

INDEX

A

- Abbreviations, xxvii–xxxii
 “ABCDE” algorithm, 116
 Abortions, septic
 Brucella and, 162–163
 ACAM2000 vaccine, 115, 631–632
 ACB. *See Acinetobacter baumannii*
 Acellular vaccines, 235
Acinetobacter baumannii
 antibiotic resistance, 328
 characterization and identification of source, 327–328
 epidemiological consultation, 324–327
 genetic analysis, 327–328
 historical perspectives, 322–324
 inclusion in ESKAPE pathogens, 322, 328–332
 molecular analysis, 327–328
 strain collection and sampling, 327
 U.S. Military Health System response, 328–332
 Acronyms, xxvii–xxxii
 Active immunization
 alphavirus encephalitides, 498–501
 Acute respiratory distress syndrome, 663–664
 Adjuvants, vaccines, 831–832
 Advanced Trauma Life Support, 110, 116, 117
 Advisory Committee on Immunization Practices, 141
 Aerobiology
 biological aerosol exposure systems, 860–864
 clinical applications in the U.S., 857–860
 conceptual basis of, 857
 dosimetry, 863
 exposure chambers, 862
 exposure systems, 860–862
 generators, 861–862
 Henderson apparatus, 861
 monitoring and control, 862–863
 offensive biological development in the U.S., 857–860
 overview, 856–857
 parameters impacting aerosol dosimetry, 863–864
 sampling, 862
 Aerosol dosimetry, 863–864
 Afghanistan
 Acinetobacter infections, 322, 323, 324–327
 Al Qaeda biological warfare program, 15
 Q fever outbreak, 307
 ricin as biological weapon research, 376
 Aflatoxins, 443, 445
 Africa
 Chikungunya outbreak, 674
 Ebola virus epidemic, 677–678
 African milk bush, 79
 Agency for Healthcare Research and Quality, 329
 Agent Orange, 79
 Agent X, 338
 Agglutination tests, 165
 Agricultural terrorism, 78–80
 Air Force field laboratories, 706
 Al Qaeda
 biological warfare program, 15, 16–17
 Alcide EXSPORE, 883
 Alibek, Dr. Kenneth, 254, 339
 Alibekov, Colonel Kanatjan, 254, 339
 Alphavirus encephalitides
 active immunization, 498–501
 antigenicity, 483–486
 clinical disease, 492–496
 diagnosis of, 492–496
 differential diagnosis of, 495–496
 eastern equine encephalitis, 484–485, 493–494
 epidemiology and ecology, 486–488
 genetic relationships, 483–486
 historical perspectives, 481–483
 immune effector mechanisms, 496–497
 immunoprophylaxis, 496–501
 medical countermeasures, 773–776
 medical management, 496
 passive immunization, 497–498
 pathogenesis, 490–492
 prevention of, 496
 replication of, 488–490
 significance of, 482–483
 therapeutics, 501
 Venezuelan equine encephalitis, 483–484, 485, 492–493, 773–774
 virion structure, 488–490
 western equine encephalitis, 484, 485–486, 494–495
 American Biological Safety Association, 889–890
 Aminoglycoside toxicity
 differentiating from botulism, 343
 Aminoglycosides
 brucellosis treatment, 166–167
 AML. *See* Area Medical Laboratory
 Amnesic shellfish poisoning
 description of toxin, 467–468
 diagnosis of, 468–469
 inhalation-acquired disease, 468
 mechanism of action, 468
 medical management, 469
 oral ingestion, 468
 signs and symptoms, 468
 Amoxicillin
 anthrax treatment, 140
 glanders treatment, 204
 melioidosis prophylaxis, 236
 “AMPLE” history, 117
 Anaplasmosis, 654–655
 Angel’s trumpet, 449
 Angiotensin-converting enzyme inhibitors, 417
 Animal and Plant Health Inspection Service, 80, 897–899, 902–904
 Animal care, 888–889
 Animal disease models, 186–189, 382–384, 406, 587, 888–889
 Animal diseases
 African milk bush attack, 79
 alphavirus encephalitides, 481–501
 anthrax attacks by Germany in 1915–1916, 43–44, 78
 Clostridium perfringens diseases, 362–367
 coxiellosis, 310
 deaths as indicator of biological agent attack, 40
 filoviruses, 580
 foot and mouth disease, 78–79
 glanders, 186–189, 191–193
 Hendra virus, 549, 552–553, 669
 Nipah virus, 549–552, 553–554, 669–670
 occurring simultaneously with human disease, 41
 Animal Efficacy Rule, 272, 931–932
 Animal poisons, 422
 Anthrax
 accidental release of, 49–50, 130
 active immunization, 140–142
 attacks by Germany in 1915–1916, 43–44, 78
 attacks in US, 2001, 47–48, 130

- Aum Shinrikyo cult attacks, 13, 46–47
 bioterrorism attacks, 13–15
 characteristics of organism, 131–132
 clinical disease, 135–138
 cutaneous, 135–136
 diagnosis of, 138–139
 epidemiology of, 132
 foodborne, 72
 gastrointestinal, 138, 650
 historical perspectives, 130–131
 incidence in the US, 132
 inhalational, 136–137
 medical countermeasures, 752, 754, 757–761
 meningitis, 137
 oropharyngeal, 138
 pathogenesis, 132–135
 prophylactic treatment after exposure, 140, 760–761
 Russian epidemic, 9
 treatment of, 139–140
 vaccine side effects, 142
 vaccines, 10, 113, 114, 753–758
 WHO surveillance and control guidelines, 140
 Anthrax vaccine adsorbed, 754, 757–758
 Anthrolysin O, 135
 Antibacterial monoclonal antibodies, 837–839
 Antibiotic resistance diseases, 655–656
 Antibiotic susceptibility testing, 727
 Antibiotics
 Animal Efficacy Rule, 272
 anthrax treatment, 139–140
 bacterial disease treatment, 759–760
 brucellosis treatment, 166–167, 768–769
 Clostridium perfringens treatment, 363
 glanders treatment, 202–204, 766–767
 melioidosis treatment, 233–234, 766
 multidrug-resistant bacterial infections, 328
 plague treatment, 272, 765
 Q fever, 771–772
 tularemia treatment, 292–294, 763–764
 Antibodies
 antibacterial monoclonal antibodies, 837–839
 antibody generations, 832–835
 antitoxin monoclonal antibodies
 antiviral monoclonal antibodies, 839–842
 biodefense development, 832–842
 development of new therapeutic formats, 832–835
 ricin treatment, 388
 Anticholinergic plants, 450
 Anticrop agents
 produced by the US military, 5
 Anticrop terrorism, 79
 Antigen-presenting cells, 404–406
 Antigenic shift, 658
 Antihypertensives, 417
 Antimicrobial Resistance Monitoring and Research Program, 331–332
 Antimicrobial susceptibility testing, 727
 Antitoxin monoclonal antibodies, 835–837
 Antitoxins
 C. botulinum pre- and postexposure prophylaxis, 347
 for *C. botulinum*, 345–346
 for *Clostridium perfringens*, 363
 Antivenoms, 432
 Antiviral agents
 hemorrhagic fever-causing mammarenaviruses, 531–532
 smallpox, 787–788
 viral hemorrhagic fevers, 790–791
 Antiviral monoclonal antibodies, 839–842
 Aquariums
 palytoxin exposure, 471–472
 Arachnids, 419–420
 ARDS. *See* Acute respiratory distress syndrome
 Area Medical Laboratory, 117, 705
 Argentinian hemorrhagic fever, 520, 526, 528, 530
 Armed Forces Health Surveillance Center, 329
 Armed Forces Medical Policy Council, 921
 ARMoR. *See* Antimicrobial Resistance Monitoring and Research Program
 Army field laboratories, 705
 Army Public Health Command, 324
 Army Techniques Publication, 716
 Army Techniques Publication No. 5-19, 95
 Arthritis
 brucellosis and, 164
 Asahara, Shoko, 46, 339
 Asia
 Chikungunya outbreak, 674
 melioidosis incidence, 227
 plague pandemic, 251
Aspergillus, 76
 Association for Assessment and Accreditation of Laboratory
 Animal Care, 889
 Association of Professionals in Infection Control and Epidemiology, 329
 ATLS. *See* Advanced Trauma Life Support
 ATP-binding cassette proteins, 190–191
 Aum Shinrikyo cult
 bioterrorism attacks, 13, 46–47
 C. botulinum research program, 72, 339
 Aureomycin
 glanders treatment, 204
 Australia
 melioidosis studies, 233–234
 paramyxovirus infections, 669
 Q fever outbreak, 306
 Automated identification systems, 724–727
 Autotransporter proteins
 glanders virulence mechanism, 190–191
 plague virulence factor, 263
 Autumn crocus, 447
 Avian influenza A virus, 19–22, 657–660, 661–662
 Avian influenza H5N1 virus, 662–663
 Avian influenza H7N9 virus, 663–664
 Azithromycin
 glanders treatment, 204
- ## B
- Bacillus aerogenes capsulatus*, 362
Bacillus anthracis
 accidental release of, 49–50, 130
 active immunization, 140–142
 attacks by Germany in 1915–1916, 43–44, 78
 attacks in US, 2001, 47–48, 130
 Aum Shinrikyo cult attacks, 13, 46–47
 bioterrorism attacks, 13–15
 characteristics of, 131–132
 confirmatory tests for, 131–132
 cutaneous anthrax, 135–136
 diagnosis of, 138–139
 epidemiology of, 132
 foodborne, 72
 gastrointestinal anthrax, 138, 650
 historical perspectives, 130–131
 inhalational anthrax, 136–137

- medical countermeasures, 752, 754, 757–761
- meningitis, 137
- oropharyngeal anthrax, 138
- pathogenesis, 132–135
- prophylactic treatment after exposure, 140, 760–761
- Russian anthrax epidemic and, 9
- treatment of, 139–140
- vaccine for US military, 10
- vaccines, 10, 113, 114, 753–758
- Bacillus cereus*, 132, 134
- Bacillus welchii*, 362
- Bacterial culture techniques
 - glanders, 198–199
 - tularemia, 293
- Bacteriophages, 202
- Baghdad, Iraq
 - Acinetobacter* infections, 325–326, 328
- BALB/c mice, 186, 188, 205
- Balkengrippe. *See* Q fever
- Bangladesh
 - Nipah virus outbreak, 553–554, 670
- BAT, 345
- Bats
 - influenza viruses in, 664–666
- BCA agar, 199
- BCX4430, 791
- Bedbugs
 - as plague vector, 256–257
- Bee venom, 420, 421
- Belladonna, 449
- Belladonna toxicity
 - differentiating from botulism, 343
- Bergendorff, Roger, 16
- Beta-bungarotoxin, 367
- Biochemical identification, 199
- Biocrimes, 12
- Biodefense and Pandemic Vaccine and Drug Development Act
 - Renewal of 2011, 933
- Biofire Defense FilmArray, 702
- Biological aerosol exposure systems, 860–864
- Biological agents. *See also* specific agents by name
 - accidental release of, 49–50
 - biocrimes, 12
 - biological surety, 896–911
 - biosafety levels, 122
 - characteristics of, 742
 - consequences of, 96–98
 - critical agents for health preparedness, 113
 - delivery systems developed by Iraq, 11
 - disarmament, 17–18
 - dual use research of concern, 19–22
 - early use of, 2–3
 - hospital infection control precautions, 121
 - the Iranian program, 12
 - the Iraq program, 10–11
 - the Libyan program, 12
 - the North Korean program, 12
 - pan-hazard preparedness, 17–24
 - produced by the US military, 5
 - prophylaxis against diseases caused by Category A agents, 119
 - regulated biological select agents and toxins, 703
 - risk assessment systems, 95
 - the South African program, 11–12
 - the Soviet program, 8–10
 - study of natural outbreaks for potential bioweapon use, 50–54
 - the Syrian program, 12
 - therapy of diseases caused by Category A agents, 119
 - the US program, 4–8
 - use during the World Wars, 3–4
- Biological and Toxin Weapons Convention, 375
- Biological Defense Research Program Laboratories, 888
- Biological Incident Annex, 94, 98
- Biological Integrated Detection System, 112
- Biological Personnel Reliability Program, 898, 901, 905–908
- Biological safety. *See* Biosafety
- Biological safety cabinets, 860
- Biological select agents and toxins
 - biosafety, 904–905
 - biosecurity, 908–910
 - centralized management of, 901
 - control of, 898–899
 - identifying, 904
 - incident response and emergency management, 910–911
 - inventory and accountability, 900–901
 - inventory audits, 901–902
 - inventory discrepancies, 911
 - list of Tier 1 agents and toxins, 898
 - permissible toxin amounts, 903
 - personnel reliability, 905–908
 - registration for possession, use, and transfer of, 899
 - reporting theft, loss, or release of, 903–904
 - restricted experiments, 904
 - sample criteria for retaining or destroying, 901
 - security breaches, 911
 - security risk assessment, 900
 - theft, loss or release of, 910
 - transfers, 902–903
- Biological surety
 - biological select agent and toxin transfers, 902–903
 - biological select agents and toxins inventory and accountability, 900–901
 - biological select agents and toxins inventory audits, 901–902
 - biosafety, 904–905
 - biosecurity, 908–910
 - centralized management of long-term biological select agents and toxins, 901
 - control of biological select agents and toxins, 898–899
 - identifying select agents and toxins, 904
 - incident response and emergency management, 910–911
 - information security, 909–910
 - international rules and treaties to limit or ban biological weapons use, 896
 - inventory discrepancies, 911
 - operational security, 909
 - overview, 897–898
 - personnel reliability, 905–908
 - personnel security, 909
 - physical security, 909
 - registration for possession, use, and transfer of biological select agents and toxins, 899
 - reporting theft, loss, or release of biological select agents and toxins, 903–904
 - restricted experiments, 904
 - security breaches, 911
 - security risk assessment, 900
 - theft, loss or release, 910
- Biological Surety Program, 888
- Biological terrorism. *See* Bioterrorism
- Biological warfare
 - impact of advanced molecular techniques on epidemiology of, 58–59
- Biological Weapons Convention, 8, 11, 17–18, 179, 338, 375, 897
- Biologics Control Act, 926
- Biomarkers, 716–718

- Biopreparat, 9, 10
- Biosafety
- assessing individual risk, 876–877
 - assigning agents in risk groups, 872–874
 - Biological Defense Research Program Laboratories, 888
 - biosafety levels, 874–876
 - case-fatality rate by disease, 873
 - definition of, 870
 - documenting safety procedures, 876
 - evolution of, 870–871
 - human infectious dose by organism, 873
 - laboratory animal care and use program, 888–889
 - laboratory safety audits, 887–888
 - laboratory worker protection, 876
 - medical surveillance, 880–881
 - microbiological practices, 884–886
 - personal protective equipment, 878–880
 - physical barriers, 877–878
 - precautions employed, 122
 - the profession, 889–890
 - program elements required for containment and maximum
 - containment laboratories, 876–886
 - program management role, 886–889
 - protecting the community and environment, 881–882
 - risk groups, 872
 - solid and liquid waste inactivation and disposal, 882–884
- BioSense 2.0 program, 57, 58
- BioShield Act of 2004, 932–933
- Biosurety Program, 888. *See also* Biological surety
- Biosurveillance, 739–741
- Bioterrorism. *See also* Medical countermeasures; specific agents by name
- agricultural, 78–80
 - case studies, 43–49
 - casualty management, 110–124
 - consequence management, 94–96
 - consequences of, 96–98
 - historical perspectives, 13–17
 - hospital infection control precautions, 121
 - impact of advanced molecular techniques on epidemiology of, 58–59
 - improving recognition and surveillance of, 56–58
 - infectious diseases resulting from, 121
 - local and national response, 98–102
 - recovery, 103–105
 - risk assessment systems, 95
 - samples to obtain from victims, 118
 - signs of *C. botulinum* attack, 346–347
- Bioterrorism Act, 897
- BioThrax, 140–141, 754, 757
- BioThreat Alert Lateral Flow Assay, 386
- BioWatch program, 56, 101
- Bites, venomous, 418
- Bivalent botulinum toxoid, 347
- Bivalent recombinant botulinum vaccine, 348
- Black Death plague, 2–3, 250–251
- “Black Maria,” 858
- Black rats
- plague transmission role, 257
- Black tar heroin, 342
- Bloomberg, Michael
- ricin attacks in 2004, 48, 377
- Bolivian hemorrhagic fever, 520, 526, 530
- Borreliosis, 652–654
- BotDB resource, 348
- Botulinum immune globulin, 347
- Botulinum toxin
- antitoxins, 345–346
 - bioterrorist attack signs, 346–347
 - botulinum neurotoxin production, 340–341
 - clinical disease, 341–342
 - description of agent, 72–73, 340–341
 - diagnosis of, 343–344
 - diagnostic assays, 343–344
 - foodborne botulism, 72–73, 342, 344
 - historical perspectives, 338–340
 - inhalation-acquired botulism, 342, 344
 - pathogenesis, 341
 - prophylactic treatment, 347, 794–795
 - symptoms of, 342
 - therapeutic drug research, 348–349
 - treatment of, 345–349
 - vaccine research, 348, 793–794
- BPRP. *See* Biological Personnel Reliability Program
- Brazilian hemorrhagic fever, 521
- Brevetoxins, 463, 465–467
- Brooke Army Medical Center
- Acinetobacter* infections, 324
- Brucella
- host specificity, 161
 - lipopolysaccharide epitopes, 161–162
 - nomenspecies, 160–161
 - virulence factors, 162
- Brucella abortus*, 163
- Brucella canis*, 162
- Brucella melitensis*, 164
- Brucella suis*
- development as biological weapon, 160
- Brucellosis
- clinical manifestations, 164–165
 - diagnosis of, 165–166
 - epidemiology of, 162
 - historical perspectives, 160
 - infectious agent characteristics, 160–162
 - medical countermeasures, 768–770
 - minimum inhibitory concentration breakpoint ranges, 167
 - pathogenesis, 163
 - prophylactic treatment, 167, 769–770
 - symptoms and signs of, 164
 - treatment of, 166–167
 - vaccines, 768
- BSAT. *See* Biological select agents and toxins
- Bubonic plague, 265, 267
- Buffalopox, 623, 628
- Bundibugyo virus, 571–575, 589, 592
- BurkDiff, 200
- Burkholderia mallei*
- animal disease models, 186–189
 - attacks by Germany in 1915–1916, 43–44, 78
 - biochemical identification, 199
 - characteristics of, 181–182
 - clinical disease in animals, 191–193
 - clinical disease in humans, 193–198
 - clinical features of laboratory-acquired infections, 196–197
 - control of, 208–109
 - decontamination, 208–109
 - diagnosis in equines, 202
 - differentiation from *B. pseudomallei*, 181, 182
 - epidemiology of, 182–183
 - growth characteristics, 198
 - historical perspectives, 179–181
 - host immunity, 205–206

- identification of, 199–201
 - immunological detection, 201
 - immunotherapies, 208
 - intracellular characteristics, 186
 - isolation of organism, 198–199
 - laboratory diagnosis, 198–202
 - medical countermeasures, 766–768
 - military relevance, 178–179
 - morphology, 198
 - nucleic acid-based identification, 199–201
 - pathogenesis, 184–191
 - prophylactic treatment, 205–209, 767–768
 - septicemia, 195
 - serologic diagnosis, 201–202
 - transmission of, 183–184
 - treatment of, 202–204
 - vaccines, 206, 207–208, 766
 - virulence mechanisms, 189–191
 - Burkholderia pseudomallei*
 - candidate virulence factors, 228–230
 - characteristics of, 224–225
 - clinical disease, 227, 230–232
 - diagnosis of, 232–233
 - differentiation from *B. mallei*, 181, 182
 - epidemiology of, 226
 - medical countermeasures, 766–768
 - military relevance, 225–226
 - pathogenesis, 226–227
 - prevention of, 234–236
 - prevention of disease, 234–236
 - treatment of, 233–234
 - Burnet, Dr. Frank Macfarlane, 306
 - Bush, George H., 10
 - Bush, George W., 22, 114
 - BWC. *See* Biological Weapons Convention
 - Byetta, 417
- C**
- Caffa
 - plague pandemic, 250, 252
 - CAFOs. *See* Concentrated animal feeding operations
 - California
 - plague pandemic, 251
 - Camelpox, 623
 - Camp Detrick, Maryland
 - biological warfare agents research, 857–858, 923–925
 - Burkholderia mallei* infections, 178, 183, 194–195, 196–197
 - Campylobacter jejuni*, 73, 77, 650–651
 - Canada
 - alphavirus encephalitides outbreaks, 482
 - Capsular polysaccharides, 235
 - Captopril, 417
 - Cardiotoxic plants, 448–449
 - Cardiotoxins, 440–441, 448
 - Cardiovascular system
 - Staphylococcal enterotoxin B effects, 407–408
 - Caribbean Islands
 - Chikungunya outbreak, 674
 - Castor beans, 375, 377, 382, 446
 - Casualty management
 - alerting authorities, 118–123
 - chemical protection, 113
 - diagnosis of casualties, 118, 120
 - disinfecting or decontaminating, 116–117
 - epidemiological investigation, 123–124
 - establishing diagnosis, 117–118
 - immunologic protection, 113–116
 - infection control, 118, 121
 - maintaining level of proficiency, 124
 - maintaining level of suspicion, 110–12
 - managing psychological aftermath, 123–124
 - physical protection, 112–113
 - primary assessment, 116
 - prophylaxis against diseases caused by Category A agents, 119
 - protecting self, 112–116
 - providing therapy, 118
 - psychological effects of biological attacks, 123–124
 - saving patient's life, 116
 - secondary assessment, 116–118
 - therapy of diseases caused by Category A agents, 119
 - Catalytic A-chain, 377–378, 380, 390
 - Cationic liposome DNA complexes, 208
 - Cats
 - plague transmission role, 257
 - Cavanaugh, Lieutenant Colonel Dan C., 252
 - C57Bl/6 mice, 186, 188
 - CBRNE Command, 705
 - CDC. *See* Centers for Disease Control and Prevention
 - Ceftazidime
 - glanders treatment, 204
 - melioidosis treatment, 233
 - Cell-free translation assay, 386, 387
 - Cell-mediated immune responses, 205
 - Cellular stress response inhibitors, 391
 - Centers for Disease Control and Prevention
 - BioSense 2.0 program, 57
 - BSAT forms, 899, 902–904
 - case definition for brucellosis, 165
 - Division of Select Agent and Toxins, 860, 897–898
 - Emergency Operations Center, 345
 - epidemiological investigative assistance, 123
 - Laboratory Registration and Select Agent Transfer Program, 897
 - Laboratory Response Network, 14, 22, 101, 122, 386, 704, 727–728
 - Morbidity and Mortality Weekly Report, 259
 - plague diagnosis procedures, 270
 - plague treatment procedures, 272
 - procedures for isolation and presumptive identification of *Y. pestis*, 269
 - public health preparedness capabilities, 102
 - Select Agents and Toxins Program, 375
 - smallpox specimen collection, 628
 - Centipedes, 443
 - Central America
 - alphavirus encephalitides outbreaks, 482, 487–488
 - Chikungunya outbreak, 674
 - Central Intelligence Agency, 8, 377
 - CFT. *See* Cell-free translation assay; Complement fixation test
 - Chapare virus, 521, 523–524
 - Chemical Battalions, 117
 - Chemical-Biological Incident Response Force, 117, 123
 - Chemical Corps, 116
 - Chemical nerve agent poisoning
 - differentiating from botulism, 343
 - Chemical protection, 113
 - Chemical Warfare Service, 5
 - Chemical Weapons Convention, 375
 - CHEMPACKs, 102
 - Chikungunya, 673–674
 - China
 - accusations of US biowarfare attacks, 6–7
 - Avian influenza H7N9 virus infections, 663–664
 - plague pandemic, 251
 - severe fever with thrombocytopenia syndrome virus, 675–676

- Chloramphenicol
 glanders treatment, 204
 melioidosis treatment, 234
 plague treatment, 272
- Chloroform:methanol residue vaccine, 312
- Chloroquine
 Q fever treatment, 311
- Cholera, 647–649
- Cidofovir, 635
- Ciguatoxic fish, 422, 462
- Cilastatin
 melioidosis treatment, 233
- Ciprofloxacin
 anthrax exposure prophylaxis, 10, 140
 anthrax treatment, 139
 plague treatment, 272
- Civil Support Teams, 123
- Clavulanate
 glanders treatment, 204
 melioidosis prophylaxis, 236
- CLIA. *See* Clinical Laboratory Improvement Amendments
- Clindamycin
 anthrax treatment, 140
- Clinical Laboratory Improvement Amendments, 702–703
- Clinical Laboratory Improvement Program, 702–703
- Clinical Laboratory Standards Institute, 166
- CLIP. *See* Clinical Laboratory Improvement Program
- Clorox Ultra Germicidal Bleach, 883
- Clostridium argentinense*, 340
- Clostridium baratii*, 340
- Clostridium botulinum*
 antitoxins, 345–346
 bioterrorist attack signs, 346–347
 botulinum neurotoxin production, 340–341
 clinical disease, 341–342
 description of agent, 72–73
 diagnosis of, 343–344
 diagnostic assays, 343–344
 foodborne botulism, 72–73, 342, 344, 651
 historical perspectives, 338–340
 inhalation-acquired botulism, 342, 344
 pathogenesis, 341
 prophylactic treatment, 347
 symptoms of, 342
 therapeutic drug research, 348–349
 treatment of, 345–349
 vaccine research, 348
- Clostridium butyricum*, 340
- Clostridium perfringens* alpha toxin, 362–363
- Clostridium perfringens* epsilon toxin
 chemical properties, 364
 description of, 363–365
 diseases, 363
 historical perspectives, 362–363
 mechanism of action, 364–365
 medical management, 366–367
 natural occurrence of, 363–364
 physical properties, 364
 signs and symptoms of, 365–366
 toxin types, 362
- Clostridium perfringens* type D, 365–366
- Clostridium welchii*, 362
- Cnidarians, 420–422
- Co-trimoxazole, 203
- Colony collapse disorder, 678
- Colorado potato beetle, 79
- Common source outbreaks, 40
- Community Emergency Response Team Program, 100
- Competent medical authority, 907
- Complement fixation test, 201, 202
- Comprehensive Health Surveillance, 739
- Comprehensive Preparedness Guide 201, 95
- Concentrated animal feeding operations, 79
- Confirmation identification methods, 709–716
- Congo
 incidence of human plague cases, 259
- Congressional Office Building
 ricin bioterrorism attack, 16
- Consequence management
 Comprehensive Preparedness Guide 201, 95
 consequences of biological incidents, 96–98
 definition of, 94
 local and national response, 98–102
 National Disaster Recovery Framework, 94
 recovery, 103–105
 risk assessment systems, 95
- Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological and Toxin Weapons and on their Destruction, 8, 11, 17–18, 179, 338, 375
- Cooperative Biological Engagement Program, 10
- Corals
 palytoxin exposure, 469, 471–472
- Coronaviruses, 666–669
- Countermeasures. *See* Medical countermeasures
- Cowpox, 623, 628
- Coxiella burnetii*
 characteristics of, 307–309
 diagnosis of, 311
 disease in animals, 310
 disease in humans, 310
 epidemiology of, 309–310
 historical perspectives, 306
 medical countermeasures, 770–772
 military relevance, 306–307
 pathogenesis, 309
 postexposure prophylaxis, 772
 treatment of, 311
 vaccines, 312, 770–771
- Coxiellosis, 310
- Critical control points, 81
- Crocus, 447
- Crooker, Michael, 16
- Crop diseases, 79
- Cruikshank, George, 918
- Cryptosporidiosis, 75
- Cryptosporidium parvum*, 75, 77, 78
- Culture-based methods, 722–724, 727–728
- Cutaneous anthrax, 135–136
- Cutaneous plague, 268–269
- Cyanogenic plants, 448
- Cysticercosis, 77
- Cytotoxic plants, 446–447
- Czechoslovakia
 use of biological agents during World War II, 4

D

- Dalles, Oregon
Salmonella typhimurium attacks, 1984, 44–46
- Darwin Prospective Melioidosis Study, 227, 230, 234
- Daschle, Tom
 anthrax attack, 2001, 47–48
- Decontamination
 glanders, 208–109
- Decontamination procedures, 104, 116–117

Defence Science and Technology Laboratory, 388
Defense Laboratory Network, 706–707
Delaware
 alphavirus encephalitides outbreaks, 482
Dengue fever, 671–672
Department of Defense Global Emerging Infections Surveillance and Response System, 324, 329, 331
Dermal exposure
 palytoxin, 471
Derrick, Dr. Edward Holbrook, 306
Despeciated equine heptavalent antitoxin, 345
DHHS. *See* U.S. Department of Health and Human Services
DHS. *See* U.S. Department of Homeland Security
Diagnostic tests, in vivo/in vitro, 728
Digital imaging, 202
Dilger, Anton, 44, 78, 178
Diphtheria
 differentiating from botulism, 343
Disinfection procedures, 116–117
Division of Select Agent and Toxins, 860, 897–898
DNA assays, 199–201
DNA vaccines, 500
DoD-Geis. *See* Department of Defense Global Emerging Infections Surveillance and Response System
Dominant-negative inhibitors, 366
Dominican Republic
 cholera outbreak, 648
Domoic acid, 463, 467–469
Dosimetry, 863
Doxycycline
 anthrax exposure prophylaxis, 140
 anthrax treatment, 139
 brucellosis treatment, 166–167
 glanders treatment, 203–204
 melioidosis treatment, 234
 plague postexposure prophylaxis, 273
 plague treatment, 272
 Q fever treatment, 311
Drug-resistant bacteria. *See* Multidrug-resistant organisms
Dryvax, 631–632
Dual use research of concern, 19–20
DURC. *See* Dual use research of concern
Dutschke, Everett, 16, 377
Dysentery, 363

E

Eastern equine encephalitis, 484–485, 493–494
Ebola virus, 118, 571, 573–575, 580–592, 596–598, 677–678
ECL. *See* Electrochemiluminescence
Eczema vaccinatum, 633
Edema toxin, 132–135
Ehrlich, Paul, 375
Ehrlichiosis, 654–655
“Eight Ball,” 859, 925
Electrochemiluminescence, 385, 386, 387, 730–732
Electronic Surveillance System for the Early Notification of Community-based Epidemics, 57
ELISA. *See* Enzyme-linked immunosorbent assays
Emergency management, 910–911
Emergency Operations Center, 345
Emergency support functions, 98, 101, 123
Emergency Use Authorization, 703, 740–741, 925–926, 929
Emerging infectious diseases
 antibiotic resistance, 655–656
 avian influenza, 657–660
 bacterial diseases, 647–657
 chikungunya, 673–674

 coronaviruses, 666–669
 definition of, 646
 Dengue fever, 671–672
 Ebola epidemic in West Africa, 677–678
 factors contributing to, 646
 foodborne diseases, 650–652
 genetically engineered organisms, 679–681
 genomic epidemiology, 656–657
 high-throughput DNA sequencing, 678–679
 H1N1 influenza pandemic, 660–661
 human infection with avian influenza viruses, 661–664
 influenza viruses in bats, 664–666
 mosquitoborne viruses, 670–674
 paramyxoviruses, 669–670
 swine influenza, 660–661
 synthetic biology, 681
 tickborne diseases, 652–655
 tickborne phleboviruses, 675–677
 viral diseases, 657–679
 waterborne diseases, 647–650
 West Nile virus, 672–673
Encephalitis. *See* Alphavirus encephalitides
Encephalomyelitis
 nonviral causes of, 496
 viral causes of, 495
Endocarditis, Q fever, 310
Endopep-MS, 344
England
 plague pandemic, 250
Enhanced Response Force Package Teams, 123
Enrofloxacin
 glanders treatment, 204
Enterohemorrhagic *E. Coli*, 74
Enterotoxemia, 363, 365
Envenomation, 417, 418
Environmental niche modeling, 583
Environmental Protection Agency, 101
Enzootic
 definition of, 249
Enzyme-linked immunosorbent assays
 botulism diagnosis, 344
 brucellosis diagnosis, 165, 166
 filoviruses diagnosis, 593–595
 glanders diagnosis, 201, 202
 hemorrhagic fever-causing mammarenaviruses diagnosis, 529–530
 orthopoxviruses diagnosis, 629
 overview, 728–730
 plague diagnosis, 270
 Q fever diagnosis, 311
 ricin diagnosis, 385, 387
 Staphylococcal enterotoxin B diagnosis, 408
EpiCenter application, 57
EPICON. *See* Epidemiological consultations
Epidemics
 clues to an unnatural event, 39–41
 definition of, 38
 downwind plume patterns, 41
 Ebola virus in West Africa, 38
 epidemic curves, 42
 multiple epidemics, 40
 outbreak investigation, 41–43
 recognition of, 38–39
Epidemiological consultations, 324–327
Epidemiology
 accidental release of biological agents, 49–50
 assessment tool, 54–56

- bioterrorism events, 43–49
 - clues to an unnatural event, 39–41, 111
 - common source outbreaks, 40
 - of epidemics, 38–43
 - the epidemiological triangle, 38
 - impact of advanced molecular techniques, 58–59
 - improving recognition and surveillance of bioterrorism, 56–58
 - investigations after biological attacks, 123–124
 - point source outbreaks, 40
 - study of natural outbreaks for potential bioweapon use, 50–54
 - Epizootic
 - definition of, 249
 - Epsilon toxin vaccine, 367
 - Equine encephalitis. *See* Alphavirus encephalitides
 - Equines
 - C botulinum* antitoxin, 347
 - glanders diagnosis, 202
 - Escherichia coli*, 74, 77, 78, 377, 651–652
 - Escherichia coli* O104:H4, 652
 - Escherichia coli* O157:H7, 651–652
 - ESKAPE pathogens, 322, 328–332
 - Ethical issues
 - Animal Efficacy Rule, 931–932
 - biodefense, ethics, and research in the 20th Century, 921–925
 - biodefense and ethics in the 18th and 19th Centuries, 918–921
 - Biodefense and Pandemic Vaccine and Drug Development Act
 - Renewal of 2011, 933
 - BioShield Act of 2004, 932–933
 - conflict between regulations and ethical responsibilities, 926–929
 - current movements in the regulatory environment, 931–933
 - dilemmas for biodefense research, 933–934
 - DoD/FDA Memorandum of Understanding, 927
 - impact of regulating agencies on strategic research, 925–926
 - investigational new drug status, 927–929
 - options for fulfilling mission and ethical responsibilities to military personnel, 929–931
 - overview of, 916–925
 - Public Health Security and Bioterrorism Preparedness and Response Act of 2002, 931
 - summary points, 929
 - The Turner Bill, 933
 - EUA. *See* Emergency Use Authorization
 - Europe
 - plague pandemic, 250–251
 - Excitatory neurotoxins, 430–432
 - Exendin-4, 417
 - Expeditionary Medical Dental Group, 326
 - Exposure chambers, 862
 - Exposure systems, 860–862
 - Eyes
 - Staphylococcal enterotoxin B effects, 408
- F**
- F1 antigen, 262
 - F1-V vaccine, 273–274
 - Fairchild Air Force Base
 - ricin attacks in 2004, 377
 - Farcy. *See* Glanders
 - Favipiravir, 791
 - FBI. *See* Federal Bureau of Investigation
 - Federal Bureau of Investigation, 14, 45, 101
 - Federal Emergency Management Agency, 94, 100
 - Federal Experts Security Advisory Panel, 23
 - Federal Response Plan, 22
 - Federal Select Agent Program, 20, 897–900, 904–906
 - FEMA. *See* Federal Emergency Management Agency
 - Field laboratories, military, 705–706
 - FilmArray, 738
 - Filoviruses
 - behavioral modification for prevention, 586
 - categorization of viruses, 571–572
 - clinical presentation of disease, 590–591
 - decontamination, 586
 - diagnosis of, 591–595
 - disease nomenclature, 571, 574
 - environmental niche modeling, 583
 - epidemiology of, 580–583
 - epizootiology of, 580
 - filovirion structure, 572
 - function of, 576–579
 - genomes, 572–573, 575
 - geographic distribution, 574
 - inactivation of, 586
 - lifecyle, 573–574
 - molecular biology, 572–583
 - natural reservoirs of, 574–575
 - nomenclature, 571–572
 - pathogenesis, 587, 590
 - prevention of, 586–587
 - proteins, 572–573
 - serological surveys, 583
 - Soviet biological warfare program, 584–586
 - taxonomy, 571
 - transmission of, 583–584
 - treatment of, 595, 596–598
 - vaccines, 587, 588–589
 - Fimbrae, 262–263
 - Fish, venomous, 420–422
 - Fleas
 - as plague vector, 256–257
 - plague virulence and transmission factors, 264
 - Florida
 - plague pandemic, 251
 - Flow cytometry, 732–733
 - Flu Near You, 57
 - Fluorescence in situ hybridization assay, 202
 - Fluorescence Resonance Energy Transfer, 630
 - Fluorescence spectroscopy, 202
 - Fluorescent antibody staining, 166, 270–271
 - Food, Drug, and Cosmetic Act, 926
 - Food and Drug Administration, 82, 112, 272, 587, 702–704, 916, 926–933
 - Food Emergency Response Network, 101
 - Food Safety and Modernization Act, 82
 - Food supply security, 80–82
 - Foodborne diseases
 - anthrax, 72
 - botulinum toxins, 72–73, 342, 344
 - Campylobacter jejuni*, 73, 77, 650–651
 - Clostridium botulinum*, 72–73, 342, 344, 651
 - Clostridium perfringens* diseases, 363
 - cryptosporidiosis, 75
 - emerging diseases, 650–652
 - Escherichia coli*, 74, 651–652
 - gastrointestinal anthrax, 650
 - hepatitis A, 75
 - listeriosis, 73–74
 - mycotoxicosis, 75–76
 - parasites, 76–77
 - salmonellosis, 44–46, 73, 652
 - shigellosis, 47, 74–75
 - threat potential, 76, 77
 - Foot and mouth disease, 78–79

Force health protection, 928–929
Fort Detrick, Maryland
 Burkholderia mallei infections, 178, 183, 194–195, 196–197
Fox squirrels
 plague transmission role, 257
Foxglove, 447
Francisella pathogenicity island, 289
Francisella tularensis
 acquired, 289
 aerosol transmission, 288
 arthropod vectors, 288
 bacterial culture techniques, 293
 characteristics of, 286–287
 clinical manifestations, 290–292
 diagnosis of, 292–294
 direct contact, 287
 epidemiology of, 287–289
 food and water ingestion, 288
 laboratory-acquired disease, 289
 laboratory worker exposure, 296
 mammalian bites, 288
 medical countermeasures, 761–764
 pathogenesis, 289–290
 postexposure prophylaxis, 295, 764
 prophylactic treatment, 295–295
 rapid diagnostic methods, 293–294
 serology, 293
 treatment of, 294–295
 in unusual settings, 288–289
 use as biological weapon, 296
 vaccination with live vaccine strain, 289, 290, 295–296, 761–763
Freeman, Dr. Mavis, 306
Frist, Bill
 ricin attacks in 2003–2004, 48–49
Fugu puffer fish, 422
Fungal toxins, 443, 445

G

Gas gangrene, 362–363
Gas masks, 112
Gastroenteritis, 78
Gastrointestinal diseases
 anthrax, 138, 650
 plague, 268
 plant irritants, 451
 tularemia, 291
Genetic analysis
 Acinetobacter baumannii, 327–328
Genetically engineered organisms, 679–681
Geneva Convention, 8, 11
Geneva Protocol, 3, 6, 896–897
Genomic epidemiology, 656–657
Gentamicin
 plague treatment, 272
Germany
 cholera outbreak, 647
 Shiga toxin deaths, 377
 use of biological agents during World War I and II, 3–4, 43–44, 78, 178
Giardia lamblia, 78
Gila monster, 417
Glanders
 animal disease models, 186–189
 attacks by Germany in 1915–1916, 43–44, 78, 178
 biochemical identification, 199
 clinical disease in animals, 191–193
 clinical disease in humans, 193–198

 clinical features of laboratory-acquired infections, 196–197
 control of, 208–109
 decontamination, 208–109
 diagnosis in equines, 202
 epidemiology of, 182–183
 historical perspectives, 179–181
 host immunity, 205–206
 identification of, 199–201
 immunological detection, 201
 immunotherapies, 208
 infectious agent characteristics, 181–182
 isolation of organism, 198–199
 laboratory diagnosis, 198–202
 medical countermeasures, 766–768
 military relevance, 178–179
 morphology, 198
 nucleic acid-based identification, 199–201
 organism growth characteristics, 198
 pathogenesis, 184–191
 prophylactic treatment, 205–209, 767–768
 septicemic, 195
 serologic diagnosis, 201–202
 transmission of, 183–184
 treatment of, 202–204
 vaccines, 206, 207–208, 766
 virulence mechanisms, 189–191
Global Emerging Infections Surveillance and Response System, 324, 329
Gonyautoxins, 463
Good Clinical Practices, 927, 929
Government Accountability Office, 24
Granulocyte colony-stimulating factor, 234
Great Britain
 eradication of glanders, 180
 use of biological agents during World War II, 4
Ground squirrels
 plague transmission role, 257, 258
Guanarito virus, 521, 522, 523–524, 530–531
Guillain-Barré syndrome
 differentiating from botulism, 343
Guinea pigs
 as animal disease models, 186
Gulf War
 Q fever outbreak, 307

H

HACCPs. *See* Hazard analysis critical control points
Haffkine, Waldemar M.W., 273
Hague Convention, 3
HAIs. *See* Healthcare-assisted infections
Haiti
 cholera outbreak, 648–649
Hamsters
 as animal disease models, 186
Handheld assay devices
 overview, 733–734
 ricin detection, 385, 387
Harris, Larry Wayne, 13–14
Hatfill, Dr. Steven J., 14
HAVCR1. *See* Hepatitis A virus cellular receptor 1
Hazard analysis critical control points, 81
Hazardous Material Regulations, 902
Hazardous Materials Response Unit, 117
HBAT, 345
Healthcare-assisted infections, 329
Heartland virus, 676–677

- Hematology
 Staphylococcal enterotoxin B, 408
 Hemolytic toxins, 437–440
 Hemorrhagic fever-causing mammarenaviruses
 antiviral agents, 531–532
 clinical presentation, 522–523
 coagulopathies, 527–528
 diagnosis of, 529–530
 epidemiology of, 519–521
 historical perspectives, 519–521
 immune response, 528–529
 molecular characteristics, 524–525
 New World mammarenaviruses, 520–521, 523, 526–527, 528–529
 Old World mammarenaviruses, 519–520, 522–523, 525–526, 528
 passive antibody therapy, 530
 pathogenesis, 525–527
 pathology, 525–527
 phylogenetic relationships, 523–524
 reservoirs of, 521–522
 taxonomy, 523–524
 treatment of, 530–532
 vaccines, 530–532
 Hemorrhagic toxins, 437–440
 Hemostasis-active toxins, 435–437
 Hemostasis system, 438–439
 Henderson apparatus, 861
 Hendra virus, 549, 552–553, 669
 Henipaviruses
 anti-henipavirus immune response detection, 558–559
 antigen detection, 558
 availability of, 557–558
 as biological weapons, 557–558
 clinical presentation, 554–555
 diagnosis of, 558–559
 dissemination of, 558
 emergence of, 549–552
 epidemiology of, 552–554
 epizootiology of, 552–554
 Hendra virus, 549, 552–553
 historical perspectives, 549–552
 innate immunotherapy, 560
 isolation of virus, 559
 medical management, 559–560
 molecular biology of, 555–556
 newly identified viruses, 552
 next-generation sequencing, 559
 Nipah virus, 549–552, 553–554
 passive immunotherapy, 559–560
 pathogenesis, 557
 pathology, 555
 potential for high morbidity and lethality, 558
 production of, 558
 reverse transcription-polymerase chain reaction, 558
 ribavirin, 560
 signs and symptoms of, 554–555
 therapies evaluated in vitro, 560
 virus genome, 555
 virus proteins, 555–556
 virus structure, 555
 Hepatitis A, 75, 77
 Hepatitis A virus cellular receptor 1, 367
 Heptavalent despeciated antitoxin, 346
 Herbal medicine
 ricin poisoning, 381
 Hfab-BAT, 346
 HHA. *See* Handheld assay devices
 High-efficiency particulate air filters, 871, 877, 882
 High throughput DNA sequencing, 678–679
 High throughput screening, 390, 391
 Highly pathogenic avian influenza A virus, 19–22, 662–663
 H1N1 influenza A virus, 19, 22, 660–661
 H5N1 virus, 19–22
 Homeland Security Council, 22
 Homoheptamers, 365
 Hong Kong, China
 Avian influenza H5N1 virus infections, 662–663
 Horses
 glanders diagnosis, 202
 Host immunity, 205–206
 Host response, 741–743
 HTS. *See* High throughput screening
 Human fleas
 as plague vector, 256
 Hussein, Saddam, 10–11
 Hybridization probes, 630
 Hydroxychloroquine
 Q fever treatment, 311
 Hyperimmune sera, 367
- ## I
- Iatrogenic botulism, 342, 344
 IHA. *See* Indirect hemagglutination assay
 Ilimaquinone, 391
 Illumina MiSeq instrument, 740
 Imipenem
 glanders treatment, 204
 melioidosis treatment, 233
 Immunization. *See also* Vaccines
 alphavirus encephalitides
 anthrax, 140–142
 Immunodiagnostic methods, 728–730
 Immunologic protection, 113–116
 Immunological detection, 201
 Immunosorbent assays. *See* Enzyme-linked immunosorbent assays
 Immunotherapies
 glanders, 208
 IMP dehydrogenase inhibitors, 792
 In vivo/in vitro diagnostic tests, 728
 Inactivated vaccines, 499
 Incapacitating agents
 produced by the US military, 5
 Incident Command System, 121
 Incident response and emergency management, 910–911
 IND. *See* Investigational new drugs
 India
 Chikungunya outbreak, 674
 Nipah virus outbreak, 553–554
 plague pandemic, 251
 Indian Ocean islands
 Chikungunya outbreak, 674
 Indian Plague Commission, 256
 Indirect hemagglutination assay, 201
 Indirect immunofluorescence assay, 311
 Infants
 botulism, 342, 346
 Infection control, 118, 121
 Infectious Diseases Society of America, 322
 Influenza
 Avian influenza pandemic threat, 657–660
 H1N1 influenza pandemic, 660–661
 swine influenza, 660–661

Inhalation-acquired disease
 amnesic shellfish poisoning, 468
 anthrax, 136–137
 botulism, 342, 344
 neurotoxic shellfish poisoning, 466
 palytoxin, 471
 paralytic shellfish poisoning, 464
 ricin, 382–384
Injections
 ricin administration, 382
Innate immunotherapy
 henipaviruses, 560
Insect stings, 420, 421
Institutional Biosafety Committee, 904
Integrated Consortium of Laboratory Networks, 706–707
Intercellular adhesion molecule-1, 406
Interferon gamma, 163, 205–206, 406
Interferons, 791
International Clonal Complex, 323
International Committee of the Red Cross, 6
International Health Regulations, 259
International Society on Toxinology, 416
Invasive species, 80
Inventory audits, 901–902
Invertebrates
 as disease models, 188–189
Investigational new drugs, 114–116, 345, 346, 347, 498, 927–929
Iran
 biological warfare agents, 12
 ricin as biological weapon research, 376
Iraq
 Acinetobacter infections, 322, 323, 324–327
 biological warfare agents, 10–11
 C. botulinum research program, 339
 Q fever outbreak, 2005, 53–54, 307
 ricin as biological weapon research, 376
Iraq Survey Group, 11
Iron sequestration, 263
Irritants, local
 plants causing, 451
Ishii, General Shiro, 3–4, 5, 338
Ivins, Dr. Bruce E., 15

J

Japan
 Aum Shinrikyo cult bioterrorism research and attacks, 13, 46–47, 72, 339
 biocrimes, 12
 biological agent research during World War I, 3–4
 bioterrorism attacks, 13
 C. botulinum research program, 338
 development of *Burkholderia mallei* as potential biowarfare agent, 179
 plague warfare research, 252–254
 severe fever with thrombocytopenia syndrome virus, 676
Japanese encephalitis virus, 550
JBAIDS. *See* Joint Biological Agent Identification and Diagnostic Systems
Jellyfish stings, 420, 430, 432, 441
Jewett, Frank B., 921
Joint Bacterial Repository, 329
Joint Biological Agent Identification and Diagnostic Systems, 112, 702–704, 738
Joint Biological Integrated Detection System, 112
Joint Task Force for Civil Support, 123
Junín virus, 519–520, 522, 523, 526–528, 530531
Justinian plague, 250

K

Kathmandu, Nepal
 cholera outbreak, 648
Kefauver-Harris Drug Amendments, 926
Kennedy, John F., 7
Khrushchev, Nikita, 9
Killed whole cell vaccines, 206–207
Kosovo
 tularemia outbreak, 1999–2000, 52–53
Kostov, Vladimir, 9, 376
Krishnaswami, Dr. C.S., 224

L

Laboratories
 allies' identification levels, 718–719
 antibiotic and antimicrobial susceptibility testing, 727
 assessing individual risk, 876–877
 automated identification systems, 724–727
 Biological Defense Research Program Laboratories, 888
 biosafety program element requirements, 876–886
 biosurveillance, 739–741
 civilian identification levels, 707–708
 Clinical Laboratory Improvement Amendments, 702–703
 Clinical Laboratory Improvement Program, 702–703
 containment and maximum containment laboratories, 876–886
 culture-based microbiological methods, 722–724
 Defense Laboratory Network, 706–707
 documenting safety procedures, 876
 early recognition of host response, 741–743
 electrochemiluminescence, 730–732
 emerging threat surveillance, 739–741
 enzyme-linked immunosorbent assays, 730
 flow cytometry, 732–733
 future perspectives, 734–736
 hand held assays, 733–734
 horizon-agnostic diagnostic applications, 738–739
 identification approaches, 719–739
 identification levels, 707
 immunodiagnostic methods, 728–730
 integration of in vivo and in vitro diagnostic tests, 728
 Joint Biological Agent Identification and Diagnostic Systems, 112, 702, 704
 laboratory animal care and use program, 888–889
 laboratory worker protection, 876
 MAGPIX, 733
 medical surveillance, 880–881
 microbiological culture methods, 727–728
 microbiological practices, 884–886
 military field laboratories, 705–706
 military identification levels, 708, 716–718
 molecular detection methods, 736
 Next Generation Diagnostic System, 702
 next generation molecular diagnostics, 738
 personal protective equipment, 878–880
 physical barriers, 877–878
 presumptive and confirmation methods, 709–716
 protecting the community and environment, 881–882
 rapid methods, 727–728
 real-time polymerase chain reaction, 736–738
 regulated biological select agents and toxins, 703
 research, development, test, and evaluation laboratories, 888
 role of military clinical and field laboratories, 705
 safety audits, 887–888
 solid and liquid waste inactivation and disposal, 882–884
 specimen collection and processing, 719–722

Laboratory-acquired diseases
 botulinum intoxication, 342
 tularemia, 289, 296
Laboratory of HealthCare Associated Infections, 327
Laboratory Registration and Select Agent Transfer Program, 897
Laboratory Response Network, 14, 22, 101, 122, 386, 704, 727–728
Lahore Polo Club, 204
Lambert-Eaton syndrome
 differentiating from botulism, 343
Landstuhl Regional Medical Center
 Acinetobacter infections, 323, 324–327
Lassa virus, 519, 522, 523–525, 528–531
Latin America
 cholera outbreak, 647
LcrV, 261–262
Lectin B-chain, 377–378, 389–390
Legionella, 308–309
Legionellosis, 649–650
Lethal toxin, 132–135
Levofloxacin
 plague postexposure prophylaxis, 273
 plague treatment, 272
Libya
 biological warfare agents, 12
Lice
 as plague vector, 256–257
Linezolid
 anthrax treatment, 140
Lipid rafts, 364–365
Lipopolysaccharide antibodies, 235, 308
Liquid chromatography, 386, 387
Listeria monocytogenes, 73–74
Listeriosis, 73–74
Liston, W.G., 256
Live attenuated vaccines, 207, 273, 758, 825–826
Live vaccines
 alphavirus encephalitides, 498–499
 tularemia, 289, 290, 295–296, 761–763
Livestock. *See* Animal diseases
Lloviu virus, 571–575, 580
Local response, 98–102
London, England
 ricin bioterrorism attack, 16
Louisiana
 plague pandemic, 251
LRN. *See* Laboratory Response Network
Lujo virus, 519–520, 523
LVS tularemia vaccine, 295–296
Lyme disease, 652–654
Lymphocyte function-associated antigen, 406
Lysosomal-associated membrane proteins, 308

M

M-44 vaccine, 312
Machupo virus, 520, 522, 523–524, 526–527, 531
MAGPIX, 733
Major histocompatibility complex, 404–405
Malaysia
 Nipah virus outbreak, 553
 paramyxovirus infections, 669–670
Malleomyces mallei, 178
Mammarenaviruses. *See* Hemorrhagic fever-causing mammarenaviruses
Manganese sequestration, 263
MAP. *See* Mitogen-activated protein kinase
Marburg virus, 571–575, 580–592, 596–598

Marine algal toxins
 amnesic shellfish poisoning, 467–469
 neurotoxic shellfish poisoning, 465–467
 palytoxin, 469–472
 paralytic shellfish poisoning, 463–465
Marine envenoming, 420–422
Markov, Georgi, 9, 375, 376, 382
Marshall, Lieutenant Colonel John D., 252
Marshall Plan, 7
Martha's Vineyard, Massachusetts
 tularemia outbreak, 2000, 51–52, 292
Maryland
 alphavirus encephalitides outbreaks, 482
MASCAL. *See* Medical mass casualty event
Masks, 112–113
Mass median aerodynamic diameter, 862
Mass spectrometry, 202, 328, 344, 386, 387
Massachusetts
 alphavirus encephalitides outbreaks, 482
 tularemia outbreak, 2000, 51–52, 292
Mau-Mau attack, 79
MDCK cells, 366
MDR Organism Repository and Surveillance Network, 329–332
MDROs. *See* Multidrug-resistant organisms
Meadow saffron, 447
MEDCOM. *See* U.S. Army Medical Command
Medical countermeasures
 anthrax, 752, 754, 757–761
 bacterial diseases, 752–772
 botulinum neurotoxin, 793–795
 brucellosis, 768–770
 encephalitic New World alphaviruses, 773–776
 glanders, 766–768
 melioidosis, 766–768
 plague, 764–765
 Q fever, 770–772
 ricin, 796–797
 ricketsial diseases, 752–772
 smallpox, 776–788
 Staphylococcal enterotoxin B, 795–796
 toxins, 793–797
 tularemia, 761–764
 viral diseases, 773–793
 viral hemorrhagic fevers, 788–793
Medical ethics. *See* Ethical issues
Medical mass casualty event
 casualty management, 110–124
Medical Reengineering Initiative, 705
Medical treatment facilities, 705
Melioidosis
 candidate virulence factors, 228–230
 clinical disease, 227, 230–232
 diagnosis of, 232–233
 epidemiology of, 226
 infectious agent characteristics, 224–225
 medical countermeasures, 766–768
 military relevance, 225–226
 pathogenesis, 226–227
 postexposure prophylaxis, 235–236, 767–768
 prevention of, 234–236
 treatment of, 233–234
 vaccines, 766
Meningitis
 anthrax meningitis, 137
 plague meningitis, 268
Merck, George W., 5
Merck, George W., Jr., 921

Meropenem
 glanders treatment, 204
 melioidosis treatment, 233
MERS. *See* Middle Eastern respiratory syndrome
Meselson, Matthew, 9
Metropolitan Medical Response System, 121
Mexico
 alphavirus encephalitides outbreaks, 487
Meyer, Karl F., 273
MHS. *See* Military Health System
Mice
 as animal disease models, 186–188
Microbiological methods
 culture-based, 722–724, 727–728
Microbiological practices
 biosafety, 884–886
MicroChem Plus, 883
Middle Eastern respiratory syndrome, 666–669
MIDI Sherlock Microbial Identification System, 199
Military field laboratories, 705–706
Military Health System
 response to *Acinetobacter* infections, 328–332
Military installations. *See also* U.S. military
 plague risks, 252, 253
Military personnel
 options for fulfilling mission and ethical responsibilities, 929–931
Minnesota Patriots Council, 13–14
Minor Groove Binding Proteins, 630
Missoula, Montana
 Q fever outbreak, 306
Missouri
 Heartland virus, 676–677
Mitogen-activated protein kinase, 134, 378
MNGCs. *See* Multinucleated giant cells
Modified Vaccinia Ankara, 632
Modified vaccinia virus, 826
Mold toxins, 443
Molecular detection methods
 Acinetobacter baumannii, 327–328
 next generation diagnostics, 738
 overview, 736
Molecular sequencing technology, 58–59
Monkeypox, 623, 627–628
Monoclonal antibodies
 antibacterial, 837–839
 antitoxin, 835–837
 antiviral, 839–842
Monocyte chemoattractant protein-1, 205, 406
Montana
 Q fever outbreak, 306
Morbidity and Mortality Weekly Report, 259
Mosquitoborne viruses, 670–674
Mousepox virus, 19
MRSN. *See* MDR Organism Repository and Surveillance Network
Mucosal vaccines, 830–831
Multidrug-resistant organisms
 antibiotic resistance, 328, 655–656
 characterization and identification of source, 327–328
 epidemiological consultation, 324–327
 ESKAPE pathogens, 322, 328–332
 genetic analysis, 327–328
 historical perspectives, 322–324
 molecular analysis, 327–328
 strain collection and sampling, 327
 U.S. Military Health System response, 328–332
Multilocus sequence typing, 181, 182
Multinucleated giant cells, 186, 190
Multiple-locus variable number tandem repeat analysis, 182–183

Mushrooms, 422, 442, 444–445, 452
Mussolini, Benito, 375
Myasthenia gravis
 differentiating from botulism, 343
Mycotoxins, 75–76
Myonecrosis, 362, 363
Myotoxins, 432–435

N

National Academy of Sciences, 73, 857
National Biosurveillance Integration System, 101
National Committee for Clinical Laboratory Standards, 166
National Disaster Medical System, 123
National Disaster Recovery Framework, 94, 96, 104
National Guard, 100, 123
National Incident Management System, 96–97, 121
National Institute of Occupational Safety and Health, 879
National Institutes of Health
 human genome project, 58
 Office of Biotechnology Activities, 898
 Office of Science Policy, 20
National laboratories, 122
National Mitigation Framework, 96
National Naval Medical Center, 328
National Preparedness Goal, 94, 98
National Prevention Framework, 96
National response, 98–102
National Response Framework, 94, 96, 98–99, 100
National Response Plan, 22
National Safety Council, 6
National Science Advisory Board for Biodefense, 20–21
National Security Council, 22
National Strategy for Countering Biological Threats, 23
Navy field laboratories, 706
NBC News
 anthrax attack, 2001, 47–48
NDRF. *See* National Disaster Recovery Framework
Necrotizing enteritis, 363
Nectrotoxins, 442–443
Nepal
 cholera outbreak, 648
Nephrotic plants, 450
Nephrotoxins, 442
Nerve agent poisoning
 differentiating from botulism, 343
Neuraminidases, 365, 367
Neurotoxic plants, 450
Neurotoxic shellfish poisoning
 description of toxin, 465–466
 diagnosis of, 467
 inhalation-acquired disease, 466
 mechanism of action, 466
 medical management, 467
 oral ingestion, 466
 signs and symptoms, 466
Neurotoxins, 340–341, 424–432
New Orleans, Louisiana
 plague pandemic, 251
New World mammarenaviruses, 520–521, 523, 526–527, 528–529
New York, New York
 plague pandemic, 251
 West Nile virus outbreak, 1999, 50–51
Next Generation Diagnostic System, 702, 704
Next generation molecular diagnostics, 738
Next-generation sequencing, 559, 738–739
NGDS. *See* Next Generation Diagnostic System
Nightshade, 449

NIH. *See* National Institutes of Health
 Nine Mile variant, 307–308
 Nipah virus, 549–552, 553–554, 669–670
 Nixon, Richard M., 7, 338, 897
 Nomenclature, 160–161
 North America
 alphavirus encephalitis outbreaks, 482, 487
 North Atlantic Treaty Organization, 718–719
 North Carolina
 alphavirus encephalitis outbreaks, 482
 North Carolina Disease Event Tracking and Epidemiologic Collection Tool, 57
 North Korea
 accusations of US biowarfare attacks, 6
 biological warfare agents, 12
 Nosocomial infections, 326–327
 NSABB. *See* National Science Advisory Board for Biodefense
 Nucleic acid-based identification
 glanders, 199–201
 Nucleic acid vaccines, 829–830
 Nunn-Lugar Biological Threat Reduction Program, 10
 Nuremberg Code, 921, 922
 Nuttall, George, 362

O

Obama, Barack, 48, 377, 898
 Occupational Safety and Health Administration
 Respiratory Protection Standard, 879
 Oculoglandular tularemia, 291
 Office International des Epizooties, 180–181
 Office of Biotechnology Activities, 898
 Office of Emergency Preparedness, 22
 Office of Public Health Emergency Preparedness, 22
 Office of Science and Technology Programs, 21
 Office of Science Policy, 20
 Ofloxacin
 glanders, 203
 Q fever treatment, 311
 OFPBL agar, 199
 Old World mammarenaviruses, 519–520, 522–523, 525–526, 528
 Oleander, 440
 Operation Whitecoat, 6, 858, 923
 Operations Desert Shield/Storm
 biological agents exposure, 10
 immunologic protection, 113
 pyridostigmine bromide prophylaxis, 113
 Operations Enduring Freedom/Iraqi Freedom
 Acinetobacter infections, 322, 323, 324–327
 Q fever outbreak, 53–54, 307
 Oral ingestion
 amnesic shellfish poisoning, 468
 neurotoxic shellfish poisoning, 466
 palytoxin, 470–471
 paralytic shellfish poisoning, 464
 ricin, 380–382
 Oropharyngeal anthrax, 138
 Orthopoxviruses
 as biological warfare agents, 622–623
 characteristics of, 617–622
 classification, 617
 clinical aspects of infections, 624–628
 diagnosis of, 628–630
 entry into cells, 618
 immunodiagnosis, 629
 medical management, 630–635
 monkeypox, 627–628
 morphogenesis and egress, 619

 morphology, 617–618
 nucleic acid diagnosis, 629–630
 pathogenesis, 621–622
 phenotypic diagnosis, 628–629
 phylogenetic relationships, 620–621
 prophylaxis, 630–634
 replication, 619
 specimen collection and handling, 628
 treatment of, 624–635
 Outbreak investigations, 41–43

P

p38 mitogen activated protein kinase, 391
 Pacific Yew tree, 449
 Paclitaxel, 416–417
 Pakistan
 glanders outbreak, 204
 Palytoxin
 dermal exposure, 471
 description of toxin, 469–470
 diagnosis of, 472
 exposure through home aquaria, 471–472
 inhalation-acquired disease, 471
 mechanism of action, 470
 medical management, 472
 oral ingestion, 470–471
 signs and symptoms, 470–472
 Pan-hazard preparedness, 17–24
 Pandemics
 Avian influenza threat, 657–660
 Paralytic neurotoxins, 424–430
 Paralytic shellfish poisoning
 cause of death, 464
 description of toxin, 463
 diagnosis of, 465
 differentiating from botulism, 343
 inhalation-acquired disease, 464
 mechanism of action, 463–464
 medical management, 465
 oral ingestion, 464
 signs and symptoms, 464
 Paramyxoviruses, 669–670
 Parasites, 76–77
 Passive antibody therapy
 hemorrhagic fever-causing mammarenaviruses, 530
 Passive hemagglutination antibody detection, 270
 Passive immunotherapy
 alphavirus encephalitis, 497–498
 bacterial diseases, 758–759
 botulinum toxins, 794
 henipaviruses, 559–560
 Staphylococcal enterotoxin B, 795–796
 viral hemorrhagic fevers, 792
 PBT. *See* Pentavalent botulinum toxoid
 pCD, 261
 PCR. *See* Polymerase chain reaction assays
 Peake, Lieutenant General James B., 324
 Penicillin
 anthrax exposure prophylaxis, 140
 anthrax treatment, 139
 Pennsylvania
 Legionnaires' disease outbreak, 649
 Pensacola, Florida
 plague pandemic, 251
 Pentavalent botulinum toxoid, 347, 793
 Personal protective equipment, 860–861, 877–880
 Personnel reliability programs, 898, 901, 905–908

- PFGE. *See* Pulsed field gel electrophoresis
- Phage shock protein response, 263
- Pharyngeal plague, 268
- Phleboviruses, 675–677
- Phospholipases, 135
- Physical protection, 112–113
- PLA2 toxins, 432–434
- Plague
- antibiotic treatment, 272
 - autotransporter proteins, 263
 - biochemistry of, 255–256
 - as biological warfare agent, 252–254
 - Black Death, 250–251
 - bubonic plague, 265, 267
 - clinical manifestations, 265–269
 - cutaneous, 268–269
 - diagnosis of, 269–271
 - endemic disease, 251–252
 - epidemiology of, 256–259
 - F1 antigen, 262
 - fimbriae, 262–263
 - first pandemic, 250
 - gastrointestinal, 268
 - growth characteristics, 254–255
 - historical perspectives, 249–251
 - incidence of, 259–261
 - infectious agent characteristics, 254–256
 - iron sequestration, 263
 - isolation of patients, 271–272
 - Justinian plague, 250
 - laboratory confirmation, 269–271
 - mammals known to harbor plague in the US, 257
 - manganese sequestration, 263
 - medical countermeasures, 764–765
 - meningitis, 268
 - morphology, 254
 - pathogenesis, 264–265
 - phage shock protein response, 263
 - pharyngeal, 268
 - plasminogen activator, 262
 - pneumonic, 259, 267, 268
 - postexposure prophylaxis, 273, 765
 - prevention of, 272–273
 - second pandemic, 250–251
 - septicemic, 265–267
 - signs and symptoms, 269
 - small RNAs, 263
 - surface structures, 263
 - taxonomy, 254
 - third pandemic, 251
 - transmission of, 2–3
 - treatment of, 271–274
 - twin arginine transport, 263
 - Type III secretion system, 261–262
 - vaccines, 115, 273–274, 764–765
 - virulence and transmission factors in the flea, 264
 - virulence determinants, 261–264
 - virulence factors in mammalian hosts, 262–263
 - warfare and, 251–254
- Plague Manual, 269
- Plague Vaccine USP, 273
- Plant poisons, 422, 440, 446–452
- Plaque reduction neutralization test, 629
- Plasminogen activator, 262
- pMT, 261
- Pneumonic plague, 259, 267, 268
- Pneumonic tularemia, 291–292
- Point source outbreaks, 40
- Poisons
- animals, 422
 - as biological warfare agents, 423
 - definitions, 417
 - epidemiology of, 418–423
 - mushrooms, 422, 444–445
 - plants, 422, 446–452
 - research directions, 452–453
- Poland
- use of biological agents during World War II, 4
- Poliovirus type 1, 19
- Polymerase chain reaction assays
- Acinetobacter* infection diagnosis, 328
 - botulism diagnosis, 344
 - brucellosis diagnosis, 161, 165
 - filoviruses diagnosis, 593–595
 - glanders diagnosis, 200, 202
 - hemorrhagic fever-causing mammarenaviruses diagnosis, 529–530
 - orthopoxviruses diagnosis, 629–630
 - overview, 728–730
 - real-time polymerase chain reaction, 678, 736–738
 - ricin diagnosis, 387
 - Staphylococcal enterotoxin B diagnosis, 408
 - tularemia diagnosis, 293
 - viral pathogen diagnosis, 678–679
- Polysaccharide-based subunit vaccines, 207–208
- Portal Shield, 112
- Powered air-purifying respirators, 879
- Poxviruses, 617
- pPCP, 261
- Prairie dogs
- plague transmission role, 257, 258
- President's Disaster Relief Fund, 100
- Presumptive identification methods, 709–716
- Primary atypical pneumonia, 307
- Primates, nonhuman
- as animal disease models, 188
- Project 112, 7
- Project BioShield Act, 22–23, 740, 926
- Pronase, 367
- Protective clothing, 112–113
- Protein kinases, 391, 406
- Protein subunit vaccines, 207
- Protein tyrosine kinases, 406
- Proteolysis, 364
- Proteus OX-19, 4
- Prototoxin, 367
- PTA. *See* Pterioic acid
- Pterioic acid, 390
- Public health preparedness, 102
- Public Health Security and Bioterrorism Preparedness and Response Act of 2002, 931
- Public Health Service Act, 925, 926
- Public Readiness and Emergency Preparedness Act, 925
- Puffer fish, 422
- Pulpy kidney disease, 365
- Pulsed field gel electrophoresis, 325, 327, 328
- Purple foxglove, 447
- Putin, Vladimir, 10
- Pyridostigmine bromide, 113

Q

- Q fever
- diagnosis of, 311
 - disease in animals, 310
 - disease in humans, 310

- epidemiology of, 309–310
 - Gulf War, 307
 - historical perspectives, 306
 - infectious agent, 307–309
 - Iraq outbreak, 2005, 53–54, 307
 - medical countermeasures, 770–772
 - military relevance, 306–307
 - outbreaks during World War II, 8, 306–307
 - pathogenesis, 309
 - postexposure prophylaxis, 772
 - treatment of, 311
 - vaccines, 115, 312, 770–771
 - Q-Vax, 312
 - Queensland, Australia
 - Q fever outbreak, 306
 - Quorum sensing systems, 191
- R**
- Rajneesh, Bhagwan Shree, 13, 44–46
 - Rajneeshee cult
 - bioterrorism attacks, 13, 44–46
 - Raman spectroscopy, 202
 - RANTES protein, 206
 - Rat fleas
 - as plague vector, 256
 - Rats
 - plague transmission role, 257, 258
 - Ravn virus, 571–575
 - Raxibacumab
 - anthrax treatment, 140
 - Reagan, Ronald, 9
 - Real-time Outbreak and Disease Surveillance Laboratory, 57
 - Real-time polymerase chain reaction, 678, 736–738
 - Recombinant granulocyte colony-stimulating factor, 234
 - Recombinant vaccine vectors, 826–827
 - Recovery operations, 103–105
 - Red tides, 466
 - Reference laboratories, 122
 - Registered Biosafety Professional, 889–890
 - Research, development, test, and evaluation laboratories, 888
 - Research ethics. *See* Ethical issues
 - Respiratory Protection Standard, 879
 - Respiratory system
 - Staphylococcal enterotoxin B effects, 407
 - Respiratory tularemia, 291
 - Reston virus, 571–575, 580, 587
 - Restriction fragment-length polymorphism, 629–630
 - RevCons, 17
 - Reverse transcription-polymerase chain reaction, 558, 678
 - Review conferences, 17
 - Rhodesia
 - biological warfare agents, 11–12
 - Ribavirin
 - henipavirus treatment, 560
 - viral hemorrhagic fever treatment, 790–791
 - Ribosome inactivating proteins, 377
 - Richardson, Shannon Guess, 16, 48, 377
 - Ricin
 - activity assay, 386
 - antibody treatment, 388
 - attacks in US, 2003–2004, 48–49
 - biochemical identification, 377–378
 - as biological warfare agent, 376
 - bioterrorism attacks, 13, 15–16, 376–377
 - cause of death, 384–385
 - cellular stress response inhibitors, 391
 - description of agent, 377–379
 - detection of, 385–386
 - diagnosis of, 386–387
 - enzyme-linked immunosorbent assays, 385, 387
 - handheld assay detection devices, 385, 387
 - historical perspectives, 375–376
 - inhalation of, 382–384
 - injection of, 382
 - liquid chromatography/mass spectrometry, 386, 387
 - medical countermeasures, 796–797
 - medical management, 387–391
 - oral intoxication, 380–382
 - pathogenesis, 378–379
 - pathology, 379–385
 - ricin A chain inhibitors, 390–391
 - sample verification platforms, 385–386
 - signs and symptoms of, 379–385
 - small molecule inhibitors, 389–390
 - Soviet Union attacks, 9
 - supportive and specific therapy, 389
 - transport inhibitors, 391
 - vaccines, 387–388, 796
 - Rifampin
 - brucellosis treatment, 167
 - Riluzole, 366
 - Ring vaccination, 115
 - RIPs. *See* Ribosome inactivating proteins
 - Risk assessment systems, 95
 - Risk communication, 115, 124
 - RiVax, 388
 - Rock squirrels
 - plague transmission role, 257, 258
 - Roosevelt, Franklin D., 5, 858
 - RTA. *See* Catalytic A-chain
 - RTB. *See* Lectin B-chain
 - Russell, Findlay E., 416
 - RVEc, 388
- S**
- Sabiá virus, 521, 523–524, 531
 - Sacroiliitis
 - brucellosis and, 164
 - Safety audits, 887–888
 - Saint Joseph, Missouri
 - Heartland virus, 676–677
 - Salmonella
 - bioterrorism attacks, 13, 44–46
 - food- and waterborne, 44–46, 73, 652
 - Salmonella typhimurium*
 - attacks in Dalles, Oregon, 1984, 44–46
 - food and waterborne, 73
 - Salmonellosis
 - attacks in Dalles, Oregon, 1984, 44–46
 - food and waterborne, 73
 - Sample verification platforms, 385–386
 - San Francisco, California
 - plague pandemic, 251
 - Sarin
 - bioterrorism attacks, 13
 - SARS, 666
 - Saudi Arabia
 - Middle Eastern respiratory syndrome, 666–669
 - Saxitoxins, 463–465
 - Scolopendrid centipede, 443
 - Scorpion stings, 419–420, 430–432, 442–443
 - Sea snakes, 420–422
 - Secreted proteins, 189–190
 - Secretory systems, 189–190

- Security risk assessment, 900
- Select Agent List, 22
- Select Agent Program, 14, 23
- Select Agent Regulations, 900, 902
- Select Agents and Toxins Program, 375
- Senate Office Building
 - anthrax attack, 2001, 47–48
 - ricin attacks in 2004, 48–49, 377
- Sentinel laboratories, 122
- Septic abortions
 - Brucella* and, 162–163
- Septicemic disease
 - plague, 265–267
 - septicemic glanders, 195
 - tularemia, 292
- Sequence types, 328
- Sequencing technology, 58–59
- Serologic diagnoses
 - filoviruses, 583
 - glanders, 201–202
 - plague, 270
 - tularemia, 293
- Severe acute respiratory syndrome, 666
- Severe fever with thrombocytopenia syndrome virus, 675–676
- Shiga toxins, 74, 377, 651–652
- Shigella dysenteriae*
 - attacks in Dallas, Texas, 1996, 47
 - food and waterborne, 74–75
- Shigella sonnei*, 78
- Shigellosis
 - attacks in Dallas, Texas, 1996, 47
 - food and waterborne, 74–75
- Shipping standards, 723
- Sialidases, 365
- Simonson, Stewart, 340
- Singapore Armed Forces
 - melioidosis cases, 225
- Skin diseases
 - cutaneous anthrax, 135–136
 - cutaneous plague, 268–269
- Skin irritation
 - plants causing, 451
- Small molecule inhibitors, 389–390
- Small RNAs, 263
- Smallpox
 - as biological warfare agents, 622–623
 - biothreat policy, 634
 - characteristics of virus, 617–622
 - classification, 617
 - clinical aspects of infections, 624–626
 - diagnosis of, 628–630
 - entry into cells, 618
 - immunodiagnosis, 629
 - impact on Native Americans, 3
 - medical countermeasures, 776–788
 - medical management, 630–635
 - morphogenesis and egress, 619
 - morphology, 617–618
 - nucleic acid diagnosis, 629–630
 - outbreak in Yugoslavia, 39
 - pathogenesis, 621–622
 - phenotypic diagnosis, 628–629
 - phylogenetic relationships, 620–621
 - preparedness, 18–19
 - prophylaxis, 630–634
 - replication, 619
 - Soviet Union production of virus, 9
 - specimen collection and handling, 628
 - treatment of, 624–635
 - vaccine, 114–115, 777–787
 - WHO eradication program, 9
- Smallpox Response Plan, 628
- Smuggling risks, 80
- Snakes, venomous, 418–419, 424–426, 428–430, 432–442
- Soman
 - pyridostigmine bromide prophylaxis, 113
- South Africa
 - biological warfare agents, 11–12
- South America
 - alphavirus encephalitides outbreaks, 482
 - Chikungunya outbreak, 674
- South Korea
 - severe fever with thrombocytopenia syndrome virus, 676
- Soviet Union
 - accidental anthrax release, 49–50, 130
 - accusations of US biowarfare attacks, 6–7
 - biological warfare agents, 8–10
 - C. botulinum* research program, 338–339
 - filoviruses biological warfare program, 584–586
 - plague warfare research, 254
 - ricin as biological weapon research, 376
- Specimen collection, 719–722
- Spider bites, 419–420, 421, 430, 432, 442–443
- Spokane, Washington
 - ricin attacks in 2004, 377
- Squirrels
 - plague transmission role, 257–258
- Stafford Act, 98, 100
- Stalin, Joseph, 9
- Standing operating procedures, 876
- Staphylococcal enterotoxin B
 - animal models, 405–406
 - cardiovascular symptoms, 407–408
 - characterization of, 404–405
 - clinical disease, 406–408
 - detection of, 408
 - development of therapeutics, 409
 - diagnosis of, 408
 - fever onset and duration, 407
 - headache onset and duration, 407
 - hematology, 408
 - host response, 405–406
 - medical countermeasures, 795–796
 - medical management, 408–409
 - nausea and vomiting, 407
 - ocular effects, 408
 - respiratory symptoms, 407
 - signs and symptoms, 406–408
 - vaccines, 409, 795
- Staphylococcus aureus*
 - animal models, 405–406
 - cardiovascular symptoms, 407–408
 - characterization of toxins, 404–405
 - clinical disease, 406–408
 - detection of, 408
 - development of therapeutics, 409
 - diagnosis of, 408
 - fever onset and duration, 409
 - headache onset and duration, 407
 - hematology, 408
 - host response, 405–406
 - medical management, 408–409
 - nausea and vomiting, 407
 - ocular effects, 408
 - respiratory symptoms, 407
 - signs and symptoms, 406–408
 - vaccines, 409

- State response planning, 102
 Sternberg, Surgeon General George, 918
 Stevens, Robert, 14
 Stillmark, Peter Hermann, 375
 Stimson, Henry L., 921
 Stingrays, 421–422
 Stings, venomous, 418
 Strategic National Stockpile, 22–23, 102, 123, 631–632
Streptococcus pyogenes
 animal models, 405–406
 cardiovascular symptoms, 407–408
 characterization of toxins, 404–405
 clinical disease, 406–408
 detection of, 408
 development of therapeutics, 409
 diagnosis of, 408
 fever onset and duration, 409
 headache onset and duration, 407
 hematology, 408
 host response, 405–406
 medical management, 408–409
 nausea and vomiting, 407
 ocular effects, 408
 respiratory symptoms, 407
 signs and symptoms, 406–408
 vaccines, 409
 Streptomycin
 brucellosis treatment, 166–167
 glanders treatment, 204
 Stroke
 differentiating from botulism, 343
 Structural vaccinology, 829
 Subunit vaccines, 827–829
 Sudan virus, 571–575, 587–589, 597
 Sulfadiazine
 glanders treatment, 204
 Superantigens, 404
 Supportive therapy
 ricin, 389
 Staphylococcal enterotoxin B, 408
 Surface polysaccharides, 189
 Surface structures, 263
 Suzuki, Dr. Mitsuru, 12
 Sverdlovsk, Soviet Union
 accidental anthrax release, 49–50, 130
 Swine influenza, 660–661
 Syndromic surveillance, 56–57
 Synthetic biology, 681
 Syria
 biological warfare agents, 12
 ricin as biological weapon research, 376
 Systems vaccinology, 829
- ## T
- T-cell receptors, 404–405
 T-cells
 response to *Brucella*, 163
 Tactical Combat Casualty Care, 140
Taenia solium, 76–77
 Tai virus, 571–575, 580, 587, 589
 Tanzania
 Chikungunya outbreak, 673–674
 Tapeworms, 76–77
 Technical Escort Units, 117
 Terrorism, biological. *See* Bioterrorism
 Tetrodotoxin, 422, 426, 430
- Texas
 plague pandemic, 251
 Thailand
 botulinum toxin foodborne outbreak, 339–340
 melioidosis incidence, 227
 Thompson, Diane, 12
 Thrombocytopenia syndrome, 675–676
 Tickborne disease
 anaplasmosis, 654–655
 borreliosis, 652–654
 differentiating from botulism, 343
 Ehrlichiosis, 654–655
 Heartland virus, 676–677
 paralysis caused by Ixodidae family, 419–420
 phleboviruses, 675–677
 severe fever with thrombocytopenia syndrome virus, 675–676
 TMP-SMX
 melioidosis treatment and prophylaxis, 234, 236
 Tokyo, Japan
 Aum Shinrikyo cult anthrax attacks, 13, 46–47
 Toll-like receptors, 404
Torovirus, 78
 Toxic shock syndrome, 404–405, 408
 Toxins
 arachnids, 419–420
 biological surety, 896–911
 as biological warfare agents, 423
 bites, 418
 botulinum toxins, 72–73, 340–349, 793–795
 cardiotoxins, 440–441
 classes, 424–452
 cnidarians, 420–422
 definitions, 417
 epidemiology of, 418–423
 excitatory neurotoxins, 430–432
 fish, 420–422
 hemolytic toxins, 437–440
 hemorrhagic toxins, 437–440
 hemostasis-active toxins, 435–437
 insects, 420, 421
 marine algal, 462–473
 medical countermeasures, 793–797
 myotoxins, 432–435
 necrotrotoxins, 442–443
 nephrotoxins, 442
 origin of word, 2
 paralytic neurotoxins, 424–430
 research directions, 452–453
 scorpions, 419–420
 sea snakes, 420–422
 snakes, 418–419
 spiders, 419–420, 421
 staphylococcal enterotoxin B, 404–409, 795–796
 stings, 418
 Transport inhibitors, 391
 Tree squirrels
 plague transmission role, 257
 Trimethoprim
 glanders treatment, 204
 Tularemia
 aerosol transmission, 288
 arthropod vectors, 288
 bacterial culture techniques, 293
 clinical manifestations, 290–292
 diagnosis of, 292–294
 direct contact, 287
 epidemiology of, 287–289
 food and water ingestion, 288

infectious agent, 286–287
Kosovo outbreak, 1999–2000, 52–53
laboratory-acquired, 289
laboratory worker exposure, 296
mammalian bites, 288
Martha's Vineyard outbreak, 2000, 51–52, 292
medical countermeasures, 761–764
pathogenesis, 289–290
postexposure prophylaxis, 295, 764
prophylactic treatment, 295–295
rapid diagnostic methods, 293–294
serology, 293
treatment of, 294–295
in unusual settings, 288–289
use as biological weapon, 296
vaccination with live vaccine strain, 289, 290, 295–296, 761–763
The Turner Bill, 933
Twin arginine transport, 263
Type III secretion system, 261–262
Typhoidal tularemia, 291, 292

U

U.K. Laboratory of HealthCare Associated Infections, 327
Ukraine
 plague pandemic, 250, 252
Ulceroglandular tularemia, 291, 292
UN Special Commission, 10, 11
United States Naval Ship *Comfort*, 323, 325
University of Pittsburgh, 57
UNSCOM. *See* UN Special Commission
Uruguay Round Agreement on the Application of Sanitary and Phytosanitary Measures, 80
U.S. Army Center for Health Promotion and Preventive Medicine, 324
U.S. Army Medical Command, 329
U.S. Army Medical Research and Materiel Command, 329
U.S. Army Medical Research Institute of Infectious Diseases
 anthrax sample testing, 14–15
 biosafety, 880–881
 casualty management, 110–124
 creation of, 8, 923
 ricin vaccine research, 388
 tularemia vaccine, 295–296
U.S. Congress
 anthrax attacks in US, 2001, 47–48, 130
 ricin bioterrorism attack, 16, 377
U.S. Department of Agriculture, 5, 23, 44, 80, 101–102, 703, 897
U.S. Department of Defense, 57, 112, 324, 329, 331–332, 628, 704, 888, 927–931
U.S. Department of Energy, 58
U.S. Department of Health and Human Services, 20, 21–22, 100–102, 703, 897
U.S. Department of Homeland Security, 23, 56, 94, 101–102
U.S. Department of State, 102
U.S. Department of Transportation, 902
U.S. Environmental Protection Agency, 882–883
U.S. Food and Drug Administration, 82, 112, 272, 587, 702–704, 916, 926–933
U.S. military. *See also* specific wars by name
 biological warfare agents, 4–8
 Health System response to *Acinetobacter* infections
 laboratories, 705–708, 716–718
 options for fulfilling mission and ethical responsibilities to military personnel, 929–931
 plague risks at military installations, 252, 253
U.S. National Science Advisory Board for Biosecurity, 59
U.S. Postal Service
 anthrax attacks in 2001, 47–48, 130

 ricin attacks in 2003–2004, 48–49
 ricin bioterrorism attack, 16
USA PATRIOT Act, 897, 900
USAMRIID. *See* U.S. Army Medical Research Institute of Infectious Diseases
USDA. *See* U.S. Department of Agriculture

V

V3526 vaccine, 500
Vaccine Adverse Event Reporting System, 757
Vaccines
 ACAM2000 vaccine, 115
 adjuvants, 831–832
 adverse events, 757–758
 alphavirus encephalitis, 498–501, 773–776, 777–787, 789–790
 anthrax, 10, 113, 114, 140–141, 753–758
 bacterial diseases, 753–756
 botulinum toxin, 348, 793–794
 brucellosis, 768
 Clostridium perfringens, 363, 366–367
 filoviruses, 587, 588–589
 glanders, 206, 207–208, 766
 inactivated, 499
 live attenuated vaccines, 207, 273, 758, 825–826
 live vaccine strains, 289, 290, 295–296, 498–499
 melioidosis, 234–236, 766
 mucosal vaccines, 830–831
 nucleic acid vaccines, 829–830
 orthopoxviruses, 630–634
 plague, 115, 273–274, 764–765
 Q fever, 115, 312, 770–771
 recombinant vaccine vectors, 826–827
 ricin, 387–388, 796
 ricketsial diseases, 753–754
 ring vaccination, 115
 smallpox, 114–115, 777–787
 Staphylococcal enterotoxin B, 409, 795
 Staphylococcus aureus, 409
 Streptococcus pyogenes, 409
 subunit vaccines, 827–829
 trends in biodefense development, 824–825
 tularemia, 289, 290, 295–296, 761–763
 viral hemorrhagic fevers, 788–790
 whole cell vaccines, 312
 yellow fever, 115
Vaccinia immune globulin, 633, 634
Vaccinia virus, 825–826
Variola virus, 617, 622–623–626
Vascular leak syndrome, 376
Venezuelan equine encephalitis, 483–484, 485, 492–493, 773–774
Venezuelan hemorrhagic fever, 521, 530
Venoms
 arachnids, 419–420
 as biological warfare agents, 423
 bites, 418
 cnidarians, 420–422
 definitions, 417
 epidemiology of, 418–423
 fish, 420–422
 insects, 420, 421
 research directions, 452–453
 scorpions, 419–420
 sea snakes, 420–422
 snakes, 418–419
 spiders, 419–420, 421
 stings, 418
Verotoxin, 377

VHF. *See* Viral hemorrhagic fevers
Vibrio cholerae, 77, 647–649
 Vibrioses, 649
 Vietnam War
 melioidosis cases, 225
 plague incidence, 252
 plague prevention, 249
 Viral hemorrhagic fevers, 725, 788–793
 Virginia
 alphavirus encephalitis outbreaks, 482
 Virtual screening, 390, 391
 Virulence factors
 glanders, 191
 melioidosis, 228–230
 Virus-like particles, 828
 Virus replicon particle vaccines, 501, 827
 Virus-Toxin Law, 926

W

W bombs, 376
 Walter Reed Army Institute of Research, 324, 327, 328–330
 Walter Reed Army Medical Center
 Acinetobacter infections, 323, 324–327
 War Bureau of Consultants, 857
 War Research Service, 921
 War Reserve Service, 5
 Washington
 plague pandemic, 251
 ricin attacks in 2004, 377
 Washington, George, 918
 Waste disposal, 882–884
 Water Sentinel program, 78
 Water supply
 bioterrorism concerns, 77–78
 security of, 80–82
 Waterborne diseases
 cholera, 647–649
 cryptosporidiosis, 75
 emerging diseases, 647–650
 Escherichia coli, 74
 hepatitis A, 75
 Legionellosis, 649–650
 listeriosis, 73–74
 parasites, 76–77
 salmonellosis, 73
 shigellosis, 74–75
 threat potential, 76, 77
 vibrioses, 649
 Weapons of Mass Destruction–Civil Support Teams, 123
 Weekly Epidemiological Record, 259
 Welch, William, 362
 West Africa
 Ebola virus epidemic, 677–678
 West Nile virus
 New York City outbreak, 1999, 50–51
 yearly spread of activity across the U.S., 1999–2004, 672–673
 Western blot assay, 202
 Western equine encephalitis, 484, 485–486, 494–495, 774–776
 Whitmore, Captain Alfred, 224
 WHO. *See* World Health Organization
 Whole cell vaccines, 312
 Whole genome sequencing, 656–657
 Wicker, Roger
 ricin attacks in 2004, 48–49, 377
 Wood rats
 plague transmission role, 258
 Working Group on Civilian Biodefense, 272, 273

World Health Assembly, 18
 World Health Organization
 anthrax surveillance and control guidelines, 140
 attempted investigation of biologic agent use during World War II, 6
 Plague Manual, 269
 smallpox eradication program, 9
 Weekly Epidemiological Record, 259
 World Trade Organization, 80
 World War I and II
 gas gangrene, 363
 plague attacks, 252–254
 plague outbreak, 252
 Q fever outbreaks, 8, 306–307
 ricin as biological weapon research, 376
 use of biological agents, 3–4, 43–44, 78
 Wound botulism, 342, 344
 WRAIR. *See* Walter Reed Army Institute of Research

X

Xoma 3AB, 346

Y

Yellow fever, 115
 Yellow Fever Commission, 918
 Yellow fever virus, 827
 Yellow oleander, 440
 Yeltsin, Boris, 10, 338–339
Yersinia pestis
 antibiotic treatment, 272
 autotransporter proteins, 263
 biochemistry of, 255–256
 as biological warfare agent, 252–254
 Black Death, 250–251
 bubonic plague, 265, 267
 characteristics of, 254–256
 clinical manifestations, 265–269
 cutaneous plague, 268–269
 diagnosis of, 269–271
 differentiation from *Y. pseudotuberculosis*, 254
 endemic disease, 251–252
 epidemiology of, 256–259
 F1 antigen, 262
 fimbriae, 262–263
 first pandemic, 250
 gastrointestinal plague, 268
 growth characteristics, 254–255
 historical perspectives, 249–251
 incidence of, 259–261
 iron sequestration, 263
 isolation of patients, 271–272
 Justinian plague, 250
 laboratory confirmation, 269–271
 manganese sequestration, 263
 medical countermeasures, 764–765
 morphology, 254
 pathogenesis, 264–265
 phage shock protein response, 263
 pharyngeal plague, 268
 plague meningitis, 268
 plasminogen activator, 262
 pneumonic plague, 267, 268
 postexposure prophylaxis, 273, 765
 prevention of, 272–273
 second pandemic, 250–251
 septicemic plague, 265–267

- signs and symptoms, 269
- small RNAs, 263
- surface structures, 263
- taxonomy, 254
- third pandemic, 251
- treatment of, 271–274
- twin arginine transport, 263
- Type III secretion system, 261–262
- vaccines, 115, 273–274, 764–765
- virulence and transmission factors in the flea, 264
- virulence determinants, 261–264
- virulence factors in mammalian hosts, 262–263
- warfare and, 251–254
- Yersinia pseudotuberculosis*, 254, 255
- YopK, 262
- Yugoslavia
 - smallpox outbreak, 39

Z

- Zmapp, 792
- Zoonotic illnesses. *See* Animal diseases