

Index

A

Adaptive management, 185–186, 188, 194
American Veterinary Medical Association (AVMA), 243
Arizona Leafy Green Marketing Association (AZLGMA) board, 179
Asian flu, 102
Avian influenza (AI) viruses. *See* Influenza A viruses (IAV)
Avian paramyxovirus (APMV). *See* Newcastle disease viruses (NDV)

B

Bacteria
antimicrobial resistance, 70–71
Campylobacter
antimicrobial resistance, 100–101
bird feeder, 91
C. coli, 67
C. concisus, 67
C. jejuni, 67, 99
C. upsaliensis, 67
in Europe, 98
gastrointestinal and extra-gastrointestinal infections, 67
genetic diversity, 68
genus, 98
in Germany, 68
Listeria monocytogenes, 69–70, 101
microbiological methodology, 67
in North-Western Italy, 68
in Norway and Finland, 68

public health concerns, 99–100
seasonality, 69
in Spain, 68–69
in Sweden, 68
transmission pathways, 67–68
Clostridium perfringens, 101
E. coli, 101
non-typhoidal *Salmonella* spp., 63–65
Salmonella (*see* *Salmonella*)
STEC
in Austrian Alps, 66
game meat chain and human infection, 66–67
infection, sources, 65
prevalence surveys, 65
reservoirs of, 65
risk factors, 66
sporadic cases, 65
trend for, 65
Yersinia enterocolitica, 101
Biodiversity, 32, 44, 52
Bovine tuberculosis, 77–78
Brucella, 3, 76
Brucellosis, 76–77
Bushmeat, 32, 35, 36, 48, 49, 52

C

CAFOs. *See* Concentrated animal feeding operations (CAFOs)
California Leafy Green Products Handler Marketing Agreement (CALGMA), 170, 173, 174, 179, 203, 207

- Campylobacter*, 13, 16, 20
 antimicrobial resistance, 100–101
 bird feeder, 91
C. concisus, 67
 in Europe, 98
 gastrointestinal and extra-gastrointestinal infections, 67
 genetic diversity, 68
 genus, 98
 in Germany, 68
Listeria monocytogenes, 69–70
 microbiological methodology, 67
 in North-Western Italy, 68
 public health concerns, 99–100
 seasonality, 69
 in Spain, 68–69
 in Sweden, 68
 transmission pathways, 67–68
Campylobacter jejuni, 4, 6, 11, 15, 27, 67, 98–100
Campylobacter upsaliensis, 67
 Ceftriaxone, 97
 Co-management processes
 adaptations, 205
 balancing food safety, 202
 bare ground buffers, 208, 209
 CAFOs, 205
 conservation practices, 212
 contamination risk, 204
 costs, 210–211
 cover crops, 206, 210
 cropping system, 209
 eliminate wildlife, 203
 Endangered Species Act, 204
 factors, pathogen transport and survival, 205
 FDA Food Safety Modernization Act, 204
 fecal contamination, careful inspection, 207
 fencing, 208–209
 food safety professionals, 202, 212
 grower practice, 206
 irrigation water, 206
 LGMA, 205
 liability insurance, 211–212
 low-hazard/negligible risk, 208
 management decisions, 203
 noise cannons, 207
 on-farm decisions, 214
 on-farm food safety programs, 219
 pre-plant risk assessment, 205
 resource conservation, 202
 set traps, 209
 stakeholders, 212
 support and training opportunities, 213–214
 temporal shift, 206
 vegetation, 203
 water, agronomic suitability, 209
 water bodies, 203
 water quality communities, 212
 Commodity Specific Food Safety Guidelines for the Production and Harvest of Lettuce and Leafy Greens (CSGLLG), 170, 171
 Concentrated animal feeding operations (CAFOs), 188, 205
Coxiella burnetii, 60, 78
Cryptococcus, 118
Cryptosporidium, 9, 13, 16, 20
Culex spp., 109, 115, 116
- D**
 DNA-based serotyping. *See* Molecular serotyping
- E**
 Eastern equine encephalitis virus (EEEV), 109, 110, 115–117
Echinococcus granulosus, 73–74
Echinococcus multilocularis, 73–74
 Emerging infectious diseases (EIDs), 31, 36–37
 Environmental impact statement (EIS), 233
 Epidemiological cut-off values (ECOFF), 100
Escherichia coli (*E.coli*), 16, 17, 20, 21
Escherichia coli O157:H7, 3, 4, 7, 15, 17, 20, 65, 66, 175, 202, 212, 218, 221, 229
- F**
 Food and Drug Administration (FDA)
 covered farm, 234
 draft regulation, 234
 Produce Safety Rule
 AEI, 231, 233
 biological hazards, 231
 commodity-specific guidance documents, 231
 cost estimation, 232
 economically significant rule, 231
 FSMA, 228–230
 EIS, 233
 on-farm food safety decisions, 220
 QAR, 231, 233
 small-scale, 232
 Foodborne pathogens
 antibiotic resistance, reservoir, 23

- contaminated meat consumption, 2–4
- emerging pathogens, reservoir for, 23
- mitigation and control strategies
 - adaptive management, 184–186
 - agricultural crops and livestock, 183
 - developing strategies, 188–190
 - fencing, 193
 - guard dogs, 194
 - habitat modification, 192
 - lethal control, 190–191
 - mitigation measures, 190
 - monitoring, 194
 - nonlethal techniques, 192, 193
 - physical barriers, 192
 - problem identification, 187
 - repellants, 192, 193
 - reproductive control, 191–192
 - risk assessment, 187–188
 - scare devices, 192, 193
- prevalence, 4–5
 - climatic/seasonal impact, 20–21
 - cultivation bias, 5
 - detection method, specificity, 13
 - hosts behavioral features, 17–20
 - host's physiological state, 16–17
 - management, 21
 - sample size and number, 13
 - sample source, 5
- produce field contamination, 4
- water sources contamination, 22–23
- wildlife–livestock–human interaction, in
 - Europe
 - bacteria (*see* Bacteria)
 - behavioral changes, 62
 - bovine tuberculosis, 77–78
 - brucellosis, 76–77
 - extensive farming, 60
 - game meat, 62
 - game species, 60
 - HEV, 71–73
 - intensive farming, 60
 - management practice, 62
 - Mycobacterium bovis*, 77–78
 - parasites (*see* Parasites)
 - proximity, 61
 - Q fever, 78
 - socioeconomic changes, 62
 - tularemia, 79
 - zoonotic diseases, 2, 60
- Food regulation
 - assist produce growers, education and extension, 234–237
 - balancing food safety, 221–223
 - decision making, 218, 224–226
 - domestic animals, 218
 - food safety requirements, 218
 - on-farm food safety decisions
 - buyers, 220
 - consumer confidence, 220, 221
 - crop–wildlife conflicts, mitigation, 219
 - farm visitors and customers, 220
 - federal agencies, 220
 - health initiatives, 221
 - Produce Safety Rule, 220
 - wildlife management strategies, 221–223
 - produce safety (*see* Produce safety)
- Food safety and wild life
 - co-management processes, 202, 212
 - global health problems, 241
 - healthy animals and environment, 242
 - One Health approach, 242
 - co-management approach, 247
 - ecosystem conservation, 243–246
 - human and animal health, 243
 - individual and disease-centered approach, 243
 - One Medicine concept, 243
 - public health, 243
 - system/community-based approach, 243
 - transdisciplinary way, 243
 - us vs. them approach, 246
 - Web of Causation, 246–247
 - wildlife preservation, 243–246
- Food safety, leafy green
 - CALGMA, 169
 - California vegetable growers, 170
 - CSGLLG, 170
 - expert panel recommendations, 179
 - recommended changes
 - adjacent land, 177–178
 - animal intrusion, 177
 - animals of significant risk, 175–177
 - contamination, 178
 - crop damage, 178–179
 - spinach outbreak, 169
 - survey
 - California leafy green food safety guidelines, 171
 - co-management issues, 172
 - co-management practices, 171
 - conservation practices, 174
 - data collection and analysis, 172
 - distribution, 171
 - expert panel review, 172
 - food safety programs, 173–174
 - Western Growers, 170

Food Safety Modernization Act (FSMA), 132, 228–230
 Food Safety Preventive Controls Alliance (FSPCA), 235
Francisella tularensis, 79
 Fungi, 118

G

GenomTrakr WGS database, 143
Giardia, 10, 16, 23
 Global Food Safety Initiative standards (GFSI), 211
 Good Agricultural Practices (GAPs), 219, 226, 235
 Guillian–Barré syndrome (GBS), 99

H

Hendra virus, 152
 Hepatitis E virus (HEV), 71–73
 Highlands J virus (HJV), 109, 117
 Highly pathogenic avian influenza (HPAI)
 H5N1, 45, 102, 104
 H7N7, 105
Histoplasma capsulatum, 118
 H1N1, 102
 Hong Kong flu, 102

I

iDecisionSciences (IDS), 171
 Influenza A viruses (IAV)
 Anseriformes, 103
 antigenic drift and shift, 102
 antiviral treatment, 103
 Asian flu, 106
 causes, 101
 epidemics, 102
 H17N10 and H18N11 viruses, 101
 H9N2, 105
 hemagglutinin, 101
 HPAI
 H5N1, 102, 104
 H7N7, 105
 LPAI viruses, 103, 104, 106
 neuraminidase, 101
 noneradicable zoonosis, 103
 pandemic, 102
 personnel protective equipment, 103
 swine influenza, 102
 vaccination, 103
 Integrated pest management (IPM), 191
 Irritable bowel syndrome (IBS), 99

J

Japanese encephalitis virus (JEV), 114

L

Listeria monocytogenes, 4
 Live-attenuated influenza vaccines (LAIV), 103
 Low pathogenicity avian influenza (LPAI) viruses, 103, 104

M

Molecular serotyping, 136–137
 Most probable number (MPN) method, 133
 Multilocus sequence typing (MLST), 100, 141–142
 Multiple-locus variable-number tandem repeat analysis (MLVA), 141
 Murray Valley encephalitis virus (MVEV), 115
Mycobacterium tuberculosis complex (MTC), 77

N

National Antimicrobial Resistance Monitoring system (NARMS), 97, 100
 National Environmental Policy Act of 1969 (NEPA), 233
 Natural Resource Conservation Service (NRCS), 220, 234
 Newcastle disease viruses (NDV)
 acute disease, 107
 arboviruses, 111
 Culex spp., 109, 110
 disease manifestations, 108
 EEEV, 115
 families, 109
 geographical range, 110
 HJV, 117
 hosts, 109
 humans and domestic mammals, 108
 JEV, 114
 long-distance spread, 111
 MVEV, 115
 public health risk, 110
 SLEV, 114
 transmission cycles, 108, 109
 USUV, 117
 WEEV, 116
 WNV (*see* West Nile virus (WNV))
 chickens, 107
 human infections, 108
 lentogenic/respiratory pathotype, 106
 mesogenic pathotype, 106
 natural reservoirs, 107

- neurotropic velogenic pathotype, 106
 - outbreaks, 106
 - peracute disease, 107
 - species, 106
 - strict biosecurity measures, 108
 - transmission, 107
 - vaccination, 108
 - velogenic pathotype, 106
 - virulent NDV, 106, 107
 - viscerotropic velogenic pathotype, 106
 - Nipah virus
 - foodborne risk, 163
 - henipavirus, 152, 163
 - human infection, 152
 - mode of transmission
 - bat bitten fruit consumption, 157
 - foodborne, 155–156, 164
 - pandemic, 164
 - person-to-person, 152, 157, 164
 - outbreak
 - India/Bangladesh, 153, 154, 163
 - Malaysia/Singapore, 152–153
 - Pteropus bats*, 152, 157
 - stage III zoonotic disease, 152
 - transmission, horsemeat, 163
 - vaccination, 164
 - Non-typhoidal *Salmonella* spp., 63–65
- O**
- One Health approach, 242
 - co-management approach, 247
 - ecosystem conservation, 243–246
 - human and animal health, 243
 - “individual” and “disease-centered” approach, 243
 - “One Medicine” concept, 243
 - public health, 243
 - system/community-based approach, 243
 - transdisciplinary way, 243
 - Web of Causation, 246–247
 - wildlife preservation, 243–246
- P**
- Parasites
 - Echinococcus granulosus*, 73–74
 - Echinococcus multilocularis*, 73–74
 - Toxoplasma gondii*, 74–75
 - Trichinella* spp., 75–76
 - Phasianidae, 112
 - PrimusLabs.com GAP programs, 173
 - Produce safety
 - FDA, 226 (*see also* Food and Drug Administration (FDA))
 - FSMA, 228–230
 - voluntary compliance
 - buyers, 226
 - commodity groups, 227
 - farmers and stakeholders, 228
 - PSP, 227–228
 - regulatory requirements, 228
 - third-party audit industry, 226–227
 - Produce Safety Alliance (PSA), 235, 236
 - Produce Safety Project (PSP), 228
 - Pulsed-field gel electrophoresis (PFGE), 138–140
- Q**
- Q fever, 76, 78
 - Qualified end user, 229
- R**
- Raw date palm sap
 - discouraging consumption, 158–159
 - safety improvement, 159–163
 - bamboo skirts, 160
 - only safe sap intervention, 162
 - sap stream and collection pot, 159–160
 - Red-legged partridges, 112
- S**
- Salmonella*
 - antimicrobial resistance
 - backyard chickens, 97
 - genes, 97
 - geographical distribution, 97
 - isolation, 97
 - NARMS, 97
 - wild birds, 98
 - bird feeder, 91
 - detection, molecular tools
 - DNA microarrays, 134–135
 - PCR, 134, 135
 - qPCR, 134
 - sample preparation, 135
 - enteritidis, 93
 - and foodborne disease, 132
 - genus, 93
 - molecular serotyping, 136–137
 - molecular typing methods
 - features, 138
 - gram-negative bacterial foodborne pathogens, 137
 - MLST, 141–142
 - PCR-based typing, 140–141

Salmonella (cont.)

- PFGE, 138–140
- WGS, 142–143
- non-typhoidal salmonellosis, 92
- normal gut microflora, 92
- organic food, 91
- public health concerns
 - outbreak, 94
 - pigeons, 96
 - potential health risks and mitigation strategies, 96
 - poultry, 95
 - S. Typhimurium*, 94, 97
 - transmission, mode, 92, 96
 - S. Cholerasuis*, 64
 - virulence potential, evaluation, 144
- Shiga toxin-producing *Escherichia coli* (STEC)
 - game meat chain and human infection, 66–67
 - in Austrian Alps, 66
 - infection, sources of, 65
 - prevalence surveys, 65
 - reservoirs of, 65
 - risk factors, 66
 - sporadic cases, 65
 - trend for, 65
- Spanish flu, 102
- Spoligotyping, 141
- Sprout Safety Alliance (SSA), 235
- Staphylococcus aureus*, 13
- St. Louis encephalitis virus (SLEV), 114
- Supershedders, 66
- Swine influenza (SI), 102

T

- Toxoplasma gondii*, 74–75
- Trichinella* spp., 3, 75–76
- Tularemia, 79

U

- United States Department of Agriculture (USDA), 90, 209, 213, 226, 227, 231
- Usutu virus (USUV), 117

W

- Western equine encephalitis virus (WEEV), 116
- West Nile virus (WNV)
 - age-associated differences, 112
 - Corvidae family, 111
 - Galliformes, 112
 - infection route, 113

- isolation, 112
- lineage 1 viruses, 111
- lineage 2 viruses, 111
- mature chickens, 112
- prevention, 113
- rate and incidence, 111
- seroconversion, 112
- vaccination, 114
- Whole Genome Sequence Analysis (WGS), 142–143
- Wild birds and free-range chickens
 - IAV (*see* Influenza A viruses (IAV))
 - one health issues
 - bird feeders, 91
 - human food, 91
 - meat, 90
 - organic food, 90
 - pathogen testing, 90
 - risk, 90, 91
 - zoonotic pathogens, 92–101
 - bacteria (*see* Bacteria)
 - fungi, 118

Z

- Zoonotic pathogens
 - bacteria (*see* Bacteria)
 - fungi, 118
 - IAV (*see* Influenza A viruses (IAV))
- Zoonotic viruses
 - animal-based food systems, 37–42
 - contact, 42
 - distal factors, 43–44
 - transmission routes, 42
 - animal production system
 - cost of, 32
 - global trends, 45–46
 - risk, 32
 - scale of, 33–35
 - current surveillance systems, 51
 - EID, 31, 36–37
 - intervention and risk mitigation options
 - conservation and health, 47–48
 - farmed wildlife, 50–51
 - policy landscape, 48
 - proximal and distal risk factors, 46
 - realistic interventions, 49–50
 - risk analysis, 48–49
 - wild harvest system, 32
 - costs, 32
 - global trends, 44–45
 - risk, 32
 - scale of, 35–36
 - sophisticated sale and distribution systems, 32