Index

Note: Italicized page locators refer to exhibits.

Admission rates: variation in, 61
Advanced practice providers (APPs), 101, 121, 130
American Federation of Labor and Congress of Industrial Organizations (AFL-CIO), 119
Ambulance diversion, 88; expansion of emergency department and, 63; overcrowding and, xix, xxiii; pileup of patients in emergency department and, 17; reasons for (case study), 20, 21, 22; reduced demand for emergency department beds and, 62; staffing cuts and impact on, 36–37
Ambulatory care units, 67
Anthony, Michael, xxi, xxii
Appointments: aggregating buffer time and, 150–52, 151, 156; confirming, 128
APPs. See Advanced practice providers
Assisted living facilities: joint ventures with hospitals and, 61
Bed assignment workflow: from transfer of care to inpatient unit, 42–43, 43. See also Inpatient beds
Behr, Kevin, 162
Benchmarks: length-of-stay comparisons, 18, 19
Bergland, Suzan, 162
Bottleneck resource: definition of, 10, 13; emergency department bed as, 27–30, 28, 29; inpatient bed as, 30–32, 40–41, 41; insufficient capacity at, 57
Bottleneck Rules, The (Ching), 162
Bottlenecks: causes of, 9–10; constraints vs., 71; definition of, 9; in Mattel Barbie doll example, 10–11; new, identifying, 65, 68; obstacles vs., 160; ubiquity of, xxiii; understanding, 9–11. See also Constraints; Five focusing steps (5FS)
Bottlenecks in hospital settings, elevating, 58–64; adding capacity to emergency department beds, 61–62; adding capacity to inpatient beds, 58–60; reducing demand for emergency department beds, 62–64; reducing demand for inpatient beds, 60–61
Bottlenecks in hospital systems, subordinating to, 40–44; eliminating activities, 40, 42; rearranging activities, 40, 44; shortening activities, 40, 42–44
Broken bottleneck (fifth focusing step), 11, 12, 13, 65–68; case study, 66–67; identifying new bottlenecks with each iteration of five focusing steps (5FS), 65–66
Budget cuts, 35–36
Buffer consumption, 150; color-coded and divided into thirds, 81, 81–82, 141, 141–42, 142, 144, 145, 146, 152, 152, 154–56, 155, 156; measuring, 110, 116; tracking, to coordinate system resources, 140–44, 146. See also Buffers
Buffer Management, 80–83, 153, 161; buffer consumption, divided into thirds, 81, 81–82, 86; in a clinic setting, graphical representation of, 142, 142; emergency
department flow and application of, 90, 98–99, 100, 103, 104n1; example of, 80–82; family medicine clinic and use of, 154–56; in outpatient setting, 137–38, 140. See also Buffers
Buffer Management, facilitating inpatient unit flow with, 107–16; do not let inertia become the new constraint, 115; elevate the constraint, 114–15; exploit the constraint, 108–9; identify the constraint, 108; subordinate everything else to the constraint, 109–14
Buffer Management, on an inpatient unit, 110–13; orthopedic surgery example, 111; sepsis example, 111–12
Buffer reports: purpose and benefits of, 113, 114, 116
Buffers, 39; benefits of, 82–83; in cataract surgery center case study, 143–44, 145; in dorm move-in example, 135; in Drum Buffer Rope, 77, 79, 86; in emergency department flow, 93, 94; family medicine clinic workflow and, 154–56, 155; levels of coordinated care and, 113; in outpatient setting, 136–37; patient, 135, 136–37, 138, 139, 140, 141, 146; stock, 135–36, 138, 139, 140, 141, 146, 149–50; time, 135, 136, 137, 138, 139, 140, 146, 149. See also Buffer consumption; Buffer Management Buffers, tracking to coordinate system resources, 140–44, 146; Drum Buffer Rope and buffer management in clinic setting, graphical representation of, 141–43, 142, 146; patient buffer divided into green, yellow, and red zones, 141, 142; stock buffer divided into green, yellow, and red zones, 141, 142; time buffer divided into green, yellow, and red zones, 141, 141, 141–42
Buffer time: aggregating, 150–52, 156
Cancellations, 123, 127, 128, 150, 153, 156
Capacity: adding, to emergency department beds, 61–62; adding, to inpatient beds, 58–60; nonbottleneck resources and, 59 Care coordination resources, 61
Case studies: ambulance diversion, reasons for, 20, 21, 22; elevating the bottleneck, 63; family medicine clinic patient flow, 153–56, 154, 155; inertia as new bottleneck, 66–67; inpatient bed as bottleneck resource, 32; operational measurements, 8; patient flow in cataract surgery center, 143, 143–44, 145, 146; subordinating everything to the bottleneck, 53, 54; subordinating workflow to improve productivity, 131
Cash Machine, The (Klapholz and Klarman), 162
Cataract surgery center: patient flow in, 143, 143–44, 145, 146
Centers for Medicare & Medicaid Services: patient flow performance measure, xx
Changed constraints / do not let inertia become the new system constraint (step 5), 71; continuous process improvement and, 115; gaining momentum and, 131–32; improving emergency department flow, 103
Charge nurse: emergency department, 94
Chest pain: order set for patients with, 97
Ching, Clarke, 162
Constraining resource, xxiii, 72, 73, 89, 123, 124, 125, 132
Constraint management, xxv, 71; advantages of, 130; works-in-process minimized with, 75–76. See also Drum Buffer Rope
Constraint management, emergency department flow improved with, 87–105; do not let inertia become the new constraint, 103; elevate the constraint, 101–2, 102; exploit the constraint, 89–90, 91, 92, 92–93; identify the system’s constraint, 88–89; optimizing flow, considerations for, 88; subordinating everything else to the constraint, 93–99, 100
Constraints, 66; bottlenecks vs., 71; in dorm move-in example, 134; identifying, 71, 72–73; pace of, 72, 76; reminders about, 88; understanding definition of, 71. See also Bottlenecks

Index
Continuous process improvement: Buffer Management and, 115; ongoing, Theory of Constraints and, 65–66, 68. See also Designing a continuous improvement process (phase 3), in outpatient setting Cox, Jeff, 162

Critical Chain (Goldratt), 161

Cultural change: creating, 37, 55

DBR. See Drum Buffer Rope

Delays: tracking root causes of, 149–50

Demand: reducing, elevating the bottleneck and, 57; reducing, for emergency department beds, 62–64; reducing, for inpatient beds, 60–61

Dentistry with a Vision: Building a Rewarding Practice and a Balanced Life (Kendall and Wadhwa), 161–62

Dependent events, 42, 55; definition of, 44; driving example, 44–46; in the emergency department, 46, 48, 51

Designing a continuous improvement process (phase 3), in outpatient setting, 149–57; aggregating buffer time, 150–52; summarizing three phases of implementation, 152–56; tracking delays and, 149–50

Dettmer, Bill, 162

Discharge orders: pileup of inpatients and, 18

Discharges: complex emergency department, elements of, 61; on-time, 110, 111, 112–13, 116

Dorm move-in: Drum Buffer Rope in context of, 133–35

Drinking fountain example: elevating the bottleneck and, 58; exploiting the bottleneck and, 25–26; subordinating everything to the bottleneck and, 37–39

Drum: in cataract surgery center case study, 144, 145; in dorm move-in example, 134–35; in Drum Buffer Rope, 76–77, 86; in emergency department flow, 93; in outpatient setting, 136, 137, 139, 146

Drum Buffer Rope (DBR), 75–80, 153; in an outpatient setting, 136–37, 139; buffer in, 77, 79, 86; in a clinic setting, graphical representation of, 142, 142; definition of, 76, 86; dorm move-in within context of, 133–35; drum in, 76–77, 86; emergency department flow and application of, 90, 93–96, 100, 103; family medicine clinic and application of, 154–56, 155; at the Mattel factory, 76–77, 78, 79; objective of, 134; origins of, 146n1; in the real world, 79–80; rope in, 77, 86

Dubinsky, David, 119

ED. See Emergency department

Electrocardiogram: obtaining, 97

Elevate the bottleneck (fourth focusing step), 11, 12, 13, 57–64, 57–68; capital investment and, 57, 64; case study, 63; drinking fountain example, 58; in a hospital setting, 58–64; purpose of, 58, 64

Elevate the system's constraint (step 4), 71; gaining momentum and, 130; to improve emergency department flow, 101–2, 102; inpatient flow and, 114–15

Emergency! (television show), xvii

Emergency department (ED): dependent events and statistical fluctuations in, 46, 48, 51; hospital overcrowding and overcrowding in, xix, xx; identifying bottleneck in, 17; inventory measurement in, 7; operating expense measurement in, 7; patient arrival throughout the day, volume curve of, 102, 102; process map of patient flow through, 20; steps moved upstream of bottleneck in, revised workflow for, 48, 50, 51; throughput measurement in, 7; workflow for obtaining an imaging scan in, 48, 49; workflow for processing walk-in patients, 46, 47. See also Constraint management, emergency department flow improved with

Emergency department beds: adding capacity to, 61–62; as a bottleneck resource, 27–30; reducing demand for, 62–64
Emergency department physicians: hiring additional, 102; increasing productivity of, 101; practice variations of, examining, 103; revised workflow, 92, 92; as the system’s constraint, 88–89, 104; workflow, Value Stream Mapping viewpoint, 90, 91

Expediting, 66, 95

Exploit the bottleneck (second focusing step), 11–12, 13, 25–33; case study, 32; drinking fountain example, 25–26; emergency department bed as a bottleneck resource, 27–30, 28, 29; in a hospital system, 27–32; in Mattel factory, 26–27, 27

Exploit the system’s constraint (step 2), 71; gaining momentum and, 126–27; to improve emergency department flow, 89–90, 91, 92, 92–93, 104; inpatient flow management and, 108–9

Family medicine clinic patient flow: buffers added to clinic workflow, 155, 155–56; case study, 153–56; workflow map for, 154

Fast tracks: creating, 66–67; emergency department, 54–55; underlying premise of, 54

Financial metrics: linking improvements in flow to, 159

Finishing kits, 129

Five focusing steps (5FS), 1, 70; broken bottleneck (fifth focusing step), 11, 12, 13, 65–68; elevate the bottleneck (fourth focusing step), 11, 12, 13, 57–68; exploit the bottleneck (second focusing step), 11–12, 13, 25–33; family medicine clinic and application of, 153–56; foundational to Theory of Constraints, 11–12, 13; identify the bottleneck (first focusing step), 11, 13, 15–23; Mattel factory application, 12; subordinate everything to the bottleneck (third focusing step), 11, 12, 13, 35–55; subsequent iterations and, 65–66

Five focusing steps (5FS), in terms of constraint, 71; do not let inertia become the new constraint, 71, 103, 115, 131–32; elevate the system’s constraint, 71, 101–2, 114–15, 116, 130; exploit the system’s constraint, 71, 89–90, 92–93, 108–9, 126–27; identify the system’s constraint, 71, 72–73, 88–89, 108, 125–26; subordinate everything else to the system’s constraint, 71, 93–96, 109–14, 127–29

Flex units, 60

Free products, 54–55

Gaining momentum (phase 1), in outpatient setting, 125–32; case study, 131; constraint resource determining a system’s flow, 125–26, 126, 132; do not let inertia become the new system constraint, 131–32; elevate the constraint, 130; exploit the constraint, 126–27, 132; goal in, 125, 132; identify the constraint, 125–26; subordinate everything else to the decision made in step 2, 127–30, 132

Global optimization: buffers and promotion of, 140

Goal, The (Goldratt), xxiii, xxv, 1, 4, 11, 70, 75, 76, 161

Goldratt, Eliyahu, xxiii, 1, 4, 11, 70, 76, 160, 161

Green, yellow, and red color code, buffer consumption and: adjusted sample clinic morning schedule with aggregated time buffer, 152, 152; in cataract surgery center case study, 144; in family medicine clinic case study, 154–56, 155; patient buffer
divided into, 141, 142; stock buffer divided into, 141, 142; tax preparation example, 81, 81–82; time buffer divided into, 141, 141

Grey’s Anatomy (television show), xvii

Hallway beds: capacity and, 59
Healthcare: full kitting in, 83; operational measurements in, 6–9
Healthcare delivery system: goals in, 13; overcrowding endemic in, xix, xxv
Healthcare expenditures: in United States, 117
Hoarding patients, 55
Holter monitors, 60
Hospital patient flow: process map of, 16
Hospitals: dependent events and statistical fluctuations in, 46; football analogy for, 69–70; inventory in, 6; operating expense in, 7; overcrowding in, financial costs of, xix–xx, xxv; throughput in, 6, 7
Hospital settings, elevating the bottleneck in, 58–64; adding capacity to emergency department beds, 61–62; adding capacity to inpatient beds, 58–60; reducing demand for emergency department beds, 62–64; reducing demand for inpatient beds, 60–61
Hospital systems, subordinating to the bottleneck in, 40–44, 41, 42, 43; eliminating activities, 42, 55; rearranging activities, 44, 55, 55n1; shortening activities, 42–44, 55
Huddles: agenda items, 107–8; multidisciplinary rounds and, 113–14; resource coordination and, 107

ICU. See Intensive care unit
Identify the bottleneck (first focusing step), 11, 13, 15–23; case study, 20, 21, 22; confirming your bottleneck, 19–20; emergency department, 17; inpatient units, 17–18; intensive care unit, 18–19; overview, 15–16; process map, creating, 19, 23; waiting room, 16

Identify the system’s constraint (step 1), 71, 72–73; gaining momentum and, 125–26; to improve emergency department flow, 88–89; inpatient flow management and, 108
Idle time on bottleneck: minimizing or eliminating, 25–26, 33, 37, 39, 53
I Love Lucy (television show): Drum Buffer Rope illustration, 79–80
Imaging equipment: as constraint in imaging center, 132n1
Inertia: as new bottleneck, 66–67, 68; overcoming, 65, 68. See also Changed constraints / do not let inertia become the new system constraint
Infant mortality rate: in United States, 117
Inpatient beds: adding capacity to, 58–60; as a bottleneck resource, 30–32, 40–41, 45; as a constraint, 108, 114–15, 116; productivity of, 108–9; reducing demand for, 60–61
Inpatient units: Buffer Management used in, 110–13; identifying bottlenecks in, 17–18; teamwork in, 107
Institute of Medicine, xix
Interruptions: daily log of, maintaining, 130; minimizing, 129
Inventory, 73; biggest pileup of, looking for, 15, 22; decreasing, 6, 8, 9; definition of, 4; drinking fountain example, 38; effect of a productive move on operational measurements, 5, 5; in healthcare systems, 6, 13; in hospital settings, 6; in Mattel factory example, 5, 6; staffing cuts and, 36–37; in Theory of Constraints, 4, 4. See also Works-in-process
Isn’t It Obvious? (Goldratt), 161
It’s Not Luck (Goldratt), 161
Jacob, Dee, 162
Johnson, Lyndon B., 119
Joint Commission: patient flow standard of, xx
Kaizen, xxi, xxii
Kanban, 136
Kendall, Gerry, 161
Kim, Gene, 162
Klapholz, Richard, 162
Klarman, Alex, 162
Knight, Alex, 161
Kotter, John, 161

Leadership: patient flow mandate and, 160
Leading Change (Kotter), 161
Lean, xxi, xxii, xxv, xxvi, 159, 161, 162;
emphasis of, xxiv, xxvi; kaizen in, xii, xxii;
kanban in, 136; synthesizing Theory of
Constraints and Six Sigma with, xxv, 1;
Theory of Constraints vs., 1
Leapfrogging, 95, 104
Lengths of stay: comparative examples, 111–13; nonmedical reasons and, 112; shortening, 110, 115; as time buffer, 110
Life expectancy: in United States, 117
Liker, Jeffrey, 161
Local optima (local optimization): eliminating, 37, 55; reduced throughput and, 11
Logical Thinking Process, The (Dettmer), 162
Low-acuity patients, 67, 103

Magnetic resonance imaging (MRI), 60
Maister, David, 104n2
Marketplace as constraint: in retail model, 73, 74n1
Materials flow, 84
Mattel factory, Barbie doll production, 162;
bottleneck illustration, 10–11; Drum
Buffer Rope in, 76–77, 78, 79; exploit the bottleneck in, 26–27, 27; five focusing steps (5FS) applied to, 12; how constraint works in, 72–73; marketplace as the constraint in, 73; operational measurements in, 5–6; subordinating processes in the bottleneck in, 39; value stream map of, 84, 84–85
MDRs. See Multidisciplinary rounds
Medial students: educational debt of, 118
Mental health resources: demand for emergency department beds and, 62–63
MRI. See Magnetic resonance imaging
Multidisciplinary rounds (MDRs): inpatient huddle and, 113–14, 115, 116
Multitasking: efficient flow and, 95, 104; in outpatient clinic practice, 129

Necessary but Not Sufficient (Goldratt), 161
NIOS. See Nurse-initiated order sets
Nonbottleneck resources: increased capacity and, 59
Nonbottlenecks: definition of, 10; preventing, 43; saving time on, 11
Nonconstraint resources: analyzing, 102
No-shows, 123, 127, 128, 131, 150, 153
Nurse-initiated order sets (NIOS), 97; definition of, 97; full kitting facilitated by, 97, 104; patient buffer and, 99
Nurse practitioners, 101, 121
Nurse-to-patient ratio: in the emergency department, 88
Nursing workflow: in the emergency department, 89
Observation units, 60
Obstacles: bottlenecks vs., 160
Operating expenses: decreasing, 6, 8, 9; definition of, 4; drinking fountain example, 38; effect of a productive move on operational measurements, 5, 5; in healthcare systems, 6, 7, 13; in hospital settings, 6, 7; in Mattel factory example, 5, 6; staffing cuts and, 36; in Theory of Constraints, 4, 4
Operational measurements: case study, 8; in healthcare, 6–9; of Theory of Constraints, 4, 4–6, 5
Ophthalmology practice: improving productivity in, 131–32
Outpatient clinic: identifying constraint of, 123
Outpatient flow, phases of improvement, 123, 124; designing continuous improvement
process, 123, 124, 149–57; gain momentum, 123, 124, 125–32; stabilize the system, 123, 124, 133–47
Outpatient flow: office practices, clinics, and urgent care centers, 117–19
Outpatient medical practice: key concerns of, 121–22, 122, 124
Outpatient medicine: host of services in, 121; resource coordination in, 123–24
Overcrowding: endemic in healthcare delivery system, xix, xxv; poor patient flow and, xix, xx–xxii

Parkinson’s law, 151, 156
Patient admission workflow: streamlining, from emergency department to inpatient unit, 41, 41–42, 42
Patient buffers, 135, 136–37, 138, 139, 140, 141, 146; in cataract surgery center case study, 143–44, 145; divided into green, yellow, and red zones, 141, 142; family medicine clinic workflow and, 155, 155–56
Patient flow: caring about, reasons for, xix–xx; poor, hospital overcrowding and, xix, xx–xxii; understanding, xxii
Patients: buffers used by, 147n2
Patient safety: as top priority, 88, 96
Patient satisfaction: “teamlet” model and, 130; wait times and, 104n2
PCPs. See Primary care providers
Pharmacy: coordinated medication-related resources and, 111
Phoenix Project, The (Kim, Behr, and Spafford), 162
Physician assistants, 101, 121
Physicians: delayed earning potential of, 118; full kitting for, 128. See also Emergency department physicians; Primary care providers
PIT model. See Provider-in-triage model
Playing defense: hospitals with poor flow and, 69–70
Playing offense: controlling your own destiny and, 115; smashing bottlenecks and, 70
Pregnancy-related mortality: in United States, 117

Pride and joy (Knight), 161
Primary care: delivery setting for, 121
Primary care providers (PCPs): shortage of, reasons for, 118–19; tight schedules of, 122
Process improvement: buffers and, 83; five focusing steps (5FS) and, 11–12; projects, 115, 116. See also Continuous process improvement
Process maps: creating, 19, 23; granular, of patient flow upstream of the bottleneck, 29, 29–30, 40; of hospital patient flow, 16; of patient flow in inpatient unit, 30–31, 31; of patient flow in the emergency department, 28, 28; of patient flow through the emergency department, 20
Provider-in-triage (PIT) model, 54, 55, 67
Provider shortages: reasons for, 118
Provider-to-patient ratio: in the emergency department, 88
“Psychology of Waiting Lines” (Maister), 104n2
“Pull till full” concept: emergency department bed as bottleneck and, 105n3; rationale behind, 95
Race, The (Goldratt and Cox), 76
Resource coordination: huddle and, 107; in outpatient medicine, 123–24; tracking buffers for, 140–44, 146
Retail model: marketplace as constraint in, 73, 74n1
Revenue: increasing, 156
Rope: in cataract surgery center case study, 144, 145; in dorm move-in example, 135; in Drum Buffer Rope, 77, 86; in emergency department flow, 93–94, 96, 104; in outpatient setting, 137, 139, 146
Scribes: nonconstraint tasks and, 101
Silos: breaking down, 35, 37, 55, 161; reappearing, 66
Six Sigma, xxv, xxvi, 61, 97, 159, 162; emphasis of, xxiv, xxvi; synthesizing Theory of Constraints and Lean with, xxv, 1; Theory of Constraints vs., 1

Index 169

Copying and distribution of this PDF is prohibited without written permission. For permission, please contact Copyright Clearance Center at www.copyright.com
Skilled nursing facilities: leasing beds from, 61
Spafford, George, 162
Specialty care: delivery setting for, 121
Split-flow model: emergency department “fast track” illustrative of, 54–55
Sproull, Bob, 161
Stabilizing the system (phase 2), in outpatient setting, 133–47; Buffer Management in an outpatient setting, 137–38, 140; case study, 143; Drum Buffer Rope in an outpatient setting, 136–37, 138, 139, 140; tracking buffers to coordinate system resources, 140–44, 141, 142, 145, 146
Staffing reductions, 35–37
Staff well-being and wellness: teamwork vital for, 107; as top priority, 88
Statistical fluctuations, 42, 55; definition of, 44; driving example, 44–46; in the emergency department, 46, 48, 51
St. Elsewhere (television show), xvii
Stock buffers, 135–36, 138, 139, 140, 141, 146, 149–50; divided into green, yellow, and red zones, 141, 142
Student syndrome, 151, 156
Subordinate everything else to the constraint (step 3), 71; facilitating inpatient flow and, 109–14; gaining momentum and, 127–30; to improve emergency department flow, 93–99, 100
Subordinate everything to the bottleneck (third focusing step), 11, 12, 13, 35–55; case studies, 53, 54; challenges related to, 35–37; drinking fountain example, 37–39; Mattel factory example, 39; reorganizing workflow upstream of the bottleneck, 53; subordination downstream of the bottleneck, 51–55
Substance abuse programs: demand for emergency department beds and, 62–63
“Teamlet” model, 129
Teamwork: fostering sense of, 108, 159; importance of, 107; prioritizing improved patient flow and, 160
Testing: referrals for, 60
Theory of Constraints (TOC), xxii, 2, 161; advantages of, xxiv–xxv; applications of, 1; description of, xxiii, 13; distinguished from Lean and Six Sigma, xxiv, 1; emphasis of, xxvi; five focusing steps (5FS) comprising foundation of, 11–12, 13; fundamentals of, 3–14; goal of, 13; implementation in outpatient setting, three phases of, 123–24, 125; introduction of, 1; key to, 10; as ongoing process of continuous improvement, 65–66, 68; power of, 159; synthesizing Lean and Six Sigma with, xxv, 1; Thinking Processes in, 162; three operational measurements of, 3–6, 4. See also Five focusing steps
Theory of Constraints, Lean, and Six Sigma Improvement Methodology: Making the Case for Integration (Sproull), 161
Thinking Processes, 162
Throughput, 59, 73; clarifying patient flow and, 14n2; definition of, 4, 13; drinking fountain example and, 38, 39; emergency department physicians and, 89, 104; effect of a productive move on operational measurements, 5, 5; expressing, 13n1; in healthcare systems, 6, 13; in hospital settings, 6, 7; importance of, 6, 9; improved emergency department flow and, 87; increasing, 6, 8, 9; in Mattel factory example, 5–6; staffing cuts and, 36; in Theory of Constraints, 4, 4
Time buffers, 135, 136, 137, 138, 139, 140, 146, 149; aggregated, adjusted sample clinic morning schedule with, 152, 152; in cataract surgery center case study, 144, 145; delays and, 149; divided into green, yellow, and red zones, 141, 141; family medicine clinic workflow and, 154, 155; sample clinic morning schedule and, 151, 151–52
TOC. See Theory of Constraints
Toyota Production System, xxii, 161
Index

**Toy*ota Way, The* (Liker), 161**

Triage: nurse-initiated order sets and, 97, 99

Turnover, 66

United States: healthcare expenditures in, 117

Urgent care centers/clinics, 62, 67, 121

Value Stream Mapping (VSM), 83–85, 84, 86, 103; definition of, 83; emergency department flow and application of, 90, 99, 100, 104; emergency department physician workflow, 90, 91, 92, 92; at Mattel factory, 84, 84–85; “pull till full” argument and, 96

*Velocity* (Jacob, Bergland, and Cox), 162

Volume: growing, 156

VSM. See Value Stream Mapping

Wadhwa, Gary, 161

Waiting room: identifying bottleneck in, 16

Wait times: average, 118; resource coordination and, 123

Works-in-process, 5; in dorm move-in example, 135; minimizing, 75. See also Inventory