

SECOND
EDITION

**STRATEGIC
MANAGEMENT OF THE
HEALTHCARE
SUPPLY CHAIN**

**EUGENE SCHNELLER ■ YOUSEF ABDULSALAM
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Strategic Management of the Healthcare Supply Chain

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Second Edition

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Comment on ***Strategic Management of the Healthcare Supply Chain***

By Eugene Schneller, Yousef Abdulsalam, Karen Conway, Jim Eckler

Supply chain in healthcare is fundamental. And until the pandemic it was taken for granted. The pandemic raised supply chain skills to the level of a national security issue. Supply chain in its broadest sense is a fundamental strategic tool for all aspects of emergency preparedness and healthcare delivery in times of crisis. Objectives are to have ready materials, supplies, PPE, medications, warehouse management, and backup workforce reserves are all required to assure readiness, the ability to sustain a prolonged response, maintain core business activities, and manage surges.

—*Denis A. Cortese, MD*

Emeritus Professor, President/CEO Mayo Clinic

Professor and director of Arizona State University Center for Healthcare Delivery and Policy

- This book goes beyond the lessons of the pandemic for emergency preparedness. It also makes clear the role of the CQO, cost-quality-outcomes. The value engineering triad, of which 2 out of the 3 won't do.
- As healthcare gets serious about value-based care this book clarifies the importance of the role supply chain managers and supply chain thinking brings to key strategic and tactical discussions, planning and implementation.
- As the authors wisely say, "Integration between supply chain practice and clinical practice is the hallmark of a high performing health care supply chain organization." I would rephrase this to say it is the hallmark of a high performing and resilient organization. This book is a fundamental guide for success.

—*Doug Bowen*

Senior Vice President

Banner Health

I am confident this updated edition of *Strategic Management of the Healthcare Supply Chain*, will prove valuable to all audiences. It is an orienting read for new entrants and practitioners to the field of supply chain. It is also an excellent core text for graduate courses, and a must-read for seasoned supply chain leaders.

Pay special attention to the information shared on product standardization, value analysis, and clinical integration—this is the gift that keeps on giving as it will pay dividends now and in the future. Also, I am especially excited about the Fully Integrated Supply Chain Organization (FISCO) model, which has the potential to transform and elevate healthcare supply chain practice.

As a leading healthcare supply chain practitioner and life-long supply chain student, I can attest that this dream team of collaborators—Dr. Schneller, Yousef, Jim, and Karen—have included all the required topics and insights needed to create and operate a more successful healthcare supply chain!

—Lawton Robert Burns, PhD, MBA,
*James Joo-Jin Kim Professor, a Professor of Health Care Management
Professor of Management
Wharton School at the University of Pennsylvania.
Director of the Wharton Center for Health Management & Economics*

Supply chain management is, at once, the most important source of potential cost savings and the least understood area in healthcare. Maybe that is why we, as a country, have failed to make a dent in lowering healthcare costs. Schneller and colleagues have come to the rescue, offering a comprehensive framework and holistic approach. Their book should be required reading for healthcare academics (and their students), executives, and clinicians. It is time for everyone to step up to the plate.

—Robert Handfield Bank of America University Distinguished Professor
*of Supply Chain Management Executive Director, Supply Chain
Resource Cooperative North Carolina State University*

An important update to this leading textbook on healthcare supply chains. The new book provides important insights into how hospitals and organizations in their supply chains will need to develop more resilient and agile approaches to managing the many disruptions and challenges that exist in a globally outsourced healthcare environment. These approaches are based on firsthand experience by the authors as well as ongoing discussions and interviews with healthcare executives. They are not theoretical, but rather provide important practical insights for any student of healthcare to understand and adopt. I have no doubt this book will have an enormous impact on the practice of healthcare supply chain management.

Strategic Management of the Healthcare Supply Chain is an eye-opener on how to make an effective, efficient supply chain happen in the health sector.

We do not know how many of the million-plus COVID-19 deaths were associated with the lack of protective and therapeutic supplies, but ironically, many of the products were available. They were not visible, however, in our fragmented supply chain system with its woesome transparency.

COVID-19 was not a Black Swan event. Supply chain preparedness explicated in *Strategic Management of the Healthcare Supply Chain* is critical for our future.

This is no ho-hum, hortative manual—but a terrific, easy-to-read, pragmatic book that:

- Demonstrates how to implement a fully integrated supply chain organization—a turn-of-mind program for health sector supply chain management—through an impressive team composed of an industry strategic leader, a seasoned supply chain practitioner and two highly regarded scholars.
- Provides academics, students, and practitioners guidance for the management of the supply chain not only in “normal times,” but also incorporates key lessons from COVID-19 to help bullet-proof us against future disruptions.

Strategic Management of the Healthcare Supply Chain shows how to create the supply chain management that is so essential to an efficient and resilient healthcare system.

—Regina E. Herzlinger
Nancy R. McPherson Professor of Business Administration
Harvard Business School

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- To GHX and the many supply chain professionals at both healthcare delivery and supplier organizations for reinventing how they conduct business together.
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- To the thousands of healthcare professionals we have influenced in the past 15 years since the first edition of this book was published (and those who have influenced us in this rewrite). May our messages and advice on modern supply chain management practices continue to guide you through your careers and help you to improve the performance of global healthcare supply chains.
- To Zoom for providing the technology that allowed for a team located in the United States, Canada, and Kuwait to meet frequently to discuss the key factors constituting and influencing supply chain management in the health sector.
- To the many healthcare clinicians and administrators who responded to the COVID-19 pandemic and brought the term *supply chain management* (SCM) to the forefront of the public mind and for the recognition and respect that SCM has gained.

About the Authors

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Eugene Schneller earned his PhD at New York University (Sociology). He was awarded an honorary Physician Associate (PA) degree from Duke University and an honorary Doctor of Humane Letters from the A.T. Still University. He has held faculty and research scholar positions at Duke University, Union College (New York), and Columbia University. His consulting and research focus on healthcare policy, best practice adoption, supply chain purchasing strategy design and governance, human resource development, and supply chain integration. He is a former director at Vomaris and the Barrow Neurological Institute, and has served on advisory boards for both device manufacturers and information technology companies. He was on the Expert Advisory Council for SCAN health and serves in an advisory capacity to W. L. Gore Associates. He was Principal Investigator for the U.S. Department of Defense efforts to integrate the medical supply chains for the three services. He is the former Chair of the Board of the Association of University Programs in Health Administration and the former Western Network for Health Care Management. He is co-founder of Healthcare Supply Chain Excellence and Principal at Health Care Sector Advances. In 2022, he was appointed as Co-Director for the design and management of the Resilience Initiative at the W.P. Carey School of Business. He is a frequent speaker at academic and corporate conferences, and has facilitated strategic planning retreats, focus groups, and scenario planning exercises for medical device companies, group purchasing organizations, and universities.

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Yousef Abdulsalam is an Assistant Professor of Operations & Supply Chain Management at Kuwait University's College of Business Administration. He earned his PhD in Supply Chain Management from the W.P. Carey School of Business at Arizona State University under the supervision of Professor Gene Schneller. His academic research

relates to supply management in the health sector, including supply chain integration, purchasing alliances, and the physicians' influence on supplier selection. The research has been published in both supply chain management journals (*Journal of Business Logistics*, *Journal of Operations Management*) and healthcare management journals (*Health Care Management Review*, *Medical Care Research & Review*). He teaches undergraduate courses in supply chain management, business analytics, and operations research. Prior to his academic career, Yousef was a certified Project Management Professional (PMP) working at Ernst & Young's Advisory Services division in the Information Technology, Project Management, and Business Process Reengineering domains.

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Healthcare Delivery Scientist/Supply Chain Evangelist
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Global Healthcare Exchange (GHX)

Trained as a healthcare delivery scientist, Karen Conway applies extensive knowledge of supply chain operations and systems thinking to align processes and data across the healthcare ecosystem to generate evidence on what improves the health of people and populations, and the performance of organizations upon which an effective healthcare system depends. In 2017, she completed a Capstone research project for the U.S. FDA, exploring the importance of trading partner collaboration in successful implementation of the agency's unique device identification (UDI) rule. She has also consulted internationally on the value of data standardization in the healthcare supply chain. During the Covid-19 pandemic, she led the supply chain curricula for national summits on health system recovery and health equity and delivered closing remarks on leadership to support sustainability in the health sector at a G20 Summit pre-event. She has served as elected national chair of AHRMM, the supply chain association for the American Hospital Association, as board secretary for Strategic Marketplace Initiative (SMI) and as a member of the GS1 Global Healthcare Leadership Team, the healthcare advisory board for CAPS Research, and the expert advisory council for SCAN Health. She co-wrote a best-selling book on global leadership, *Leading from the Edge*, and was a contributing author to the Springer publication, *eBusiness in Healthcare*. Her monthly column on the supply chain and value-based healthcare has been one of the most well read in *Healthcare Purchasing News* for more than a decade. She holds a masters in the Science of Healthcare Delivery from Arizona State University and a bachelor's degree from The Colorado College.

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Jim Eckler is a graduate in Mathematics from the University of Waterloo and in Management Science from the Wharton School of the University of Pennsylvania. He is a past chair of the Supply Chain and Logistics Association of Canada. As well, he is a Certified Management Consultant (CMC). Over the past 45 years, he has authored numerous articles and regularly speaks on a broad range of supply chain topics. Professionally, Jim provides advisory services in the supply chain management field delivering practical strategic and operational advice to his clients. He focuses exclusively on supply chain management, outsourcing, business strategy, corporate governance, and operations. He has a particular specialty in the healthcare field, advising hospital systems and other healthcare organizations toward the achievement of supply chain excellence.

To support this focus, Jim co-founded Healthcare Supply Chain Excellence (www.hscxi.com), a consulting firm focused on strategy, cost management, improved patient outcomes, and quality improvement, all driven to improve supply chain management performance. He is also the cofounder of Physicians for Supply Chain Excellence, an organization to help physician leaders gain clinical alignment on supply chain matters, particularly toward rationalizing high-cost physician preference items. For 18 years, Jim held senior executive roles in operating companies, including Health Shared Services BC, a provider of shared services for the healthcare system across British Columbia, and as President and CEO of SCI Group Inc., a leading supply chain management outsourcing services company, providing logistics services for major technology, healthcare, and retail companies such as Xerox, Bell Canada, Amazon, Wal-Mart, Siemens, and Lowes.

In addition to operational roles, Jim has served on six boards with roles including chair, executive committees, finance, and pensions. He also holds the ICD.D designation from the Institute of Corporate Directors. Prior to his senior executive positions, Jim was a supply chain management consultant for 18 years with Booz Allen and KPMG.

Remembering

Larry R. Smeltzer

The first edition of this book was based on work I carried out with Larry Smeltzer, beginning in 2002. Larry passed away in 2004, at the young age of 57, after co-writing but just prior to the publication of the first edition of this book. He was my dear friend and collaborator, and is greatly missed.

Larry was a pioneer in the field of supply chain management. He was significantly shocked by the extent to which healthcare supply chain practice lagged so significantly behind supply chain practice in other industries. He was equally shocked by the absence of supply chain education for senior healthcare organization leaders, and perhaps, most shocked by my ignorance and the ignorance of most health services researchers about the supply chain's centrality for operations and patient care. How could we train future health sector CEOs without ever hearing about the healthcare supply chain?

Larry started me on a supply chain journey. While I think he failed to convince me that inventory was interesting—he did convince me that it was (and still is) important. If one needs any confirmation of this, just consider the value of inventory during the COVID-19 pandemic's early days. In our travels to healthcare systems across the nation, Larry dared to ask tough and challenging questions—especially around the failure of supply chain managers to see themselves and be seen as both the agent of a healthcare organization's important assets, materials, and processes, and as influencers to improve value to healthcare business professionals, clinicians, and ultimately, patients. He was appropriately puzzled by the strong influence of physicians and the gaps in incentives between buyers and sellers in the health sector. He said, "Gene, we need to write about this!" While the influence of the first edition has been considerable for both undergraduate and graduate students, it has also been, curiously, influential in helping to shape managers from nonhealth sectors transitioning into health and physicians who have grown into roles that interface with supply chain. Hopefully, this new edition will continue to provide that influence. Healthcare needs talent that will improve the practice of supply chain management, and in turn, the delivery of healthcare.

If Larry is looking down from a heavenly perch, he is surely smiling. Terms in this new edition would excite him—value-based purchasing, clinician integration, and evidence-based practice,"....

Perhaps, most importantly, Larry was a great mentor. He changed the focus of so many undergraduate and graduate students, and unknowingly, sent me on a trajectory I had never even known existed. We thus dedicate this recasting of *Strategic Management of the Healthcare Sector* to Larry Smeltzer.

—Gene Schneller, PhD
Dean's Council of 100 Distinguished Scholar
Arizona State University

About the Companion Website

This book is accompanied by a companion website:

www.wiley.com/go/schneller/health_care_supply_chain2e



To assist students and other readers to fully benefit from this textbook, we have prepared supplemental material in the form of web-based references, discussion questions for groups, and short answer questions which are interactive in design. These resources will help to extend the learning from the text and, resulting from the web-based capability, it will be updated frequently to keep the students and other readers current on this topic.

The website includes:

- Listing of Key Associations, Trade Organizations, Trade Magazines & Journals, Peer-Reviewed Journals, and Websites
 - Associations and Research Centers for advancing supply chain
 - Trade Organizations
- Key Concepts
- Discussion Questions
- Short Answer Questions
- Selected Readings
- Case studies and Supplemental Materials

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List of Acronyms

3PL	Third-party Logistics
ACA	Patient Protection and Affordable Care Act
AHC	Academic Health Center
AHRMM	Association for Healthcare Resources & Materials Management
AHRQ	Agency for Healthcare Research and Quality
AI	Artificial Intelligence
AP	Accounts Payable
ASC	Ambulatory Surgery Center
ASU	Arizona State University
ASU/CHMR	A 2004 research study carried out by Larry Smeltzer and Gene Schneller
AVAP	Association of Value Analysis Professionals
B2B	Business-to-Business
BATNA	Best Alternative to a Negotiated Agreement
C2SHIP	Center to Stream Healthcare in Place
CAM	Complementary and Alternative Medicine
CAPS Research	Center for Advanced Purchasing Studies
CATH Lab	Interventional Cardiology Laboratory
CHMR	Center for Health Management Research
CIPS	Cloud Infrastructure and Platform Services
CMS	U.S. Centers for Medicare and Medicaid Services
COE	Center of Excellence
COVID-19	Coronavirus Disease Pandemic
CQO	Cost, Quality, and Outcomes
CRM	Customer Relationship Management
CSC	Consolidated Service Center

DOD	U.S. Department of Defense
DHA	Defense Health Agency
DRG	Diagnostic-related Group
DRP	Distribution Requirements Plan
DES	Drug-eluting Stent
EDI	Electronic Data Interchange
EHCR	Efficient Healthcare Consumer Response
EHR	Electronic Health Record
EMA	European Medicines Agency
EMR	Electronic Medical Record
EOQ	Economic Order Quantity
ERP	Enterprise Resource Planning
FDA/U.S. FDA	U.S. Food and Drug Administration
FFS	Fee-for-Service
FISCO	Fully Integrated Supply Chain Organization
FTC	Federal Trade Commission
FTE	Full-time Equivalent
HIGPII	Healthcare Group Purchasing Industry Initiative
GPO	Group Purchasing Organization
HCSA	Healthcare Supply Chain Association
IBP	Industry Best Practice
IDC	International Data Corporation
HMO	Health Maintenance Organization
HMPI	Health Management, Policy & Innovation
ICU	Intensive Care Unit
IDN	Integrated Delivery Network
IoT	Internet of Things
ISM	Internal Supply Management
IT	Information Technology

JIT	Just-in-Time
KPI	Key Performance Indicator
LGBTQ	Lesbian, Gay, Bisexual, and Transgender
ML	Machine Learning
MRI	Magnetic Resonance Imaging
NEST	National Evaluation System for Health Technology
NLP	Natural Language Processing
NHS	National Health Service
NPI	New Product Introduction
NSF	National Science Foundation
ONC	Office of the National Coordinator
OR	Operating Room
PBM	Pharmacy Benefit Manager
PO	Purchase Order
RFI	Request for Information
RFP	Request for Proposal
RFQ	Request for Quote
P2P	Procure-to-Pay
PCORI	Patient-centered Outcomes Research Institute
PO	Purchase Order
PPE	Personal Protective Equipment
PPI	Physician Preference Item
PPM	Purchasing Partner Management
PPO	Preferred Provider Organization
PSO	Point of Service Organization
ROA	Return on Assets
RPA	Robotic Process Automation
RWE	Real World Evidence
SaaS	Software-as-a-Service

SCM	Supply Chain Management
SCOR	Supply Chain Operations Reference
SCRM	Supply Chain Risk Management
SDOH	Social Determinants of Health
SKU	Stock Keeping Unit
SMART	Specific, Measurable, Achievable, Relevant and Time-based
SMI	Strategic Marketplace Initiative
SNS	Strategic National Stockpile
SOW	Statement of Work
SRM	Supplier Relationship Management
TCO	Total Cost of Ownership
TKA	Total Knee Arthroplasty
TQM	Total Quality Management
TQO	Total Cost of Ownership
UDI	Unique Device Identification
U.K.	United Kingdom
VA	Veterans Administration
VAT	Value Analysis Team
VMI	Vendor Managed Inventory
VMO	Vendor Management Office
VOI	Vendor Owned Inventory
WCC	Weighted Cost of Capital
WMS	Warehouse Management System