

Index

- Accelerating COVID-19
 Therapeutic Interventions
 and Vaccines (ACTIV), 44
 ACME POCT verification
 protocol, 159
 analytical studies (RADx),
 93–94
 antibodies, neutralizing, 40
 antibody test, 239
 antigen tests
 defined, 127, 239
 impact of variants, 178
 Regulatory Core, 198–199
 sample type, 128
- barriers (COVID-19 test
 commercialization)
 digital infrastructure,
 232–234
 payment policies, 228–230
 point-of-care (POC) assays,
 227–228
 privacy and liability issues,
 230–231
 regional guidance and
 messaging, 231–232
- biobanking
 clinical samples, 162
 RADx, 184–185
 variant vendor selection, 185
- burnout (frontline workers),
 255–256
- Centers of Disease Control and
 Prevention (CDC), 24
- China
 assessment of early
 infectivity, 10
 disease progression, 11–12
 first cases, 6–10
 first COVID-19 analysis, 14
 information censure, 9
 novel coronavirus
 announcement, 9
 sequencing laboratory
 closure, 10
 Wuhan lockdown, 11
 classification, COVID-19
 variant
- GISAID, 175
 Nextstrain, 175
 Pango, 175
 WHO convention, 176
- Clinical Review
 Committee (CRC)
 participants, 131
 process, 131–133
 use-related risk analysis,
 121
- clinical studies (RADx), 94
- CoLab, 77
- commercialization of test
 assays, core functions
 barrier identification,
 227–232
 business development,
 224–225
 business support, 224
 education, 224
 at-home testing pricing,
 223–224
 internal capabilities
 assessment, 213–214
 market education, 226–227
 market intelligence, 225
 market research, 214–215
 quantitative database,
 215–216
 stakeholder findings,
 216–222
- contact tracing, 17, 243–244
- COVID-19 dashboard (WHO),
 25–26
- COVID-19 Genomics UK
 (COG-UK), 172
- COVID-19 pandemic. *see also*
 SARS-CoV-2
 comprehensive response
 roadmap, 268
 high-level lessons
 learned, 269
 quality management system
 (QMS), 113–114
 quality management system
 (QMS)
 reprioritization, 117
 roadmap highlights,
 264–268
- test development quality,
 114–115
 vaccine platform features, 42
- COVID-19 pandemic, early
 detection
 disease progression,
 11–12, 14
 early clinical intervention
 methods, 61
 first cases, 6–10
 health emergency
 declaration, 12
 link to SARS-CoV and
 MERS-CoV, 9
 outbreak, 6
 viral infectivity
 assessment, 10
 viral pathogen
 sequencing, 10
- COVID-19 pandemic,
 management
 challenges, 25
 main strategy, 23
 testing utility, 25
- COVID-19 pandemic,
 mitigation strategies
 challenges, 236
 contact tracing, 243–244
 importance of flattening
 infection curve, 246
 Isolat model, 240–242
 KN95 masks, 242–243
 pooled testing, 245–246
 ROSALIND Diagnostic
 Monitoring (DxM),
 239–240
 testing adoption support,
 237–239
 testing public policy,
 246–248
 vaccination, 243
- COVID-19 pandemic,
 response
 areas to improve on,
 258–260
 cloud-based infrastructure
 tools, 76–77
 comprehensive response
 roadmap, 268

	Index	275
contact tracing, 17	epidemiological and clinical characteristics, 22	deep dive team (RADx) applicant contact point, 82
COVID-19 Response and Pandemic Preparedness, 18	evolution of, 22	components, 81
data and communications security, 77	formats, 23	expert assistance, 82
global, 14–17	at-home testing problems, 23	fast commercialization plan, 82
global community shutdown, 17	implementation and management, 22	proposal criteria, 82
Global Health Security (GHS) Index, 18	information overload, 21–22	RFP market research, 84
global preparedness lack, 18	initial lack of, 12	Defense Production Act (DPA) ratings, 94–95
importance of expertise and technology, 14	machine learning, 23	Deployment Core additional resources, 93
IPPPR error report, 26–27	nanobeads technique, 23	manufacturing, 92–93
lessons learned, 27–28	number of cases data point, 22	process development, 88
Pandemic Oversight Committee, 18	WHO recommendations, 22	procurement, 91–92
Pandemic Response Accountability Committee (PRAC), 18	COVID-19 pandemic testing adoption support goals of, 237	resources supplied, 88–90
public health and social measures (PHSM), 18	at-home testing, 237	role of, 88
Public Health Emergency Medical Countermeasures Enterprise, 18	My COVID Toolkit, 239	supply chain, 91
Rapid Acceleration of Diagnostics (RADx) initiative, 17–18	Project N95, 238	test reimbursement support, 93
research and development prioritization, 12–14	When To Test (website), 237–238	Deployment Core, core resources project management, 91
roadmap, 7	COVID-19 Response and Pandemic Preparedness, 18	quality management, 91
social distancing and personal protective equipment, 17	COVID-19 variants. <i>see also</i> Variant Task Force (VTF)	regulatory affairs, 91
summary, 268–273	antigen test impact, 178	design history file (DHF), 117
COVID-19 pandemic, social impact areas to improve on, 258–260	classification, 175–176	design review process (RADx), 100–101
direct impacts, 250–253	molecular test impact, 176–178	device history record (DHR), 112
divided positions on masks, testing, and vaccines, 256–257	pre-variant context, 173–174	device master record (DMR), 117
indirect impacts, 253–254	public awareness, 174–175	diagnostic test assay clinical verification inclusion and exclusion parameters, 161
long COVID, 257	sequencing methods, 171	partnerships, 160
mental health, 254–256	surveillance, 166	rural mobile units, 161
misinformation dangers, 256	timeline, 166	site staffing and training, 160–161
positive consequences of, 257–258	cross-reactivity studies, Emergency Use Authorization, 201	staff turnover planning, 161
timeline roadmap, 250	database organization (COVID clinical testing) collection and results, 163	diagnostic test assay clinical verification data collection clinical samples, 162
COVID-19 pandemic, surveillance COVID-19 dashboard (WHO), 25–26	consent forms, 162	database organization, 162–164
	demographic characteristics, 163	diagnostic test assay commercialization (COVID-19) core functions, 211–234
	inclusion/exclusion form, 162	RADx, 211
	participant reimbursement, 163–164	diagnostic test assay design across changing pandemic landscape, 140
	participant status, 163	biosafety issues, 129
	protocol deviations and adverse events, 163	considerations, 133
	server back-up procedure, 164	
	standard of care test, 163	

276	Index	
diagnostic test assay (cont.) controls, 136 delayed analysis, 129 direct detection assays, 135–136 hardware, 136 instrumentation, 136 nucleic acid amplification test (NAAT), 133–135 optimization, 136–137 over-the-counter (OTC) assay, 128 point-of-care (POC) assay, 127–128 preclinical testing, 139–140 result timing, 129 sample collector, 128–129 test performance, 137–138 test target audience, 129–131 diagnostic test assay laboratory verification ACME POCT verification protocol, 159 documentation, 158–159 inactivated virus in BSL2 laboratory, 148–149 live SARS-CoV-2 in BSL3 laboratory, 145–148 roadmap, 143 sensitivity studies, 149–153 timeline and steps, 145 variant samples for ITAP, 156–158 variant studies, 149 diagnostic test classification antigen tests, 127 molecular tests, 127 diagnostic test classification (COVID-19) antibody test, 239 antigen tests, 127, 239 molecular tests, 127, 239 diagnostic tests (COVID-19) roadmap, 126 in vitro diagnostics (IVD), 125 digital infrastructure (testing) changing pandemic landscape, 232–233 RADx reporting solutions, 234 result reporting, 233–234 traditional model, 232 direct detection assays, 135–136	documentation (COVID-19 laboratory testing) background section, 158 results section, 159 study purpose section, 158 test method section, 158–159 variant pool section, 158 early detection (COVID-19) disease progression, 11–12, 14 early clinical intervention methods, 61 first cases, 6–10 health emergency declaration, 12 link to SARS-CoV and MERS-CoV, 9 outbreak, 6 viral infectivity assessment, 10 viral pathogen sequencing, 10 Emergency Use Authorization (EUA) application, 199 clinical evaluation, 205–206 cross-reactivity studies, 201 flex studies, 206 inclusivity, 200 interference testing, 201 laboratory-developed test (LDT), 207 limit of detection (LOD), 200, 206 post-market commitments, 206–207 process evolution, 207–208 Regulatory Core, 197–198 right-of-reference (ROR), 207–208 stability, 201–204 usability studies, 206 environmental racism, 252 epitope mapping, 185–186 Europe, COVID-19 introduction, 14–16 failure modes and effects (FMEA), 121 fault tree analysis (FTA), 121 flex studies, 206 Food and Drug Administration (FDA), 196	GAITS, 77 GenBank, 171 gender inequalities and COVID-19, 253 Global Health Security (GHS) Index, 18 Global Initiative on Sharing All Influenza Data (GISAID), 172, 175 health-care system crisis global nature of, 19 medical supply chain, 19 heat map goal of, 97 key, 99 herd immunity, 41 horseshoe bats, 19–20 humoral immune response, 39–40 immunology, defined, 31 immunology, SARS-CoV-2 adaptive immune response, 39–40 entry into cell, 31–34 herd immunity, 41 innate infection immunity as double-edged sword, 36–38 innate infection response, 35–36 overview of normal system, 35 roadmap, 32 several components to, 31 in vitro diagnostics (IVD), 125 Independent Test Assessment Program (ITAP), 95–96 innate lymphoid cell (ILC), 38 interference testing, 201 interferons (IFNs) defined, 35 Type I, 36 ISO 13485, 106–107, 117 ISO 14971:2019, 107 Isolat model (IDSS COVID-19 Collaboration), 240–242 ISO/TR 24971:2020 Annex H, 107 ITAP lot-to-lot variability, 158 reason for, 156 test performance against delta variant, 157 variant testing, 157

KN95 masks, 53–54, 242–243, 256–257	Mobile and At-home Reporting through Standards (MARS), 234	Mount Sinai Beth Israel (MSBI) medical center staff support initiatives announcement schedules, 62 donation management, 63 recharge room and fitness center, 63 town halls, 62–63 work from home, 63
laboratory types (testing) BSL2, 148–149 BSL2 and BSL3 comparison, 147 BSL3, 145–148	molecular tests defined, 127, 239 impact of variants, 176–178 Regulatory Core, 198 sample type, 128	Mount Sinai Beth Israel (MSBI) medical center therapeutic interventions non-therapeutic, 62 stress and mistrust, 61–62
laboratory-developed test (LDT), 207	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	mutational order approach, 12
LAMP tests, 135	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	My COVID Toolkit, 239
limit of detection (LOD) Emergency Use Authorization, 200 performance, 206	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	nanobeads technique, 23
logistical challenges (RADx), 97	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	National Institute of Biomedical Imaging and Bioengineering (NIBIB), 74
long COVID, 257	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	National Institutes of Health (NIH) 2020 public–private vaccine partnership, 44
manufacturing (Deployment Core) additional resources, 92–93 quality management system (QMS), 112	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	National Institute of Biomedical Imaging and Bioengineering (NIBIB), 74
masked palm civets, 19–20	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	NK cells, 38
mental health and COVID-19 child, 254–255 frontline workers burnout, 255–256 problem amplification, 254 widespread demographics, 255	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	nucleic acid amplification test (NAAT) LAMP tests, 135 PCR based, 133–135 severity score calculations, 181
MERS-CoV-2, 19–20	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	optimization (assay) turnaround time, 137 workflow, 137
misinformation dangers (COVID-19), 256	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	organizational size, quality management system (QMS), 105–106
MisinfoRx toolkit (website), 256	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	over-the-counter (OTC) assay, 128
mitigation strategies (COVID-19) challenges, 236 contact tracing, 243–244 importance of flattening infection curve, 246	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	Oxford–AstraZeneca vaccine development, 44
Isolat model, 240–242	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	Pandemic Oversight Committee, 18
KN95 masks, 242–243	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	Pandemic Response Accountability Committee (PRAC), 18
pooled testing, 245–246	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	pathogen-associated molecular pattern (PAMP), 36
ROSALIND Diagnostic Monitoring (DxM), 239–240	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	
testing adoption support, 237–239	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	
testing public policy, 246–248	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	
vaccination, 243	Mount Sinai Beth Israel (MSBI) medical center clinical management emergency department case study, 54–55 challenges, 56 early testing and diagnosis, 55 facility modification, 55–56 mortality rate, 57–58 population morale and communication, 58 staff support, 56 telemedicine, 56–57	

- patient zero, 12
 pattern recognition receptor (PPR), 35
 personal protective equipment (PPE)
 KN95 masks, 242–243
 Mount Sinai Beth Israel (MSBI) medical center, 53–54
 Project N95, 238
 response to COVID-19, 17
 point-of-care (POC) assays, 127–128, 227–228
 Point-of-Care Technologies Research Network (POCTRN), 74–76
 pooled testing, 245–246
 preclinical testing
 comparator selection, 139
 reason for, 139
 sample selection, 139–140
 preliminary hazard analysis (PHA), 121
 procurement (Deployment Core), 91–92
 product development process (PDP), 110
 project management (Deployment Core), 91
 public health and social measures (PHSM), 18
 Public Health Emergency Medical Countermeasures Enterprise, 18
 public health emergency of international concern (PHEIC), 12

 quality management (Deployment Core), 91
 quality management system (QMS)
 best practices, 115–116
 COVID-19 pandemic test development quality, 114–115
 defined, 103
 development and testing, 110–112
 documentation impact, 113
 in early development, 110
 manufacturing, 112
 organizational size, 105–106
 product development process (PDP), 110
 reprioritization of standards, 117
 supplier management, 117–121
 quality management system (QMS), regulations and standards
 21 CFR 820, 106–107
 ISO 13485, 106–107
 similarities in, 107

 racial and ethnic group impact (COVID-19), 250
 raccoon dogs, 19–20
 Rapid Acceleration of Diagnostics (RADx) initiative. *see also* United States
 analytical studies, 93–94
 biobanking, 184–185
 Clinical Review Committee (CRC), 131–133
 clinical studies, 94
 cloud-based infrastructure tools, 76–77
 CoLab, 77
 collaboration, 84
 commercialization of test assays, 211–234
 Defense Production Act (DPA) ratings, 94–95
 Deployment Core, 88–93
 design review process, 100–101
 educational aspects, 84–85
 forecasting, 95
 GAITS, 77
 government entity support, 94
 heat map, 97
 Independent Test Assessment Program (ITAP), 95–96
 initiation of, 17–18
 logistical challenges, 93
 mission and goal, 74
 mitigation strategies, 237–248
 Mobile and At-home Reporting through Standards (MARS), 234
 organizational and scheduling support, 97
 organizational size, 105–106
 outcomes, 85
 pandemic response changes, 209–210
 process inception, 74–76
 professional mindset, 106
 quality best practices, 115–116
 Regulatory Core, 194–210
 roadmap, 75, 89
 sample procurement, 96–97
 spend-to-date reports, 97
 troubleshooting scale-up issues, 95
 Variant Task Force (VTF), 93
 Rapid Acceleration of Diagnostics (RADx) initiative, building out
 Clinical Review Committee, 79
 Clinical Studies Core, 78
 expert network building, 79
 Rapid Acceleration of Diagnostics (RADx) initiative, workflow
 call for proposals, 79
 deep dive team, 81–82
 Proposal Review Panel, 80
 Steering Panel, 82–84
 summary, 80
 Viability Panel, 80–81
 Regulatory Core
 antigen tests, 198–199
 Emergency Use Authorization, 197–198
 FDA and, 196
 goals of, 196
 molecular tests, 198
 origin of, 194–196
 testing future, 208
 reproduction index (R_0) (sp) defined, 10
 early SARS-CoV-2, 10
 research and development prioritization
 vaccine development, 14
 World Health Organization (WHO), 12–13
 right-of-reference (ROR), 207–208
 risk management
 being mindset, 106
 defined, 103
 human factors, 107–110
 product development process (PDP), 110

risk management considerations failure modes and effects (FMEA), 121 fault tree analysis (FTA), 121 preliminary hazard analysis (PHA), 121 use-related risk analysis, 121	mutation prevalence, 166–168 quality and risk management roadmap, 104 variant sequencing methods, 171 viral infectivity assessment, 10 viral pathogen sequencing, 10	remote learning disparities, 253 socioeconomic position (SEP) and COVID-19, 250–252 South Korea, 14 spend-to-date reports (RADx), 97 stability (Emergency Use Authorization) sample, 201 shelf life, 204 transport, 203–204 Steering Panel (RADx), decision choices WP1, 83–84 WP2, 84 Steering Panel (RADx), member composition, 83 supplier management (QMS), 117–121 supply chain (Deployment Core), 91 surveillance, SARS-CoV-2 genome databases, 171–173 emergence of, 168 global summary table, 169 swab pooling, 138
risk management, regulations and standards 21 CFR 820, 107 ISO 13485, 107 ISO 14971:2019, 107 ISO/TR 24971:2020 Annex H, 107 overview, 107 roadmap comprehensive response, 268 diagnostic test assay laboratory verification, 143 highlight, 264–268 immunology, 32 Mount Sinai Beth Israel (MSBI) medical center clinical management roadmap, 51 pandemic response, 7 quality and risk management, 104 RADx, 75, 89 social impact timeline, 143 ROSALIND Diagnostic Monitoring (DxM), 179–182, 239–240	SARS-CoV-2, immunology adaptive immune response, 39–40 entry into cell, 31–34 herd immunity, 41 infection clinical manifestations, 41–43 innate infection immunity as double-edged sword, 36–38 innate infection response, 35–36 overview of normal system, 35 roadmap, 32 serological assays to measure immune response, 43 several components to, 31 vaccination immunity, 43–46 SARS-CoV-2 Sequencing for Public Health Emergency Response, Epidemiology, and Surveillance (SPHERES) consortium, 172 Sequence Read Archive (SRA), 171 serological assays to measure COVID-19 immune response, 43 shelf-life stability, 204 social impact of COVID-19, direct environmental racism, 252 low socioeconomic position, 250–252 race and ethnic groups, 250 small business closures, 252 women, 253 social impact of COVID-19, indirect health-care access inequalities, 253 public schools, 253	T-cell responses, 39–40 telemedicine, 56–57 test performance, diagnostic assay sample pooling, 138 trade-offs, 138 toll-like receptor (TLR), 37–38 transport stability, 203–204 21 CFR 820, 106–107, 117 Type I interferon (IFN-1) cellular states due to heterogeneity response, 36 signaling, 36 stochastic layers, 36 United States. <i>see also</i> Rapid Acceleration of Diagnostics (RADx) initiative COVID-19 introduction, 16–17 lack of national strategic response, 27 Rapid Acceleration of Diagnostics (RADx) initiative, 74–86

usability studies, 206		
use-related risk analysis, 121		
vaccination (COVID-19)		
2020 NIH public-private partnership, 44		
2020 Oxford–AstraZeneca vaccine, 44		
Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV), 44		
categories, 44		
divided social opinion on, 256–257		
mitigation strategy, 243		
outcome, 44–46		
vaccine development		
early response, 14		
Mount Sinai Beth Israel (MSBI) medical center response, 66–68		
Variant Task Force (VTF), 93.		
<i>see also</i> COVID-19 variants		
biobanking vendor selection, 185		
epitope mapping, 185–186		
goals of, 178–179		
laboratory methods to assess performance, 182–185		
organization, 178		
policy, 179		
	ROSALIND Diagnostic Monitoring (DxM), 179–182	
	sample banking, 182	
	Wuhan-Hu-1 wildtype (WT) strain, 182–184	
	vendors (RADx)	
	procurement, 92–93	
	troubleshooting issues, 95	
	viral pathogen sequencing	
	critical for COVID-19 pandemic, 10	
	SARS-CoV-2 sequence, 10	
	SARS-CoV-2 Sequencing for Public Health Emergency Response, Epidemiology, an Surveillance (SPHERES) consortium, 172	
	viral pneumonia label, 9	
	viral RNA interferon effects, 36	
	VTF (Variant Task Force)	
	goals of, 150–151	
	protocol, 152	
	When To Test (website), 237–238	
	World Health Organization (WHO)	
	COVID-19 dashboard, 25–26	
	COVID-19 pandemic surveillance	
	recommendations, 22	
		health emergency declaration, 12
		IPPPR error report on response, 26–27
		public health and social measures (PHSM), 18
		Rapid Acceleration of Diagnostics (RADx) initiative, 17–18
		research and development prioritization, 12–13
		SARS-CoV-2 sequence, 10
		serological assays to measure COVID-19 immune response, 43
		variant classification, 176
		Wuhan, China travel precautions, 9–10
		Wuhan South China Seafood Market
		first cases, 7
		incident management system, 9–10
		zoonotic transference, 19
		Wuhan-Hu-1 wildtype (WT)
		variant strain, 182–184
		zoonotic monitoring
		mathematical model, 21
		organizations involved with, 21
		zoonotic transference, 19–20