

Health Sector Management, Duke University: The Fuqua School of Business (FSB)

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Medical Innovation and Strategies Conference: Wireless and Consumer Healthcare

September 23, 2009

Presentations and Discussion with Stakeholders

**Duke University: The Fuqua School of Business
Health Sector Management**



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Medical Innovation and Strategies Conference
Wireless and Consumer Healthcare
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Gopal K. Chopra, MD, Adjunct Associate Professor, Health Sector Management Program, The Fuqua School of Business, and Kevin A. Schulman, MD, Director, Health Sector Management Program, The Fuqua School of Business: Associate Director, Duke Clinical Research Institute, hosted the “Wireless and Consumer Healthcare Conference” on September 23, 2009 at Duke University’s Fuqua School of Business.

The use of wireless technology is gaining momentum as a key enabler of safer and more effective healthcare. Our goals were to define the healthcare consumer, identify his/her needs and to discuss ways the Fuqua community can participate in the development and implementation of wireless and consumer healthcare.

Keynote Address

Topic: Putting the Patient First

Speaker: Jim Sweeney, CEO of Patient Safe Solutions

Presentations

Topic: Business Models – The Future of Consumer Health

Speaker: James Mault, MD, Director of Health Solutions Group, Microsoft Corporation

Topic: The Future of Wireless in Healthcare – Medical Device Industry Perspectives

Speaker: Stephen N. Oesterle MD, Sr. VP, Medicine & Technology, Medtronic

Topic: Wireless Pharmaceutical & Disease Management

Speaker: George Savage, MD, CMO Proteus BioMedical

Topic: Global Models for Wireless Health

Speaker: Jeffrey Miller, Managing Partner, Versum Health Advisors

Topic: The Future of Consumerism in Healthcare – Disruption in Healthcare: Risks & Opportunities

Speaker: David Gruber MD, CMO, President, Healthcare Convergence Associates

Panel Discussions

Topic: The Future of Consumerism in Healthcare –Consumers – do we understand them?

Moderator: David Gruber MD, MBA, President, Healthcare Convergence Associates

Panelists: Brian Baum, President, Stayhealthy
Asif Ahmad, CIO, Duke Health Systems
Kaveh Safavi, VP of Cisco Internet Business Solutions Group Healthcare Vertical
Eric Banks, PhD., IBM Healthcare and Life Sciences, Healthcare Solutions Executive
Victoria Neidigh, VP Health & Wellness, General Electric/NBC Universal

Topic: Investor and Capital Markets – What’s exciting and how is the health of the investor market?

Moderator: Gopal K. Chopra, MD, FRACS, MBA, Adjunct Associate Professor

Panelists: Jay Watkins, Partner, De Novo Ventures
JP Peltier, Managing Director, Medtech Piper Jaffray
Anand Iyer, MD President and COO, WellDoc, Inc
Rahul D. Singal MD, President and CEO, WorldDoc, Inc

FEATURED SPEAKERS AND PANELISTS

KEVIN A. SCHULMAN, MD, MBA - *Director, Health Sector Management, Professor of Business Administration*

Dr. Kevin A. Schulman is a professor of medicine at the Duke University School of Medicine and holds a joint appointment as professor of business administration at Duke's Fuqua School of Business. At Fuqua, Dr. Schulman serves as director of both the Health Sector Management Program and the Center for the Study of Health Management. At the School of Medicine, Dr. Schulman is director of the Center for Clinical and Genetic Economics and associate director of the Duke Clinical Research Institute. Dr. Schulman received his MD from the New York University School of Medicine and his MBA, with a concentration in healthcare management, from the Wharton School of the University of Pennsylvania and is board-certified in internal medicine.

GOPAL K. CHOPRA MD, FRACS, MBA - *Fuqua School of Business, Adjunct Associate Professor*

Dr. Chopra is a board certified neurosurgeon focused on building, advising and financing technology enabled health care companies. Dr. Chopra is an entrepreneur and strategic advisor with over 20 years of business development, investment banking and operational experience in the health care sector. Dr. Chopra is an Associate Professor at the Fuqua School of Business where he teaches the full time MBA Health Sector Management program in conjunction with Duke Medical Center and the Pratt School of Engineering. Dr. Chopra has earned his degrees at University of Melbourne, M.D. in Surgery, Royal Australasian College of Surgeons F.R.A.C.S., in Neurosurgery, Duke University, Fuqua School of Business, MBA.

ASIF AHMAD - *Vice President Diagnostic Services and Chief Information Officer (CIO), Duke University Health System and Duke University Medical Center Associate Dean*

Asif Ahmad is the VP Diagnostic Services and CIO of the Duke University Health System (DUHS) and Medical Center. He provides leadership, direction, and strategic planning for the information technology staff and functions in support of DUHS and Medical Center. Additionally, Mr. Ahmad is responsible for overseeing the Health Information Management group for the health system. Mr. Ahmad earned an M.S. in Biomedical Engineering and an MBA from The Ohio State University.

ERIC B. BANKS, PhD - *IBM Healthcare and Life Sciences, Healthcare Solutions Executive*

Dr. Banks is a member of the Healthcare and Life Science executive team with specific focus in the area of information based medicine. Specifically, Dr. Banks leads the IBM healthcare sales organization for the US. In his former role, he lead a team to deliver infrastructure solutions for healthcare with specific focus on wireless and mobility healthcare technology solutions to develop integrated communication systems that are critical to enabling connectivity for healthcare services and applications. Dr. Banks studied human keratinocyte differentiation in Richard Eckert's lab at Case Western Reserve University, where he received his Ph.D. in 1998.

BRIAN J. BAUM - *President of Stayhealthy, Inc.*

Brian Baum is President of Stayhealthy, Inc., a company focused on bringing technology and innovation to individuals interested in taking control of their health. In prior positions, Baum was the founding President and Chief Operating Officer of U.S. Preventive Medicine, (USPM). He was the co-founder and Chief Executive Officer of the Duke University Health Record Network, (HRN). Baum was also the Chief Marketing Officer for the Services division of Cap Gemini Ernst & Young, North America, a \$1 billion business unit of Cap Gemini. Mr. Baum holds a BS degree in marketing from the University of Baltimore and has attended the University of Pennsylvania's Wharton Executive Education Program. He is also currently a Senior Scholar at Jefferson Medical College.

PETER ERICKSON - *Managing Partner, TripleTree*

Peter Erickson has played multiple roles in TripleTree's growth since joining the firm early in its inception. As a Managing Partner, Peter helps lead TripleTree's transaction and advisory services in healthcare with an emphasis in the firm's population health management, wireless health, and life sciences engagement and research activity. Prior to joining TripleTree, Peter helped manage international development programs focused on Eastern Europe and Southeast Asia through the National Forum Foundation in Washington D.C. Peter attended DePauw University where he earned his B.A. and the University of Minnesota's Carlson School of Management, where he received his M.B.A. with a concentration in Finance.

DAVID GRUBER MD, MBA - *President and CMO of Healthcare Convergence Associates*

Dr. Gruber is currently President, Healthcare Convergence Associates, a consulting firm focused on the tri-section of healthcare, the consumer, and digital media and technology; project assignment typically focus on strategy, value creation, innovation and new ventures. He is also a part-time Senior Fellow, Healthcare Innovation and Technology Lab located on the premises of Columbia Presbyterian Medical Center (www.hitlab.org). Dr. Gruber is a magna cum laude graduate of a six-year Bs-MD program, having received his BS from CCNY and his MD from the Mt. Sinai School of Medicine. He also has an MBA from Columbia, and was a Kellogg Foundation National Fellow between 1990-93.

ANAND K. IYER, PhD - *President and Chief Operating Officer, WellDoc Communications, Inc.*

Dr. Anand K. Iyer serves as president and chief operating officer of WellDoc Communications, Inc., where he oversees the deployment of the company's cell phone and web-based diabetes management platform, and leads efforts to integrate WellDoc's solution internationally into mainstream chronic disease management programs. Iyer has more than 20 years of consulting experience. Previously, he served as a director (partner) at PRTM Management Consultants in the firm's communications industry group and led its wireless solutions practice. Iyer is also the founder and immediate past-president of the In-Building Wireless Alliance, a global, cross-industry, not-for-profit focused on accelerating the adoption of in-building wireless technologies to improve public safety response, energy consumption and real estate value for buildings. Dr. Iyer received a bachelor's degree in electrical and computer engineering from Carleton University in Ottawa. He earned a master's and doctorate degrees in electrical and computer engineering, as well as a master of business administration degree from Carnegie Mellon University.

TOM KATSOULEAS, PhD - *Dean, Duke University's Pratt School of Engineering*

Dr. Tom Katsouleas, became Dean of Duke University's Pratt School of Engineering in July 2008. He also serves as Professor of Electrical and Computer Engineering. Prior to Duke, Dean Katsouleas served on the faculty of the University of Southern California's Viterbi School of Engineering and at UCLA. He is a fellow of both the American Physical Society and the Institute of Electrical and Electronics Engineers (IEEE) and serves as associate editor of the journal IEEE Transactions on Plasma Science. He has authored or co-authored over 200 publications and given more than 50 major invited talks. Dean Katsouleas earned a Ph.D in physics and a BS (summa cum laude) in physics, both from UCLA.

JAMES R. MAULT, MD, FACS - *Director of New Products and Business Development for the Health Solutions Group, Microsoft Corporation*

Dr. Mault has more than 25 years of experience in both clinical medicine and the medical device and health IT industry. He is board-certified in both General Surgery and Cardiothoracic Surgery, having specialized in heart and lung transplantation, thoracic oncology and critical care. He is the author of more than 100 scientific articles, chapters and books in the published medical literature and is the inventor of dozens of patents for a variety of novel health information systems and devices. In addition, Dr. Mault has also founded and managed 5 medical device and health information technology companies. Dr. Mault holds a bachelor's degree in biology and a medical degree from the University of Michigan. He conducted his general surgery and cardiothoracic surgery residency training at Duke University Medical Center.

JEFF MILLER - *Managing Partner, Versum Health Advisors*

Jeff Miller is the Managing Partner for Versum Health Advisors and currently focuses his consulting activities on the identification and development of transformational strategies and the implementation of technology-enabled business processes for a diverse set of health and information technology clients. Mr. Miller has more than twenty-five years experience in strategic planning, product development, and operational process improvement in the health care, manufacturing, and technology industries. Prior to founding Versum Health Advisors, Miller established and led the Worldwide Health and Life Sciences organization at Hewlett-Packard Company. Mr. Miller is based in Research Triangle Park, North Carolina. He holds a master's degree in business administration from the Fuqua School of Business at Duke University and a Bachelor of Arts degree in Economics and Computer Studies from Northwestern University.

VICTORIA NEIDIGH - *Vice President, Health and Wellness, General Electric/NBC Universal*

Victoria Neidigh currently serves as Vice President of Health and Wellness for General Electric/NBC Universal. In her role, Ms. Neidigh supports the GE Healthymagination platform with an ongoing commitment to reduce costs, increase access and improve quality. Prior to this, she served at the General Manager for GEHC Clinical Data Services and Enterprise Solutions. Ms. Neidigh is a registered nurse currently volunteering in home care nursing. Prior to this, she served as Vice President of Strategic Solutions at McKesson and Vice President of Strategic Alliances at Medscape/CBSHealthwatch.

STEPHEN N. OESTERLE, MD - *Senior Vice President, Medicine and Technology at Medtronic*

Dr. Stephen N. Oesterle joined Medtronic in 2002 as Senior Vice President for Medicine and Technology. In this role, Stephen provides executive leadership for Medtronic scientific research, formation of technological strategies and continued development of strong cooperative relationships with the world's medical communities, technical universities, financial institutions and emerging medical device companies. Previously, Steve served as Associate Professor of Medicine at the Harvard University Medical School and as Director of Invasive Cardiology Services at Massachusetts General Hospital, Boston. Dr. Oesterle is a 1973 summa cum laude graduate of Harvard College and received his medical doctorate from Yale University in 1977. He has served a fellowship in interventional cardiology at Stanford.

J.P. PELTIER - *Managing Director of MedTech Piper Jaffray*

J.P. Peltier is a Managing Director and member of the Health Care Team at Piper Jaffray. Peltier has 10 years of investment banking experience at Piper Jaffray focused exclusively on the medical technology sector. Peltier provides medical technology clients a full range of investment banking services from equity and debt financing to merger and acquisition advisory. Peltier graduated from the University of St. Thomas and received a Master of Business Administration degree from the J.L. Kellogg School of Management at Northwestern University.

KAVEH SAFAVI, MD - *Vice President of Cisco Internet Business Solutions, Group Healthcare Vertical*

Dr. Kaveh Safavi is vice president and global leader for the Cisco Internet Business Solutions Group Healthcare Practice. A seasoned healthcare executive, prior to Cisco, Safavi was chief medical officer for the healthcare business of Thomson Reuters, where he established the Center for Healthcare Improvement to create a thought leadership presence. Safavi's leadership experience spans the healthcare sector—from physician offices and hospitals, to insurers, to the boards of biotech companies. Safavi has the unique distinction of possessing both medical and law degrees, from Loyola University and DePaul University, respectively. He is board-certified in internal medicine and pediatrics.

GEORGE SAVAGE, MD - *CMO, Proteus BioMedical*

Dr. George Savage is a co-founder of Proteus as well as Managing Member of Spring Ridge Ventures. Prior to Proteus, Dr. Savage co-founded FemRx and served as a director and senior vice president of research and development during which time FemRx completed an IPO and was subsequently acquired by Johnson & Johnson. Previously, Dr. Savage co-founded CardioRhythm and served as a director and vice president of clinical and regulatory affairs during which time CardioRhythm was acquired by Medtronic. Dr. Savage holds a B.S. (Magna Cum Laude, Tau Beta Pi) in Biomedical Engineering from Boston University, an M.D. from Tufts University School of Medicine, and completed postgraduate training in general surgery at the University of Massachusetts Medical School. He has an M.B.A. from Stanford University Graduate School of Business.

BLAIR H. SHEPPARD, PhD - *Dean of Duke University's Fuqua School of Business, Chair and Founder of Duke Corporate Education*

Dr. Blair Sheppard has extensive experience working as a researcher, consultant and teacher in the areas of leadership, corporate strategy, negotiation, organizational relationships, and organization design. He has written over 50 books and articles on these topics and been a consultant to over a hundred companies and governments including ABB, BAE, the Canadian Government, Deutsche Bank, Eli Lilly and Company, Ernst & Young, GlaxoSmithKline, IBM, and Johnson & Johnson among others. Dean Sheppard earned a BA and MA from the University of Western Ontario and his Ph.D in social and organizational psychology from the University of Illinois at Urbana/Champaign.

RAHUL SINGAL, MD - *President and Chief Executive Officer, WorldDoc, Inc.*

As WorldDoc's President and CEO, Dr. Rahul Singal conceives and executes corporate strategies while providing vision for the organization that he has helped shape since its inception in 1999. Before joining WorldDoc, Dr. Singal served as Vice President and Medical Director for Southwest Medical Associates, a publicly traded Managed Care Organization under the umbrella of Sierra Health Services. Dr. Singal is a graduate of Stanford University School of Medicine and a Medical Scholars grant recipient. Dr. Singal completed his residency training in internal medicine at Washington University School of Medicine, St. Louis, Missouri.

JIM SWEENEY - *Chairman and Chief Executive Officer of PatientSafe Solutions Inc.*

Jim Sweeney is responsible for setting and carrying out the strategic and operational direction for Patient Safe Solutions, a patient and nurse centered company that provides complete patient safety solutions to hospitals. Mr. Sweeney has been the Founder and CEO of eight healthcare product and service companies, including Bridge Medical. Most recently, he was Founder and CEO of CardioNet, the highly successful developer and marketer of Mobile Cardiac Outpatient Telemetry. Acknowledged as the founder of the multi-billion dollar home infusion therapy industry, Mr. Sweeney founded Caremark, the industry pioneer and leader in in-home infusion and prescription benefit management. He sold the company to Baxter in 1987 for approximately \$600 million.

JAY WATKINS - *Managing Director, De Novo Ventures*

Prior to joining De Novo in 2002, Jay Watkins was a co-founder of Origin Medsystems, a venture-funded medical technology start-up that was purchased by Eli Lilly & Company in 1992. When Eli Lilly divested its medical device businesses to form Guidant in 1995, he became a member of the corporation's management committee, serving in this role from 1995-2002. In addition, Jay was the President of Compass, Guidant Corporation's corporate business development and new ventures group. Jay held management positions in several start-ups, including Microgenics Corporation, and was a consultant with the international consulting firm of McKinsey & Company. He has been a member of the board of directors of several public companies, including Gynecare, Cardiogenesis, and Rita Medical. Jay received his MBA from Harvard University and his undergraduate degree from Stanford University.

Context

The presentations and discussions focused on wireless technology as an enabler of healthcare change.

The meeting was held at The Fuqua School of Business at Duke University, and was attended by healthcare providers, members of the medical device industry, innovators in wireless healthcare, and venture/investment professionals and students of the Health Sector Management program. The purpose of the meeting was to identify and discuss fundamental drivers of connectivity in healthcare IT.

In their introductory remarks, Dean Blair Sheppard, Dean Tom Katsouleas, Dr. Kevin A. Schulman and Dr. Gopal K. Chopra provided a contextual framework for the conference by describing its goals, current challenges and incentives to developing effective wireless and consumer healthcare.

Key themes of the presentations and discussions are outlined below.

US healthcare is the best in the world, but its delivery needs to be improved. Healthcare was thought of as a unique market due to its unique services. However, as with any vertical, it does have finite parameters (regulation, environment, consumers, incentives, barriers to entry, etc). Once these parameters are defined and understood, parallels to any other market can be made; healthcare is about human experience. Understanding how to improve that experience is the key to improving healthcare delivery.

Wireless and consumer healthcare is not a panacea, it is an enabling tool. The healthcare market has been a place of great innovation. A chasm exists between technology innovators and early adopters, which will be bridged by demonstration of the efficacy of new wireless solutions. Wireless is the enabler of the change that needs to take place, and it will provide the convergence point for intelligence, technology, and access to health information. There will be more efficient, mobile access between patients and healthcare providers. However, many challenges remain in effectively delivering solutions to individuals and consumers within the current, troubled environment.

Identify the consumer and how to best communicate with them.

The healthcare consumer has changed, but it unclear who they are. Are they patients? Payers? Healthcare providers? It is clear that customer service must be improved; a clear understanding of who the consumer is and what their healthcare needs are, along with metrics that effectively and honestly assess outcomes, will inform how to best implement existing technologies.

Innovation and demonstration of value will help overcome regulatory and reimbursement challenges. Current technology must enable FDA and other agencies to work with the field to benefit healthcare. Identifying who pays for wireless solutions and what those solutions are, along with partnerships with the telecommunications industry, will enable progress and further innovation.

Profitable, sustainable businesses require a better understanding of the healthcare environment. Currently, we have fantastic technology, but it requires a new infrastructure to deliver better healthcare. It may be straightforward to create this infrastructure, but who will use it? Will it be effective? What is the penetration? Who is the consumer? Perfect connectivity with the patient is ideal for clinicians, but the consumer remains undefined.

Now is the time to make the greatest impact and effect change. We are at the peak of frustration with healthcare delivery, which will drive a paradigm shift and motivate innovators to move healthcare forward. The consumer will become empowered, more knowledgeable, and will have greater connectivity with the clinician. We must understand the healthcare environment to create profitable, sustainable businesses.

Keynote address: Putting the Patient First

Speaker: Jim Sweeney, CEO of Patient Safe Solutions

Overview: Opportunities in healthcare are enormous, but strategies for developing those opportunities will be driven by reimbursement. Must take a venture capital approach and identify funding before developing wireless and other technology solutions.

Key points:

Hospitals are expensive and unsafe environments, and though patient safety has been touted as a priority, implementation of technologies that would improve safety has not happened due to its potential cost.

Hospitals exist for the convenience of healthcare providers, not for patients. The time horizon for developing new healthcare technology solutions is attenuated due to current regulatory/reimbursement hurdles, resulting in diminished ROI. Given the convergence of FDA/CMS, it is of critical importance to identify funding for the service/product prior to developing the service/product itself. Without a means of paying for the healthcare technology, a paradigm shift will not happen.

There must be a renewed focus on patient-centered healthcare, facilitated by empowerment of patients and better support for caregivers.

The healthcare decision-maker, customer and payer are separate people, making it difficult to make a patient feel like a customer. The current regulatory, staffing, and political climates, and the cost of poor service will drive a change toward a focus on consumers. A return to a focus on “doing no harm” must start with supporting hospital nursing staff. Healthcare in hospitals starts and ends with nurses, so decreasing the administrative demands on their time will enable them to better manage their workflow by being more proactive and less reactive, resulting in better service and care quality.

Patient safety pays for itself.

The convergence of wireless and healthcare happens in the “cone of protection,” where there is a continuum of care; from pre-admission to discharge, there is constant connectivity. Interoperability between bedside portals, nurse handheld devices and patient identification bracelets will be connected via RFID infrastructure.

A 500-bed hospital can save \$5 million simply by decreasing medical errors, which results in a 105% ROI in the first year, with a payback period of approximately 6 months. This is very convincing, financially, and hospitals can use their improved safety as a marketing tool, which will attract both caregivers and patients.

Discussion points:

Q: What has the response to new ventures been by the telecommunications industry?

A: Most in healthcare IT have some experience with telecommunications vendors, though they do tend to have great fears of litigation. However, home-based healthcare is not a litigious environment, as patients are happy to be away from hospitals. There is a perception by some telecommunications vendors that they do not need healthcare expertise to gain entry into the market, which is inaccurate. Wireless healthcare is based on solutions, not on problems; healthcare innovation must be married to a solution before moving forward.

Q: What was the value proposition to hospitals when you proposed your wireless systems?

A: You must start within the context of paying based on clinical outcomes and evidence-based medicine. Understanding CMS and reimbursement is 50% of the value proposition. The best way to start is to provide clinical evidence demonstrating the savings your wireless solution will bring, running parallel with reimbursement.

Q: What is the best way to present cost-benefit analyses – how to approach payers with technology?

A: All payers are used to being promised savings, and want to avoid spending more money in the end due to an overwhelmed system. If savings are irrefutable, then clinicians/politics may stymie efforts. It is definitely a hard sell – must go to the point of guaranteeing hard dollar savings (on lawsuits, cost of hospitalization, etc).

Q: Getting from the current healthcare environment to the future state requires energy, and there is no organizational capacity to change the way things currently work. How do we enable the adoption of new technology?

A: The best way to go is to start with smaller hospitals, 1-400 bed institutions. It is easier to implement changes in smaller contexts, and hospitals are currently feeling more receptive and interested in mandating these changes. They won't implement it unless it is cost-saving; patient safety is touted as a driver, but economics/costs drive wireless healthcare. Creating an effective value proposition is critical.

Q: To what extent is the consumer market a viable market for healthcare?

A: Costs are driving consumer market growth. Costs are simply getting too high for consumers, so it is a very viable market.

Q: What is the time horizon for your bedside systems?

A: They will be in place at every bedside relatively soon. We will market directly to consumers, as 1-400 bed hospitals can be outfitted with systems in 6 months. Major hospitals (2400-3000 beds) represent a huge bureaucracy, and would require a 3-year installation. Right now, we will target midsize hospitals.

Q: Regarding installations: how do you get current IT systems to talk to new systems?

A: Large hospitals already have multiple systems, creating a layering effect. We develop interface software that will work with multiple systems. It is a big problem, but crossinterface – it's what we do. The evolution of connectivity in terms of wireless requires consistency and security, so we circumvent server issues by creating redundant systems. It's actually more reliable to use wireless – can even place cell towers on hospital roofs to maintain connectivity.

Q: How can healthcare providers be trained? How can healthcare IT be integrated into education?

A: Biomedical engineering/medical school integration seen at Duke is a great start, as this absolutely needs to be put into classrooms.

Q: Will there be a shift from process metrics to outcomes?

A: Insurance companies are driving evidence-based medicine. We must transform what we're doing due to the cost structure and use the ability to shrink hospitals to critical care centers, so people can go home. This must be implemented to connect outcomes and process. There will be a transformation from episodic doctor visits to continuous care with doctors. Technology will enable effortless, continuous surveillance. It is intrusive, but benefits outweigh inconveniences. Wireless, telemedicine, and mobile technology will allow more patient self-managing, as well.

Business Models – The Future of Consumer Health

Speaker: James Mault, MD, Director of Health Solutions Group, Microsoft Corporation

Overview: We are currently in the midst of a perfect storm of healthcare issues, and our system, as it is, is unsustainable. There is a lot of popular support for healthcare IT; freeing the data, defragmenting our health information, and making it a fun and engaging process for the patient/consumer will improve access and better coordination of care.

Key points:

Doctors were forced into many things that they initially resisted that are better for patients, and hospitals are shifting more towards consumer-centered healthcare.

Hospitals are not where patients want or should be receiving most of their healthcare. If a patient is not sick enough to require the use of an intensive care unit, they should be at home. Home-based healthcare delivery is less expensive, and of higher quality. Wireless technology can enable better coordination among healthcare institutions (laboratories, primary caregivers, specialists, pharmacies). This is popular among voters/patients/consumers, particularly as it will consolidate currently fragmented healthcare information and empower patients.

The existing healthcare data silos need to be more open and easily accessible. Free the data, and allow consumers to be the aggregators.

Health information is already in existence, the concern is more about where the data will go. Patients will be able to get their prescription, medical, and laboratory data deposited into their healthcare account, where they will also have the ability to pay their insurance and provider bills. By giving consumers control over sharing and applications, their information will be more useful to them and more secure. Consumers will determine who accesses their data.

Microsoft's HealthVault provides an open platform that is interoperable and fluid.

The platform is free for users and developers, and open to any new applications, data sources and modifications. The goal is complete interoperability. It's not about the data; it's all about the places you can go and things you can do with the healthcare data, or connectivity. HealthVault is a new ecosystem of partner applications; it is an operating system, not a personal health record. It is a tool for others to create partner applications, and innovate ways to use the data in a newly connected health world.

How do we deliver better care to more people, fewer care providers, at lower costs?

Healthcare is better delivered in a continuum, not in episodes. Providers will be able to monitor events in real-time, before they become a crisis and require a trip to the emergency room. People are amenable to computer consults vs. regular face-to-face, episodic meetings, using online connections.

Health monitoring programs can be delivered to consumers at lower costs, and allow health professionals to monitor and better manage more patients yet focus on those who need more attention. When larger epidemiological events take place (eg, H1N1), these systems can be used for biosurveillance and help people assess the severity of their symptoms, a way of self-triage. This will help prevent overwhelming emergency rooms and primary care clinics.

We need to change the way healthcare providers communicate with consumers.

Using a punitive tone is clearly ineffective (eg, telling consumers to take responsibility, be compliant, don't drink, don't smoke, adhere to these guidelines, you must exercise). Innovation is desperately needed to find the formula to incentivize people to become active in managing their own health. It must be made simple and convenient, entertaining, interesting, rewarding, and fun.

Discussion topics:

Q: How are privacy issues being addressed?

A: The ACLU has drafted a letter with privacy provisions to get Congress on-board with privacy standards. A transient fear regarding healthcare privacy remains, but private data are already safely stored and accessed online (e.g., credit cards, billing information). The relative benefits will outweigh risks.

Q: Will doctors have to be licensed in several states to provide medical care over the internet? What are the risks/liabilities?

A: AMA will verify provider licensure, and physicians will only be available to provide online care to people in their state of licensure. Malpractice insurance sometimes has riders for online coverage, system will provide backup.

Q: What is the business model for the consumer?

A: We envision an enterprise platform: if a doctor earns money, the wireless healthcare service extracts fees from the service provided, and then money is collected by the doctor.

Q: What standards are in development?

A: There are currently no standards in practice and probably will not be available in the near future. Medical information is too diverse for the creation of a standard. Microsoft is a "standard agnostic."

The Future of Wireless in Healthcare – Medical Device Industry Perspectives

Speaker: Stephen N. Oesterle MD, Sr. VP, Medicine & Technology, Medtronic

Overview: The medical device field will best participate in wireless healthcare by partnering with software developers. This will allow for better use of the healthcare data wirelessly communicated from medical devices (implanted/wearable sensors, distance telemetry), and allow medical device companies to focus on the value they best provide.

Key points:

How do medical devices contribute to the development of wireless medicine?

The medical device industry is service-intensive; staff is regularly onsite, in operating rooms, programming various devices. However, connectivity between implanted devices and programmers must be built by enabling remote programming and distance telemetry (particularly for emerging international markets). Remote connectivity will keep costs low, and can be easily scaled to serve millions of people. The following are several ways in which medical devices can provide value to healthcare:

- Improved efficiency/productivity, and safety
- Economy
- Scale
- Improved compliance
- Transferability to emerging markets

Patient monitoring uses an intimate body network, and can be a closed-loop system that is part of a personal area network (moving data from device to programmer or from device to device), facilitated by a worldwide mobile network carrier.

Medtronic focuses on sensors/adapted algorithms at the end stage. Examples of health conditions where Medtronic can easily add value: the management and monitoring of heart conditions, diabetes, hypertension, Parkinson's disease, epilepsy, ischemia, depression, vascular inflammation, and more.

Congestive heart failure.

Heart failure is a major medical event that is very expensive. The next generation of pulmonary pressure monitors will have a leadless, battery-powered pressure sensor that is telemetry enabled. Continuous, real-time monitoring of pulmonary pressure will provide the opportunities for early interventions and prevent heart failure. Developing this level of connectivity will keep about 30% of patients out of hospitals, and save millions of dollars.

Diabetes.

Using devices to perform continuous glucose monitoring and/or insulin delivery in a closed-loop, wireless system could empower many patients with diabetes, particularly children. Remote monitoring by parents and providers could improve quality of life and prevent potential complications.

Drug/treatment delivery.

Wireless-controlled release of drug is another mechanism by which medical devices could provide value; remote drug delivery could improve compliance by taking variability out of equation. Wireless microchips could hold 100-400 doses/sensors programmed drug delivery.

The Synchroned II pump is an intrathecal drug pump. Instead of administering drug systemically, at higher doses, the drug can be delivered directly into the brain. The blood/brain barrier will not be a concern, so lower doses can be administered.

Wireless Pharmaceutical & Disease Management

Speaker: George Savage, MD, CMO Proteus BioMedical

Overview: Providing cost-effective, high-value healthcare to consumers requires a focus on understanding and transforming the current healthcare environment. The opportunities lay in promoting health and wellness; improving ambulatory and chronic disease management; and making current therapeutics more effective by using technology.

Key points:

The goal is to make incremental changes by delivering therapeutics to more people.

We must consider the patient perspective on our current chronic disease management system. Currently, patients are given prescriptions as instructions, and the failure of the patient to comply with therapy is treated as a moral failing of the individual. We must move forward by taking a step back and making physician interactions more personalized. Population-based medicine has prolonged our lives and improved healthcare; we must now translate therapies in cost-effective ways that take best practices from the population to the individual. The true opportunity is in promoting health and wellness with a focus on patients and consumers, and on bringing value to individuals.

Effective partnerships with domain experts will enable us to bring meaningful healthcare to patients while bringing value to investors.

The network pill was based on products developed by medical device companies. Linking pills to devices by using chip adds value; no longer is the therapy focused on the molecule alone, but also on the information gathered by the chip. The network pill starts with a cell phone (which is personalized, not a widget, but a system) and uses a silicon chip that is an activated physiological sensor that communicates with your phone. One-price, one pill – the technology will be a part of the cost structure of the drug already paying. Then a wireless network is established between the individual, caregiver, family members – to whoever access is granted by the patient. The drug could be the plug into this global utility, the single point of access. This is an open system and can communicate with other companies' sensors and data will be delivered via the internet. Instead of selling a molecule, companies will sell a treatment system developed in partnership.

The business model is the biggest challenge, not the technology (consumerization, systematization and globalization).

Patients should have ownership of their healthcare information. Individuals will require short-term awards for long-term behaviors, incentives for patients to engage in management of their healthcare. Improved consumerization should be integrated into the business model, to improve the healthcare experience. Systematization requires the creation of systems that does not require an expert to make decisions. There is not much value in getting better care while costs increase, so we must be the innovators in globalizing access to our considerable primary healthcare provider workforce. Can high-cost technology provide better healthcare to poorer people? The ideal handheld computer is the cell phone, to which many people in the world have access. It will revolutionize healthcare, particularly if wireless technology is leveraged with the use of embedded sensors in oral therapies.

Therapeutic context is important for data interpretation.

Though it is easy to gather data, it is much more complicated to organize it in a way that is meaningful. There is a great deal of information that can be collected from ingestible computers, but it must be organized in ways that are effective for the user (clinicians, elderly patients, younger patients, family members).

Global Models for Wireless Health

Speaker: Jeffrey Miller, Managing Partner, Versum Health Advisors

“The future is not so hard to predict. It’s already here, it’s just unevenly distributed.”

-- William Gibson, Writer

Overview: An evaluation of global healthcare is key to improving efficacy, as it provides opportunities to learn from others who have innovated either out of necessity or due to different cultural drivers. From an investor or entrepreneurial perspective, more people live outside the US, which is a huge available market. Products will need to be introduced in country/population-specific ways.

Key points:

How are other countries innovating by using wireless healthcare solutions?

By transforming existing healthcare systems to improve efficiency and/or quality, extending services from traditional healthcare into new settings (increasing efficiency and more patient-centered healthcare), creating mobile healthcare units to provide new services in emerging markets, and using existing cell phones/mobile networks to overcome healthcare access issues.

Transformation.

A hospital in Sweden, St. Olav’s, built a new hospital based on technical capabilities that currently exist. They were able to address nursing shortages and patient satisfaction issues by improving mobility of nursing staff and patients. They effectively broke down data/communication silos by using RFID/wireless solutions to decrease the mobility of nurses (allowing them to redistribute their time effectively), connected disparate processes, and were able to better track resources within the hospital. The closed process also allowed them to manage and audit in real-time. They improved operation dynamics from intake to discharge and saved/reduced the number of admitted patients due to scheduling issues, decreased medical errors and redistributed resources more effectively, eliminating bottlenecks.

The value is in the services that use the technology provided by devices.

Sweden uses mobile medical devices to maintain connectivity with patients’ medical devices. The device suppliers may change, but the development of new applications or delivery of healthcare is the important component. Good service will create long-lasting business. There are no disincentives for Swedish providers to use the technology; they focused on acute-care first, and then also cater to the health-conscious patient. In Korea, they used service-oriented changes to deliver care post-surgery cardiac patients, by providing at home monitoring. The Yonsei University developed a set of services that are very effective for home-based care, by allowing healthcare providers access to mobile, real-time cardiac information. They recognized the need and provided mobile access to both patients and healthcare providers.

Product –based business is fine, but service is the critical component. Consumers are looking for services provided by several vendors: hospitals, telecommunications, and healthcare providers. Medical device entities should seek out a partnership to better provide a service or to help understand what components will help provide value.

Who benefits, and who pays? The value of buyer needs to match value of offerer.

Everyone can benefit, and the ways in which things are organized is more important. For example, if reduction of utilization is important, avoid markets where pay is based on utilization – that’s not providing value. As there is no consensus on the identity of the buyer, value has to be in providing in a service for which the buyer wants to pay.

New services and new paradigms brought to wireless healthcare in emerging African markets.

Carego International developed a set of partnerships between established acute care clinics and mobile clinics. This enables them to deliver healthcare to patients in remote locations, and the clinics are connected via cellular systems. Healthcare providers can directly communicate with patients and involve the communities they serve in healthcare programs using existing cellular systems. Providers can remain in constant contact with patients and improve compliance by sending text reminders. This is an example of a new way to bring healthcare to new markets, in a flexible and light-touch environment.

Where is the US in terms of global healthcare?

We have the capability to build and deliver services that will provide well-defined, achievable healthcare benefits. There are many opportunities for expanding on current technology in international markets, and the financial organizations can be paid in ways that provide incentives for use in non-US markets.

Discussion points:

Q: Is there softening in terms of financial investments to initiate the process for services/devices?

A: There hasn't been much weakness globally – there is great access to capital. There is significant investment from non-traditional funds, such as the Middle East. However, where is the value? Coming to the global market with a redundant product is not helpful. If you have a unique product and have the ability to leverage the products to provide value, funding will not be an issue.

Q: What is the best entry point to the healthcare market?

A: Be aware of cultural differences in any new market. The concept of personal responsibility is different in non-US cultures/markets. In some global markets, some decision-making is not afforded to the consumer; healthcare providers deploy/mandate a treatment, and consumers will comply. It really depends on the market.

The Future of Consumerism in Healthcare – Disruption in Healthcare: Risks & Opportunities

Speaker: David Gruber MD, CMO, President, Healthcare Convergence Associates

Overview: We are in the midst of a healthcare paradigm shift, from physician mandate to consumer choice. In order to have a competitive advantage, we must take the time to better understand consumer needs.

Key points:

Healthcare solutions, not the product or service, are most important from the consumer perspective.

The average American consumer wants simple, affordable, accessible solutions. There is a high market value for wireless technology such as telemetry/monitoring, as it provides a clear consumer value – real-time, continuous healthcare. Consumers, however, are a diverse group that will require a variety of solutions. Video exams, for example, will solve the issue of consumer accessibility; 25-40% of doctor's visits don't require a physical exam. Not only will more people gain access by the use of wireless to provide video healthcare, but there will be better triage, higher efficiency, and lower costs.

Consumers need help gaining health literacy to empower them to manage their own health.

Most people do not understand or retain information given to them by their healthcare provider. The majority of adults 60 years and older are unable to read the labels on their prescriptions, resulting in poor compliance. A better understanding of consumer demographics and providing effective ways to educate them will be an important first step in facilitating patient self-management. Timing may be of importance when providing this information – providers should take advantage of the time when people are most willing to learn (upon diagnosis). Better educated patients will be more confident to administer self-care across the condition continuum (maintaining health, preventing deterioration of chronic conditions, monitoring).

Incrementalism is the key to capturing large markets.

Businesses such as Walgreen's and WalMart are the groups to watch, as they are utilizing in-store clinics to incrementally enter the healthcare market. If a consumer can't get to their primary healthcare provider, they can use their "minute clinic" at their local store.

Disruptive innovation leads to societal change.

Personal empowerment in wireless healthcare should be enabled as it has for social networking (eg, Facebook, Twitter). Social networking sites have changed the ways people interact, and the same may be possible for implementing wireless health care solutions. The anonymity of online social groups can sometimes result in open sharing of information among patient groups. Consumers want convenience, mastery and choice; home-based, tetherless access provided by mobile wireless technology access; and the ability to communicate in a non-institutional, peer-to-peer community. This unregulated sharing of experiences provides the support network and empathy patients need as they manage chronic health conditions.

The Future of Consumerism in Healthcare – Consumers: Do We Understand Them?

Moderator: David Gruber MD, MBA, President, Healthcare Convergence Associates

Panelists: Brian Baum, President, Stayhealthy
Asif Ahmad, CIO, Duke Health Systems
Kaveh Safavi, VP of Cisco Internet Business Solutions Group Healthcare Vertical
Eric Banks, PhD., IBM Healthcare and Life Sciences, Healthcare Solutions Executive
Victoria Neidigh, VP Health & Wellness, General Electric/NBC Universal

Discussion topics:

Q: How does Duke define consumer engagement?

Asif Ahmad (AA): This is a big problem – it's undefined. In fact, it's left to entrepreneurs to define. At Duke, we use a consumer-oriented approach. We provide as much info as possible online, so patients have access to their information, with complete transparency.

Kaveh Safavi (KS): What is a consumer? It's a question of circumstances vs attributes. Healthcare thinks of patients by diseases, and segments the market by conditions. As a result, people see themselves differently. Consumer products market understands this, but healthcare does not, at this point.

Victoria Neidigh (VN): Instead of focusing on the disease states, we focus on health and wellness.

Q: What are primary barriers to consumer engagement?

Brian Baum (BB): – Consumers will behave similarly in healthcare as with other consumer situations; if you provide value, they will find a way to get it. Unique challenges in healthcare include acute care and management of chronic diseases. We spend 80% of healthcare costs on 20% of the population, but what about healthy people? How do we engage them? We need to develop the "prosumer," and enable a change from the passive to engaged consumers. Ways to do this include bundling information and take the mystery out of aging/lifestyle changes that come with it. Provide tools, services and indicators for consumers to engage. Wireless healthcare is the convergence of health management, monitoring, and portability.

Eric Banks (EB): – How do we monitor healthcare provided in ancillary clinics or at home? We have the technology; the challenge is to find ways to use the current technology to get reimbursed. The goal is to manage wellness, not illness.

Q: How well do we know people – do we need to do a better job of understanding motivators, social connectedness – how does this fit into consumer engagement?

EB: Much of the time, consumers think they have enough information to make the best decision. But to provide them with the best information, they must be better engaged. Currently, consumers aren't invested in maintaining their health – they don't feel they have ownership over it.

VN: We must influence the consumer and enable family connectedness. Cue the doctor to provide information, cue the patient to teach themselves how to access and interpret the data – this will result in better compliance, better care.

AA: There was a misperception that the consumer is not capable of dealing with healthcare information. At Duke, we challenged the myths about the consumer, and let consumers figure out what the information means.

KS: Consumer-driven innovation will come from a non-healthcare organization with consumer knowledge. Providers are going to be dismissive, then surprised, that people outside of healthcare will have a big impact on healthcare.

Q: How willing are consumers to pay for these services?

AA: If services are targeted to patients, the response would be very positive. When providers make an effort to meet consumer needs, people are shocked and happy that outreach is happening. Patients want service, so a shift towards service-oriented care will make consumers more willing to pay.

How does technology enable consumer behavioral change? Is there any new technology available today that could revolutionize healthcare?

KS: The best methods to make impacts on consumer behavior would be to: make technology mobile; improve connectivity; keep the size small; and provide visual representation of information (the ability to see will help patients recall information). The gold standard for physical examinations may not be face to face visits, but technology-augmented visits. There is a big difference between personal care vs in-person care.

AA: Value will drive how service is delivered, not the product itself. Simplified formats are important and will provide broader accessibility. Allowing provisions for visual data will also make a big impact, for quickly communicating information between providers and between patients and providers. This will allow for better remote monitoring and triage, in addition to helping clinicians better prepare/assess any emergent situations.

Investor and Capital Markets – What’s Exciting and How is the Health of the Investor Market?

Moderator: Gopal K. Chopra, MD, FRACS, MBA, Adjunct Associate Professor

Panelists: Jay Watkins, Partner, De Novo Ventures
JP Peltier, Managing Director, Medtech Piper Jaffray
Anand Iyer, MD President and COO, WellDoc, Inc
Rahul D. Singal MD, President and CEO, WorldDoc, Inc

Discussion topics:

Q: What is the value proposition in terms of the investor market? What is the investment environment like?

Jay Watkins (JW): It is currently unclear which field is responsible for different healthcare IT. As money is not traditionally made from healthcare IT, the value proposition needs to be clarified, particularly the roles of: banks, content, and service. It must be demonstrated that you can build sustainable service businesses, which will lower barriers to entry, from an investment perspective. Concerns regarding healthcare IT include that it is easily copied, there may be multiple businesses developed contemporaneously, and it is difficult to show how to exit them. Who buys for the service provider? Who owns the provider?

Q: What is the current environment on Wall Street?

JP Peltier (JP): The good news is that capital markets are fine. However, the take-out play is still undefined. Wall Street is looking good; IPOs are happening now, particularly those with hard-to-replicate profiles are good. It will take approximately \$25 million in revenue to get investors involved.

Q: What was your value proposition?

Rahul Singal (RS): We first approached employers to provide support for healthier employees and increase member engagement, want to send message to employees that “we care; we offer benefits for a reason.” We asked: can we get them to change behavior, be more compliant, exercise and diet? These are complex solutions, but we then asked: can you make additional revenue from subscription (market to health plans)? We then want to implement other services, to get more value from member engagement.

Anand Iyer (AI): We provided outcomes and cost reduction to the healthcare system, including:

1. Portability. We translated data into actionable information, and provided a point of consumption infrastructure.
2. We also demonstrated the value of cost reduction to payers, which was better workforce presenteeism. This had an easy ROI with a short time horizon (3 months), and we used the existing telecommunications infrastructure, which allowed us to leverage a smaller investment to unlock revenue.

Q: What is the view or cost-benefit analysis of new business?

Jay Watkins (JW): From the venture investment perspective, there is a narrow view; there are low barriers to entry, but no clear exit strategy. We prefer big assets that are not capital intensive, can get ROI early (as compared to the 9-10 year time horizon for drug development). Capital efficiency with cash-flow break-evens is attractive, as you can build real businesses earlier. If value can be created, there is a huge asset in ROI in the short time horizon. Consumers will then demand the new service/product from payers and employers. Stakeholders can serve as proxy for consumers, as they can pay sooner rather than later, and field can make ROI. A challenge to new business is the analytics, which become more problematic as the regulatory role becomes clearer.

Q: What is the current reach to capital?

JP: The venture capital environment is not currently at its best. There is a shorter list in terms of raising capital with reimbursement risk, regulatory risk (FDA panels), etc. If you do not have a predictable business model, don't go public. The risk is too high, as you don't know what you'll have in the end. It will be very tough without these things in place; there will be preferences, strategics involved that allow the right of first refusal on an acquisition for venture capital. The good news is that Medtronic and other companies have reformulated corporate investment fund. Abbott, Johnson & Johnson, Covidian, Qualcomm all now have dedicated strategic funds. There are different, better opportunities to minimize dilution in financials than in the traditional VC landscape.

Q: When developing a sustainable business, one must determine how to get paid for provided value. What wireless healthcare business models do not work?

RS: Don't sell to doctors, it's a tough model. Partner with companies to bring select solutions to doctors. Innovative doctors are looking at solutions, population health. Finding the right distribution partner to market to doctors is key. There is a lot of optimism that patients will pay, given what they currently spend, particularly if they will get better services. Align early on with a partner of a different mindset who understands multiples (investment bankers, etc).

AI: Market to doctors, don't sell to doctors. It is still too early to tell what will really work. In one model, the payer assumes all costs (they get savings, anyway), or you get a percentage of payer savings, which will yield higher pay than simply licensing a service.

Q: If the goal is to create a consumer platform that is ubiquitous, how does medical technology start to lure consumers? How should we dismantle walls between bankers, consumers, and medical technology? What happens on the capital and investor side?

JW: Medical technology is not consumer-oriented at all, and it is still determining how to aggregate health data. A huge gap exists between what we think of as therapy and what we think of as the associated service. Medtronic provides both service and medical devices. We are witnessing the violent hybridization of devices into services/devices – violent because they are info silos – and they know little about each other. How do we move spheres of knowledge closer for collaboration? Previously, most medical technology companies wouldn't partner with anyone, as they were all about IP. Today, there are many more companies that medical technology partners with. When thinking about new ventures, let the idea of partnership take hold.

From the investor perspective, we worry a bit about scale with these partnerships. An investor concern is that sustainability looks like scale, but how do we get to scale? This is where clever partnering comes in. There will be no need to build a new infrastructure, but you must get to scale to convince investors of sustainability. You don't want to plow ground for a larger scale venture that is not you.

JP: There is no need to change on the Wall Street end. Market size gets defined; profitability is defined based on consumerability.

Q: How do you see social-connectivity, payer-to-payer interactions, viral marketing - in terms of investments? Also – how do you define their value?

JW: From the investor perspective, a lot happens on cells that no one makes money on. There is no clear way to monetize the use of mobile/wireless in healthcare; again, where is the value? There is a lot of room for a creatively packaged value proposition, where new technology doesn't make much, but it doesn't cost much, either. It's not bad to be a feature, if you are a real partner and can provide value together. Then, capital will flow more freely.

JP: A fun approach to healthcare will be less likely to be effective; a paradigm shift away from acute care towards preventative care needs to take place, to keep people out of hospitals.