

Index

Page references followed by *fig* indicate an illustrated figure.

- A/B testing, 35
- Acute lymphoblastic leukemia (ALL), 210
- ADAPTABLE clinical trial, 150–151
- “Alarm fatigue,” 84
- Alector, 99
- Alphabet, 233
- ALS (Lou Gehrig’s disease), 108
- Alzheimer’s disease
 - apps trying to distinguish memory issues from, 125
 - biomarkers’ potential to diagnose, 20, 52, 155, 212–213
 - building patient equation for, 119–125
 - drug development to fight off, 99
 - gathering data on, 40–41
 - offering interventions for, 61
 - theoretical paths for
 - neurodegenerative disease, 121–123
 - See also* Cognitive impairment; Dementia; Diseases
- Amazon, 35, 195
- Amazon Alexa, 54
- American Healthcare Leader*, 83, 85
- American Heart Association, 170
- American Medical Association, 223
- American Society of Clinical Oncology, 176
- Apple
 - Apple HealthKit app, 176, 209
 - Apple HomeKit app, 54
 - Apple Watch, 30, 46, 76, 153, 195, 233
 - health care research by, 195
 - iPhones, 51, 195
- Applied Health Signals (Livongo), 228
- Apps
 - Apple HealthKit, 176, 209
 - Apple HomeKit, 54
 - Babylon Diagnostic and Triage System, 45
 - BlueStar, 177
 - brain training, 126
 - Cardiogram, 45
 - debate over medical value of, 45–46
 - to distinguish memory issues from Alzheimer’s-like dementia, 125
 - Flumoji, 88
 - Migraine Alert, 45, 46
 - MoovCare, 177
 - Noom app-based diet and life coaching tool, 211
 - OneDrop, 75–77, 175, 180, 186
 - reSET, 177

- Apps (*continued*)
 Trak, 66
 Waterlogged, 175, 176
See also Digital technologies;
 Smartphones; Wearables
 App Store, 195
 Artificial intelligence (AI), 85–86,
 219, 226
 Artificial pancreas
 FDA warning on hacking, 74
 as solution to diabetes, 72–75
 Aspen Ideas: Health, 99
 ASSIST (Advanced Self-Powered
 Systems of Integrated Sensors
 and Technologies) [North
 Carolina State University], 70
 Asthma
 comparing diabetes to, 69–70
 wearable aimed at eliminating
 attacks, 71
The Atlantic, 211
 Automated Decision Support system
 (OneDrop), 75–77, 175, 180,
 186
 Ava ovulation-tracking bracelet,
 60–63, 64–67, 70, 71, 219
 Babylon Diagnostic and Triage System
 app, 45
 Babylon (UK), 45
 Bach, Dr. Peter, 211, 212
 Basal body temperature, 63
 Battery technology, 48, 51
 Bayesian methodologies
 collaborative Bayesian adaptive
 trials, 158*fig*
 combined with synthetic control,
 168–170, 198
 description of, 156
 I-SPY 2 breast cancer study,
 157–162, 197
 Bayes, Thomas, 156
 B-cell acute lymphoblastic leukemia,
 98
 B-cell lymphomas, 210
 BCR–ABL fusion, 127
Becker's Hospital Review, 134
 Behavioral data
 combining genetic information
 with, 13–14
 multiscale view of health including,
 6*fig*
 Bernard, Charlès, 237
 Berry, Dr. Don, 156–159, 197
 Beta-amyloid plaques, 119–120
 Biden, Joe, 94
 Big Data, 76
 Bill & Melinda Gates Foundation, 101
 Biomarkers
 collaborative Bayesian adaptive trials
 on, 158*fig*
 continuous vs. discrete points
 measuring of, 39–40
 description of, 17, 18
 digital technologies measuring
 medical, 29–31
 PSA (prostate-specific antigen),
 18–19, 115–118*fig*, 120–121
 testing for, 18–20
See also Measurements
 Biospecimens, 17–18, 20–21
 Blood pressure
 AI model to predict hypertension,
 86
 DeepHeart (algorithm) prediction
 of high, 45
 Bloomberg terminal, 31
 Bloomlife, 66
 Bluebird Bio, 211
 BlueStar app, 177
BMC Infectious Diseases, 87
 BrainHQ app, 126
 “Brain training” memory game
 (Lumosity), 126
 Breast cancer study (I-SPY 2 model),
 157–162, 197

Index

247

- Cambridge Cognition, 125
- Cancer Moonshot project (NCI), 94, 126
- Cancers
- application of data to treatment of, 22–23
 - changing the way we look at, 94–96
 - colon cancer screening, 85
 - complexity of genes and, 13
 - complexity of the disease, 93
 - glioblastoma (brain cancer), 161
 - interaction between other diseases and, 129–130
 - p53 mutation and susceptibility to, 20, 96–97
 - prostate, 18–19, 21, 115–118*fig*, 120
 - TP53 gene in DNA causing, 127
 - triple-negative tumors, 94
 - See also* Diseases
- Cancer treatments
- for B-cell acute lymphoblastic leukemia, 98
 - IBM's Watson failure, 44, 47, 133–134, 219
 - I-SPY 2 breast cancer study on, 157–162, 197
 - Keytruda, 98–99, 155
 - Kymriah, 98, 210, 211
 - phage therapy applied to, 93–94, 99
 - proteomics approach to, 94
 - value of collaboration to develop, 194
 - See also* Treatment/clinical care
- Cardiogram app, 45
- CardioNet, 184
- Carson, Joy, 98
- Carson, William, 194
- Castleman disease
- data management role in treating, 107–108
 - description and traditional treatment of, 106
 - Dr. Fajgenbaum's work fighting, 102, 106, 107–110, 140, 153, 170
 - idiopathic multicentric Castleman disease (iMCD) form of, 106–109
 - implications for other diseases, 111
- Castleman Disease Collaborative Network, 106, 153
- Center for Genomics and Personalized Medicine (Standard University), 232
- Centers for Disease Control and Prevention (CDC) "Flu View" report, 86, 86–87
- Chasing My Cure: A Doctor's Race to Turn Hope into Action* (Fajgenbaum), 107
- Cheek, Julia, 224–225
- Chronic myeloid leukemia, 127
- Clinical care. *See* Treatment/clinical care
- ClinicalTrials.gov, 145, 146
- Clinical trials
- accepting new kinds of data, 152–154
 - ADAPTABLE, 150–151
 - advantages of Bayesian methodology for, 156–170
 - expanding access to, 144–147
 - GBM AGILE, 161–162
 - insights into adaptive designs for, 170–172, 196
 - I-SPY 2 breast cancer study, 157–162, 197
 - making them truly patient-centric, 149–152
 - synthetic control, 162–168, 198
 - typical phase III, 149–150
 - See also* Drug development
- Cognitive data
- building patient equations using, 119–125

- Cognitive data (*continued*)
 multiscale view of health including,
 6*fig*
 Cognitive factors, 34–36
 Cognitive impairment
 building patient equations for,
 119–125
 factors involved in treating,
 123–125
 false “brain training” memory game
 to slow, 126
 See also Alzheimer’s disease;
 Dementia
 Collaborative data
 to accelerate the value of research,
 197–201
 to become part of larger digital
 ecosystem, 195–196
 Colon cancer screening, 85
 ColonFlag system, 85, 89
 Columbia Business School, 214
 Columbia Presbyterian Medical
 Center, 19
 Columbia University, 119, 120, 137,
 161
 Consumer Electronics Show (CES),
 46
 Costello, Anthony, 150
 Cowen, Tyler, 43
 Crick, Francis, 4, 10, 14
 Crowdsourcing to track flu, 86–87
 Cue Health, 233
 CURE magazine, 145
 Cyrcadia Health, 94
 Cystic fibrosis, 99, 100

 Dachis, Jeffrey, 75–77
 Dassault Systèmes, 237, 238
 Data
 application to treatment of cancer,
 22–23
 biomarkers, 17–20
 biospecimens, 17–18, 20–21
 clinical trials accepting new kinds
 of, 152–154
 Flumoji (crowdsourcing tracking
 engine), 86–87
 layers of, 24–25
 molecular, 6*fig*, 123
 partnering with doctors, 83–85
 PatientsLikeMe’s self-reported,
 26–28
 patient territory, 22–24
 privacy and transparency issues of,
 234–235
 tracking the flu, 81–89
 traditional biomarkers, 29–31
 See also Patient equations; Statistics
 Data collaboration
 accelerating the value of research,
 197–201
 Data & Society Research Institute, 84
 Davi, Ruthanna, 166
 DeepHeart (algorithm), 45
 Dementia
 apps trying to distinguish memory
 issues from, 125
 beta-amyloid plaques linked to,
 119–120
 factors involved in treating,
 123–125
 financial and social costs of, 123
 theoretical paths for
 neurodegenerative disease,
 121–123
 See also Alzheimer’s disease;
 Cognitive impairment
 Dennis, Kara, 153, 176
 Department of Defense, 128, 130
 Department of Veterans Affairs, 128,
 130
 Diabetes
 artificial intelligence model to
 predict, 86, 219
 artificial pancreas-type solution to,
 72–74

Index

249

- DeepHeart (algorithm) prediction
 - of, 45
 - doctors incentivized to prevent, 206
 - latent autoimmune diabetes of
 - adulthood (LADA), 76
 - multi-hormone closed loop system
 - treatment for, 74
 - Noom app-based diet and life
 - coaching tool, 211
 - OneDrop system for, 75–77, 175, 180, 186
 - Open Artificial Pancreas System
 - project (#OpenAPS), 74–75
- Diabetes* journal, 76
- Diagnosis
 - biomarkers used for, 17–20, 29–31
 - data used for early intervention and, 88–89, 220–222, 232–233
 - heart disease, 220–222
 - high-frequency feedback used for, 29–31
 - low cost of better digital
 - measurements, 37–40
 - See also* Treatment/clinical care
- Digital technologies
 - artificial intelligence (AI), 85–86, 219, 226
 - complexity of digital images, 135–136
 - empowering patients through, 224–228, 232–233
 - importance of doctors to
 - revolutionary use of, 217–222
 - low cost of measurements using, 37–40
 - machine learning and AI, 85–86
 - need for increased application to
 - clinical trials, 154–156
 - as part of a larger ecosystem, 195–197
 - privacy and transparency issues of, 234–235
 - See also* Apps; Medical devices; Wearables
- Diseases
 - asthma, 69–71
 - Castleman disease, 102, 106
 - cystic fibrosis, 99, 100
 - data used for early intervention, 88–89, 220–222, 232–233
 - diabetes, 45, 69–77, 86, 206, 211, 219
 - heart disease, 220–222
 - interaction between cancer and
 - other, 129–130
 - Lyme disease, 225, 232
 - “omnigenic” nature of, 13
 - proteins used to diagnose, 20
 - rheumatoid arthritis (RA), 111, 209
 - transitioning to wellness following
 - treatment for, 129–130
 - See also* Alzheimer’s disease; Cancers; Illness
- DNA
 - biospecimen to search for specific
 - sequences of, 18
 - Gattaca*’s illustration on limitations
 - of, 10–11, 235
 - “junk,” 25
 - TP53 cancer-causing gene in the, 127
 - Watson and Crick’s breakthrough
 - on, 4, 10, 14
 - See also* Genotype
- Doctors
 - partnering with patients, 222–224
 - their importance to the data
 - revolution, 217–222
- Drug development
 - how precision medicine impacts, 105–106
 - incentives for delivery of
 - therapeutic value of, 211
 - including engagement strategy as
 - part of, 180–182
 - See also* Clinical trials
- Duchenne muscular dystrophy, 38

- Dudley, Dr. Joel, 7–8
 Duke University Hospital's Sepsis Watch system, 82–85, 89
- ECG
 CardioNet, 184
 livestream and continuous, 14, 33
The Economist, 195
 Elashoff, Barbara, 28–29, 165–166
 Elashoff, Mike, 29, 166
 El Camino Hospital (California), 85
Elemental publication, 224
 Elish, Madeleine Clare, 84
 Engagement strategy
 challenges to implementing, 182–185
 pre- versus post-regulatory approval, 181*fig*
 EverlyWell, 224–225
- Facebook, 195
 Fajgenbaum, Dr. David, 102, 106, 107–110, 140, 153, 170
Fantastic Voyage (film), 236
 Farmanfarmaian, Robin, 216, 226
 FDA (Food and Drug Administration)
 artificial pancreas-style system approved by, 73
 Ava approval by, 60
 clinical trial responsibilities by, 149
 concerns over 23andMe genetic diagnostics by, 36
 Keytruda cancer treatment approved by, 98
 mTOR inhibitor sirolimus approved by, 108
 6-minute walk test used for submission to, 38
 support of Bayesian trial design, 160
 Fernandez, Clara Rodriguez, 73–74
 Fertility
 Ava ovulation-tracking bracelet, 60–63, 64–67, 70, 71
 Trak's at-home testing kit, 66
 YO's at-home semen analysis by smartphone, 66
Financial Times, 45
 Fitbit, 52, 66, 76, 153
 Flatiron Health, 168
 Flu
 benefits of catching early, 81–82
 CDC's "Flu View" report on the, 86–87
 data tracking the, 86–89
 Flumoji (crowdsourced flu-tracking app), 86–87, 88
 Flu Near You, 87
 Flu shots, 87
Forbes Healthcare Summit, 73
Forbes magazine, 223
 Frequentist methodology, 156, 157
- Gartner, 153
 Gastric bypass surgery, 205
 Gates Foundation, 101
Gattaca (film), 10–11, 235
 Gawande, Dr. Atul, 43, 175
 GBM AGILE (Glioblastoma Adaptive Global Innovative Learning Environment), 161–162
 Genes: cancer and, 13; HER2/neu gene, 94
 Genetic panels, 153
 Genome
 a future of predicting disease using, 232
 importance in determining our health, 4
 sequencing the, 3, 10
 Genotype
 the false promise of, 10–14
 phenotype vs., 3–4, 11*fig*–13
 See also DNA
 GlaxoSmithKline, 86, 87, 209
 Glioblastoma (brain cancer), 161
 Glucose-sensing contact lens, 44, 47
 Goldner, Dan, 77

Index

251

- Google
 attempts to track the flu by, 87
 Gmail, 195
 Google Home, 54
 health care research and products by, 195
 Nest Learning Thermostat, 53–54, 60
 Verily, 47
 Groove Health, 177
- Hatfull, Dr. Graham, 99–101
 HealthKit app, 176, 209
 Heart disease, 220–222
 Helme, Kady, 73, 74
 HER2/neu gene, 94
 Herophilus, 6, 8, 14
 Herrling, Paul, 6–7, 119
 Heywood, Jamie, 26–28, 32
 High blood pressure
 AI model to predict hypertension, 86
 DeepHeart (algorithm) prediction of, 45
 Hypertension study (2018), 31
 Hippocrates, 3, 4
 HITLAB (Healthcare Innovation and Technology Lab), 183
 HIV, 111
 Hodgkin's lymphoma, 147
 Hodgkins, Michael, 223
 Hook-Barnard, India, 88
 Hourani, Andrew, 177
 Hypertension, 45, 86
 Hypertension study (2018), 31
 Hypothermia, 5
- IBM's Watson failure, 44, 47, 133–134, 219
 Icahn School of Medicine (Mount Sinai), 8
 Idiopathic multicentric Castleman disease (iMCD), 106–109
IEEE Spectrum, 83
- Ikeguchi, Dr. Edward, 137–138
 Illness
 benefits of catching early, 81–82, 86–87
 challenges of stopping spread through data, 87–89
 See also Diseases
 Immunotherapy treatments
 for Alzheimer's disease, 99
 customized, 98–99
 great potential of, 101–102
 Kymriah, 98, 210, 211
 Incyte, 87
Inside Signal Processing newsletter, 82
 Institute for Next Generation Healthcare, 8
 Insulin
 artificial pancreas-type system to replace, 72–74
 multi-hormone closed loop system to supplement, 74
 International Programme on Chemical Safety (WHO), 17
 iPhones, 51, 195
 IVF, 64
 I-SPY 2 breast cancer study, 157–162, 197
- Janssen (Johnson & Johnson), 177
 Jawbone fitness trackers, 195
 Jenkins, Julian, 87, 88
 Jobs, Steve, 51
 Johnson & Johnson, 177
Journal of Chronic Diseases, 162
Journal of Medical Internet Research, 84
 "Junk DNA," 25
Jurassic Park (film), 234
- Kachnowski, Dr. Stan, 183–185, 186–187
 Kaiser Permanente (Oregon and Washington State), 85
 Kennedy, Ted, 161
 Kepler, Johannes, 130

- Keytruda, 98–99, 145, 155
 Koenig, Pascal, 61–62, 64–66
 Kuelper, John, 207
 Kymriah, 98, 210, 211
- The Lancet*, 45
 Lassman, Andrew, 161
 Latent autoimmune diabetes of
 adulthood (LADA), 76
 Lee, David, 107, 136
 Lee, Dr. Jerry, 94, 126–129, 130, 137
 Lind, James, 8–9, 10, 154
 Livongo, 223, 227, 228
Los Angeles Times, 135
 Lumosity, 126
 Lyme disease, 225, 232
 Lymphoma, 111
 L-DOPA, 223
- Machine learning systems,
 85–86
 Margolis, Jeff, 226–227
 Mars Climate Orbiter (1998), 133,
 134–136, 137, 140
 McCain, John, 32, 161
 Measurements
 discrete points vs. continuous,
 39–40
 how doctors can use improved
 digital, 219–222
 low cost of better digital, 37–40
 Nest Learning Thermostat, 53–54,
 60
 to predict fertility, 59–60
 to predict heart disease, 220–222
See also Biomarkers; Steam tables
MedCityNews, 186, 223, 226
 Medical devices
 Ava (ovulation-tracking bracelet),
 60–63, 64–67, 70, 71
 Bloomlife, 66
 Fitbit, 52, 66, 76, 153
 Medtronic Minimed 670G, 73
See also Digital technologies;
 Smartphones; Wearables
 Medical reimbursement. *See*
 Value-based reimbursement
 Medidata Solutions, Inc.
 ADAPTABLE trial involvement by,
 150–151
 advantages of data sharing by,
 198–199
 creating value from data, 136–141
 demystifying clinical trials data,
 135–136
 the founding and focus of, 138–141
 PARADE study role of, 209
 purchased by Dassault Systèmes,
 237
 synthetic control model developed
 by, 165–168, 198
 work with Castleman Disease
 Collaborative Network, 140
 Medtronic Minimed 670G, 73, 77
 Memorial Sloan Kettering Cancer
 Center (New York City), 130,
 211
 Mendel, Gregor, 4
 Merad, Dr. Miriam, 98–99
 mHealthIntelligence, 223
 Migraine Alert app, 45, 46
 Mindstrong, 36
 Mind-body connections, 34–36
 Misra, Dr. Veena, 70–72
 MIT Connection Science, 86, 87
MobiHealthNews website, 66, 88, 177
 Mobile apps. *See* Apps
 Molecular data, 6*fig*, 123
 MoovCare app, 177
 Morphogens, 12
 Mount Sinai Health System, 7–8, 86
 MRIs, 135–136
 mTOR, 108
 Muscular dystrophy, 38
Mycobacterium abscessus strains, 101

Index

253

- National Cancer Institute (NCI), 126, 127
 National Institutes of Health (NIH), 145
 National Patient-Centered Clinical Research Network, 150
 Nest Learning Thermostat, 53–54, 60
 New Atlas, 76
New England Journal of Medicine, 31
Newsweek magazine, 95
New York Times
 on benefits of Ava bracelet, 61
 criticism of clinical trial procedures by, 144
 on doctors' use of data to predict disease, 232–233
 on lack of treatment for rare cancers, 98
 on proteins used to diagnose disease, 20
 on social indicators of depression, 36
 Nixon, Richard, 93, 94
 Nokia Health (now Withings), 51–52
 Noom app-based diet and life coaching tool, 211
 North Carolina State University's ASSIST program, 70
 Northwestern University, 46
 Norton, Larry, 130
 Novartis, 6–7, 98, 119, 177, 178, 210
 Novella Clinical, 98
 Nuclear attack data story, 224

 Omada Health, 211
 OneDrop app, 75–77, 175, 180, 186
OneZero, 99
 Open Artificial Pancreas System project (#OpenAPS), 74–75
 Otsuka Pharmaceutical, 194
 Outcomes-based contracts (OBCs), 210–211
 Ovulation-tracking
 Ava bracelet for, 60–63, 64–67, 70, 71
 differing methods used for, 59–60

 p53 mutation, 20, 96–97
 Pahwa, Dr. Rajesh, 223–224
 PARADE study (Patient Rheumatoid Arthritis Data from the RealWorld), 209
 Parkinson's disease, 223
 Parsa, Ali, 45
 Patient-Centered Outcomes Research Institute (PCORI), 150
 Patient equations
 building a steam table to represent, 115–119
 a call to action and future use of, 235–238
 cognitive dimension of, 34–36
 Dr. Fajgenbaum's research on leveraging, 102, 106, 107–110, 140, 153, 170
 moving from univariate to multivariate approaches to, 31–33, 43
 progressing through Alzheimer's disease, 119–125
 See also Data
 Patients
 doctors partnering with, 222–224
 empowering through new technologies, 224–228, 232–233
 finding a marketing niche that benefits the, 66–67
 how apps can help compliance through engagement strategy, 179–182
 making clinical trials patient-centric, 149–152
 medical devices and changing role of, 63–64
 quality of life over duration of life, 207–210, 215, 219
 survival rates of, 204

- PatientsLikeMe, 26–28
 Patient territory data, 22–24
 Pear Therapeutics, 177
 Personalized medicine
 for Alzheimer's disease, 99
 customized immunotherapy
 treatments as, 98–99
 Kymriah, 98, 210
 phage therapy used as, 93–94,
 99–102, 106
 Petrov, Stanislav, 224
 Phage therapy, 93–94, 99–102,
 106
 Pharma
 “digital from the beginning”
 applications by, 180–185
 drug development by, 105–106,
 211
 making the case for value-based
 reimbursement, 203–216
Pharmaceutical Technology magazine,
 107
Pharma Times, 152
PharmaVOICE, 98
 Phase diagrams
 on transition from matter to liquid
 or gas, 116*fig*
 for treatment choices,
 118*fig*
 Phenotypic scale, 5–6*fig*
 Phenotype
 description and examples of, 4
 genotype vs., 3–4, 11*fig*–13
 multiscale view of health role of,
 6*fig*
 Physical therapy (PT), 205–206
 Physicians. *See* Doctors
 Physiological data
 combining genetic information
 with, 13–14
 multiscale view of health including,
 6*fig*
PLOS Medicine, 48
 Pocock, Stuart J., 162, 165
 Poon, Dr. Eric, 83, 85
 “Powering Your Own Wellness”
 TEDx Talk (Misra), 72
 PP2A cell regulator protein, 97
 PPR0M (preterm premature rupture
 of membranes), 61
 Precision Immunology Institute
 (Mount Sinai School of
 Medicine), 99
 Privacy, 234–235
 Progesterone, 94
 Project Baseline (Verily), 195–196
 Prostate cancer, 18–19, 21,
 115–118*fig*, 120
 Proteins
 beta-amyloid plaques, 119–120
 cancer treatment using proteomics,
 94
 p53 tumor suppressor, 96–97
 PP2A cell regulator, 97
 Proteomics, 94
 Proteus Digital Health, 177, 178, 179
 PSA (prostate-specific antigen), 18–19,
 21, 115–118*fig*, 120–121, 155
 PSA mRNA, 19
 Quality of life (QOL), 207–210, 215,
 219
 Radical prostatectomy, 115–116*fig*
 Razorfish, 75
 Regulators, 204–205
 Reimbursement. *See* Value-based
 reimbursement
 reSET app, 177
 Rheumatoid arthritis (RA), 111, 209
 “The Rise of Consumer Health
 Wearables: Promises and
 Barriers” (*PLOS Medicine*), 48
 RNA, PSA, 19
 Rosenthal, Arnon, 99
 Rose, Sophia Miryam
 Schüssler-Fiorenza, 232–233

Index

255

- Schizophrenia, 86
- Science Friday (NPR), 86
- Science Translational Medicine*, 74
- Scripps Translational Science Institute (San Diego), 36
- Scurvy, 8–9
- Sendak, Dr. Mark, 82, 83
- Sepsis
description and mortality rate of, 82
using data to catch it earlier, 82–85
- Sepsis Watch system (Duke University Hospital), 82–85, 89
- Shark Tank* (TV show), 224
- Sharpe, T. J., 144–145, 146, 149
- Sherif, Tarek, 138, 152
- 6-minute walk test, 38–39
- Slate* magazine, 48
- Sleep apnea, 45
- Smartphones
Apple Watches, 30, 46, 76, 153, 195, 233
iPhones, 51, 195
as a medical device, 14, 15, 51
See also Apps; Medical devices
- Smart toilets, 52
- Snyder, Michael, 232
- Social media
Facebook, 195
tracking the flu using, 87–88
- “The Stakes of Uncertainty:
Developing and Integrating
Machine Learning in Clinical
Care” (Elish), 84
- Staley, Alicia, 147–148, 149
- Stanford’s Center for Genomics and
Personalized Medicine, 232
- Statistics
Bayesian methodology, 156–162, 168–170
frequentist methodology, 156, 157
See also Data
- STAT (publication), 207
- Steam tables
for cancer, 126–128
example of a, 115–116*fig*
how to improve graphs and, 118–119
See also Measurements
- Steinhubl, Dr. Steve, 36
- Survival
difference between quality of life and, 207–210, 215, 219
- Synthetic control
Bayesian adaptive model used with, 168–170
conducting clinical trials with, 162–165
Medidata’s model for, 165–168
- Tay-Sachs disease, 11
- T-cell acute lymphoblastic leukemia (T-ALL), 97
- Thalassemia, 211
- Theranos, 44, 47
- Thermometer readings, 4–5
- TP53 gene, 127
- Trak (at-home testing kit), 66
- Treatment/clinical care
application of data to cancer, 22–23
factors involved in cognitive impairment, 123–125
Keytruda used in cancer, 98–99, 145
phage therapy, 93–94, 99–102, 106
steam tables and phase diagram for choosing, 115–118*fig*
See also Cancer treatments;
Diagnosis
- Triple-negative tumors, 94
- Tuberculosis, 101
- Tullman, Glen, 223, 227–228
- 23andMe, 36
- UnitedHealth, 26
- University of California, San Francisco, 88
- University of Kansas Medical Center, 223

- University of Pennsylvania, 106, 108
- University of Pittsburgh, 99
- University of Southern California, 94, 126
- University of South Florida, 126
- University of Texas M.D. Anderson Cancer Center, 156
- Value-based reimbursement
 - doctors incentivized to prevent diseases, 206–207
 - incentives for delivery of therapeutic value, 211
 - making value-based care the future, 212–216
- van Leeuwenhock, Anton, 8, 14
- Vator News*, 211
- Vector* (Boston Children's Hospital blog), 97
- Verily, 44, 47, 195–196
- Washington Post*, 224
- Waterlogged app, 175, 176
- Watson, James, 4, 10, 14
- Wearables
 - Apple Watch, 30, 46, 76, 153, 195, 233
 - asthma monitoring, 71
 - Ava ovulation-tracking bracelet, 60–63, 64–67, 70, 71, 219
 - battery technology barrier to, 48, 51
 - Consumer Electronics Show (CES) exhibitors on, 46
 - criticism of, 175–176
 - Fitbit, 52, 66, 76, 153
 - potential and developments in, 46–48, 49, 52
 - Verily's work on, 44, 47, 195–196
 - See also* Apps; Digital technologies; Medical devices
- Weather Channel, 87
- WebMD, 45
- Wellness transition, 129–130
- WellTok, 226
- Whelan, Jack, vii–x, 225
- Win probability added (WPA), 213
- Wired* magazine, 100, 134
- Withings (was Nokia Health), 51–52
- World Health Organization, 17, 123
- Yadegar, Dr. Daniel, 216, 220–222
- YO (at-home semen analysis), 66