard populations, 46, 368 standardisation direct, 45, 50, 366-7 indirect, 48, 50, 372-3 standardised incidence ratios (SIR), 48, 50, 61, 372-3 standardised mortality ratios (SMR), 18, 48, 50, 61, 84, 372-3 statin use, and atrial fibrillation, 219 stationary populations, 35 statistical significance, 147-8, 152, 154, 155-6 stepped-wedge design, 99 stillbirth rates, 51, 52 stillbirth ratios, 52 stomach cancer, and Helicobacter pylori, 85-6, 113, 212, 240, 241 - 2stratification, to identity and control confounding, 188, 200-2 streptokinase, and heart attack mortality, 153 stroke incidence, and smoking, 121-2, 130, 132, 133, 135 study designs case-control studies, 106-10, 168 case-crossover studies, 110 cohort studies, 100-3 control of confounding, 195-200 cross-sectional studies. 110-12 eligibility and exclusion criteria, 167 ideal, 94-5, 212

#### intervention studies, 95-100 observational studies, 100-13 randomised controlled trials (RCTs), 95-8 screening program evaluation, 345-8 study populations, 50, 77 sudden infant death syndrome (SIDS) study, 107 sufficient causes, 230 suicide rates, 61, 111, 112, 203, 317-18 surveillance active, 268 case definition, 276 definition. 267 digital, 271–3 and epidemiology, 266 essentials, 275 event-based, 268-9, 271-2 indicator-based, 268, 270 key steps, 267 mass gathering, 273 passive, 268 rumour, 271 sentinel 273 syndromic, 276 types of, 268-74 undercount, 275-6 using mobile telephones, 277 surveillance data analysis, 276-8 collection, 276, 277 surveillance pyramid, 275 surveillance systems, 278 surveys, 77, 79 see also cross-sectional studies survival curves, 55 survival rates, 50 survival studies, 105 Sustainable Development Goals, 16, 51, 52, 76 syndromic surveillance, 276 system science approach, 362, 363 systematic errors, 161, 172-3, 174-7 systematic reviews, 245-56 appraising literature, 249–50 assessing heterogeneity, 250-1 assessing quality of, 256 and bias, 254-5 conclusions, 256 graphical display of results, 250 guidelines for, 245-6, 257 literature searches, 247-8 meta-analysis, 252-3 pooled analysis, 253 PROSPERO register, 247 publication bias, 248 summarising the data, 250-6 specifying research question, 247 studies for inclusion, 248, 253 validity of, 257 writing, 246

instrument choice, 178-9

Index

415

Cambridge University Press 978-1-108-76680-7 — Essential Epidemiology 4th Edition Index <u>More Information</u>



tables, 2×2, 124 target populations, 77, 78, 166, 169 telephoning patients, influenza immunisation rates, 124-5, 131 temporality, as factor in evaluating causality, 238 tertiary prevention, 303 Thai Cohort Study, 102 thalidomide, and birth defects, 107, 297 thromboembolism, and oral contraception, 166 Titanic Inquiry Project, 10, 202 tomatoes, and hepatitis A, 296 translation of research into practice, 354 - 5challenges, 356 improving measurement, 358-9 limiting error, 357 phases, 354 synthesis and integration, 360-2 transmission of infection, 288-9 true negative test results, 330 true positive test results, 330 tuberculosis (TB), mortality rates, 303 - 4Tuskegee syphilis study, 114

type I errors, 147, 151 type II errors, 147, 151-3 type-2 diabetes and body mass index (BMI), 239 - 40and obesity, 140-1 typhoid, 288 under-5 mortality rates, 51 undercount, 275-6 United Nations, 291 United States all-cause mortality rates, 46-7 trends in mortality rates, 19-20, 74 US Air Force Suicide Prevention Program, 317-18 US Community Guide, 259 US Physicians' Health Study, 96 US Preventive Services Task Force (USPSTF), 250, 258-62, 328, 346 vaginal cancer, and diethylstilboestrol

(DES) exposure, 151, 260, 297 validity external, 162, 222 internal, 162, 212–13, 220–1

of systematic review, 257 verbal autopsies, 72 veterans' health, and mortality rates, 164 virulence, 287 vital statistics, 68-72 vitamin A, and childhood mortality, 96 volunteer bias, 162-3, 341-2 Women's Health Initiative (WHI), 219 World Cancer Research Fund, 260, 319 World Health Organization (WHO), 2, 46, 51, 56, 76, 266, 271, 277, 289, 291, 314 Global Cancer Observatory, 81 Global Health Observatory, 81, 83 International Classification of Diseases, 70, 75 writing papers, 223-4 Wynder, Ernest, 14

years of life lost (YLL), 56-7

zoonotic origins of infections, 286