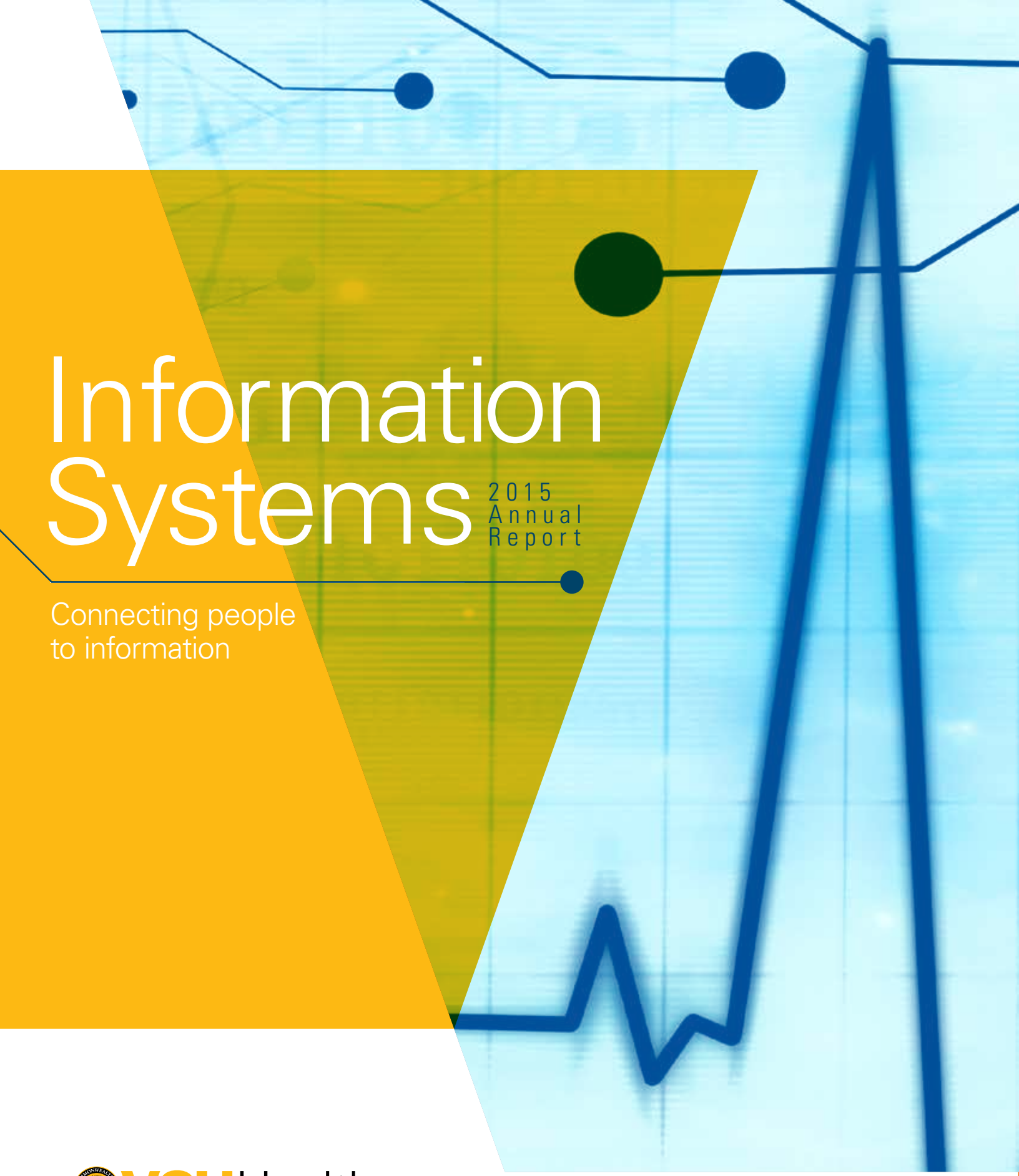


Information Systems

2015 Annual Report

Connecting people to information

VCU Health™

Message from the vice president and CIO

This 2015 Information Systems Annual Report reviews our significant IS activities and accomplishments across the breadth of VCU Health.

With a focus on innovation, Information Systems continues to enable fundamental and sustained improvements to the flow and management of patient information. Those advances impact safety, quality and accuracy of care in measurable and positive ways. This is a natural result of the degree to which all of us have applied our collective expertise and vision to the mission of the health system.

This year we have set up this report to take you on the fictitious journey of a multitude of patient encounters that reflect many of the care services that IS impacts on a daily basis.

Finally, I make the point of giving due credit to the management team and staff of Information Systems. It is through their creativity, dedication and focus that we are leveraging IT tools to daily improve the safe and effective care of the patients we serve.

For more information about the 2015 annual report, please contact the office of the CIO at (804) 828-5913 or email richard.pollack@vcuhealth.org.

Richard Pollack, CHCIO, FHIMSS
Vice president and CIO
Information Systems
VCU Health

As VCU Health remains focused on delivering world-class interdisciplinary health care, in 2015 Information Systems once again furthered safety, innovation and reliability to improve the patient experience.

It's no secret that today's health care is enabled by the instantaneous flow of information that moves between departments, systems and professionals and into the hands of patients and their families. As VCU Health patients grow more diverse, mobile and educated about their health, Information Systems is empowering patients and providers alike by meeting them at the source of their needs.

The following groups compose IS to help improve the patient experience. Look for these icons throughout this report:

CA Clinical Applications

CI Clinical Informatics

EA Enterprise Analytics

FS Financial Systems

IDS Integration and Departmental Systems

ISR IT Service Response

OCT Office of Clinical Transformation

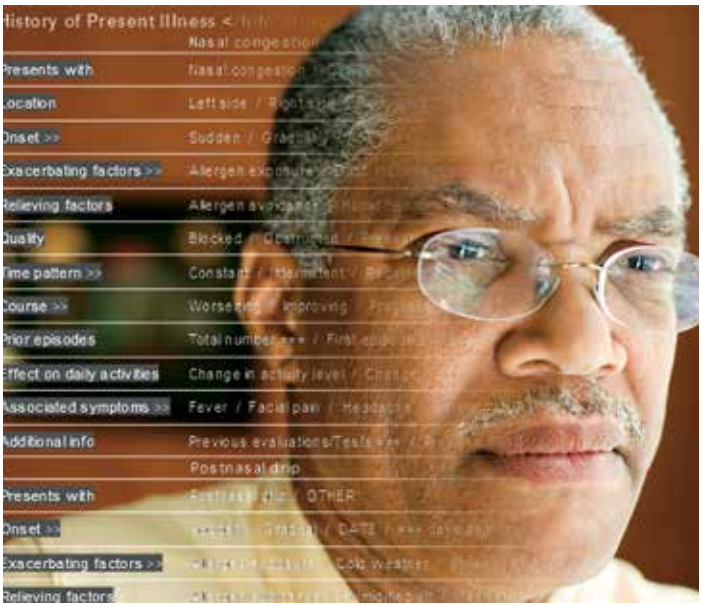
TES Technical and Engineering Services

When we innovate, we're thinking of both the technology and the people who benefit.

For this reason, the story of our accomplishments is best told from the perspective of the lives we touch. In the pages that follow, you'll read about typical patient scenarios* that occur throughout VCU Health, along with what Information Systems has done to improve their outcomes in 2015.

*Fictional patients

Connecting patients and doctors to the right info



Robert, known as Red, is a hard worker who has always been in extremely good health. Perhaps for this reason, when diagnosed with hypertension, he viewed the issue as a passing dilemma. Unfortunately, this also made him noncompliant when it came to taking his medications. By the time some patients (like Red) reach VCU Health, they may already be experiencing stroke symptoms.

Following his stroke, Red's life has changed, but is getting better and better every day with the ongoing help of doctors and medications.

Part of emergency treatment for stroke victims includes an MRI.

- We improved handoff and communication between nursing and MRI staff, by automating MRI patient questionnaires into a PowerForm format in Cerner, including online documentation. CA CI OCT

To avoid situations like Red's, comprehensive patient understanding is critical.

- We made the "teach back" option more accessible in Patient Education to better document comprehension, while also meeting the quality indicators required within payer contracts. CA CI

With common first and last names (like Robert), patients are at high risk for misidentification.

- We added photos to the Electronic Medical Record (EMR) Banner Bar for quick, visual identification. CA OCT

Additional new functions support patients like Red.

- We updated ED workflow, including Acute Stroke PowerPlan (an electronic order-set). CA CI OCT
- Stroke Alert PowerPlan for inpatients improves alert workflows on inpatient units. CI OCT

Linking diagnosis to critical travel information

With globalization, knowing and documenting a patient's travel history makes all the difference in diagnosing and preventing the spread of diseases. When Leila, an international traveler and philanthropist, returned home from Sierra Leone with a severe fever accompanied by joint and muscle aches, the following helped doctors to track the potential for Ebola:

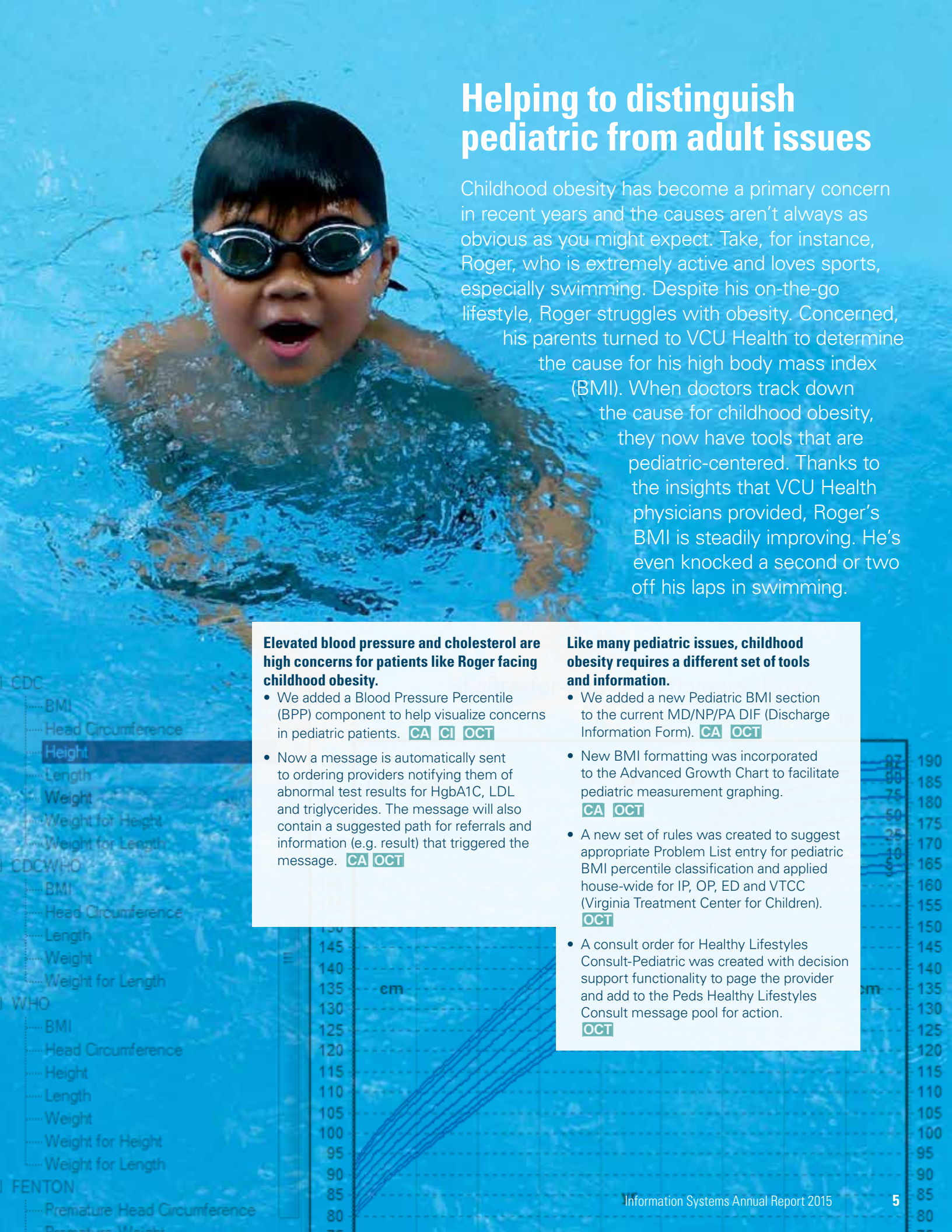
New documentation tools to collect critical information about patients' travel CA CI OCT

A new ADT Interface for Travel History IDS

Revised criteria and automation for pneumonia and influenza vaccines CA CI OCT

Helping to distinguish pediatric from adult issues

Childhood obesity has become a primary concern in recent years and the causes aren't always as obvious as you might expect. Take, for instance, Roger, who is extremely active and loves sports, especially swimming. Despite his on-the-go lifestyle, Roger struggles with obesity. Concerned, his parents turned to VCU Health to determine the cause for his high body mass index (BMI). When doctors track down the cause for childhood obesity, they now have tools that are pediatric-centered. Thanks to the insights that VCU Health physicians provided, Roger's BMI is steadily improving. He's even knocked a second or two off his laps in swimming.



Elevated blood pressure and cholesterol are high concerns for patients like Roger facing childhood obesity.

- We added a Blood Pressure Percentile (BPP) component to help visualize concerns in pediatric patients. CA CI OCT
- Now a message is automatically sent to ordering providers notifying them of abnormal test results for HgbA1C, LDL and triglycerides. The message will also contain a suggested path for referrals and information (e.g. result) that triggered the message. CA OCT

Like many pediatric issues, childhood obesity requires a different set of tools and information.

- We added a new Pediatric BMI section to the current MD/NP/PA DIF (Discharge Information Form). CA OCT
- New BMI formatting was incorporated to the Advanced Growth Chart to facilitate pediatric measurement graphing. CA OCT
- A new set of rules was created to suggest appropriate Problem List entry for pediatric BMI percentile classification and applied house-wide for IP, OP, ED and VTCC (Virginia Treatment Center for Children). OCT
- A consult order for Healthy Lifestyles Consult-Pediatric was created with decision support functionality to page the provider and add to the Peds Healthy Lifestyles Consult message pool for action. OCT

Smoothing out the road to replacement and recovery

When aches and pains threaten to take away something we love, we first turn to every form of non-invasive therapy. But those measures didn't get Joe, a lifelong cyclist, back to his favorite activity. To get back on the road, patients like Joe increasingly turn to VCU Health for total joint replacement. How well did Joe's total knee replacement and physical therapy go? Let's just say he's now a triathlete.

To make joint replacement as safe and effective as possible, pre- and post-operative processes need to be well documented, reliable and easily accessed.

- A new ordering process and documentation tools for the Preoperative Assessment Communication and Education (PACE) Clinic improve utilization of services, as well as adding an option for telephone screenings. CA CI OCT
- Required documentation elements were added to Immediate Post-op and Day-of-Surgery Updates in PowerNotes (online documentation), adding an additional layer of safety. CA OCT
- A new common Total Joint Arthroplasty DIF form (tracking implants) now streamlines discharge instructions for all total joint patients. CA CI OCT
- Added multimodal pain medication and dosing to orders in the Orthopedic Patients: Total Hip/Total Knee Arthroplasty PowerPlan. CA OCT

Notes need to be available not only in pre- and post-op, but throughout therapy.

- Enhanced documentation and charge capture capabilities for physical therapy, occupational therapy and hand management. CA CI FS OCT
- We developed orders and rules to make tracking the status of therapy services for each patient a little easier. CA CI OCT

Making the unexpected a little easier

When it comes to pregnancy, knowing what to expect provides a feeling of comfort like no other. When the time came for Rian to go to Labor and Delivery (L&D) to welcome her son Joseph, she was nervous, but she knew what to expect and had her "go bag" ready. Now, first-time mothers can be a little more at ease and have their doctors waiting, thanks to new online tools and easy access to obstetricians. These days, Rian has no idea what to expect with Joseph, who's steadily growing and getting into everything. The only "go bag" she needs now is for a restful weekend getaway.

To be effective, parental education needs to be convenient and easy.

- We developed an OB Patient Education component that displays all of the topics taught over the course of pregnancy, also allowing new mothers (like Rian) to access and refer back to what they've learned at any stage. CA CI OCT
- LATCH Assessments (for breast feeding) were added to clinical documentation and made available in multiple views for reference by providers. CA CI OCT

L&D procedure scheduling does not need to be time consuming.

- We improved the process for scheduling L&D procedures by moving them online resulting in ubiquitous access for our clinicians. CA CI FS OCT

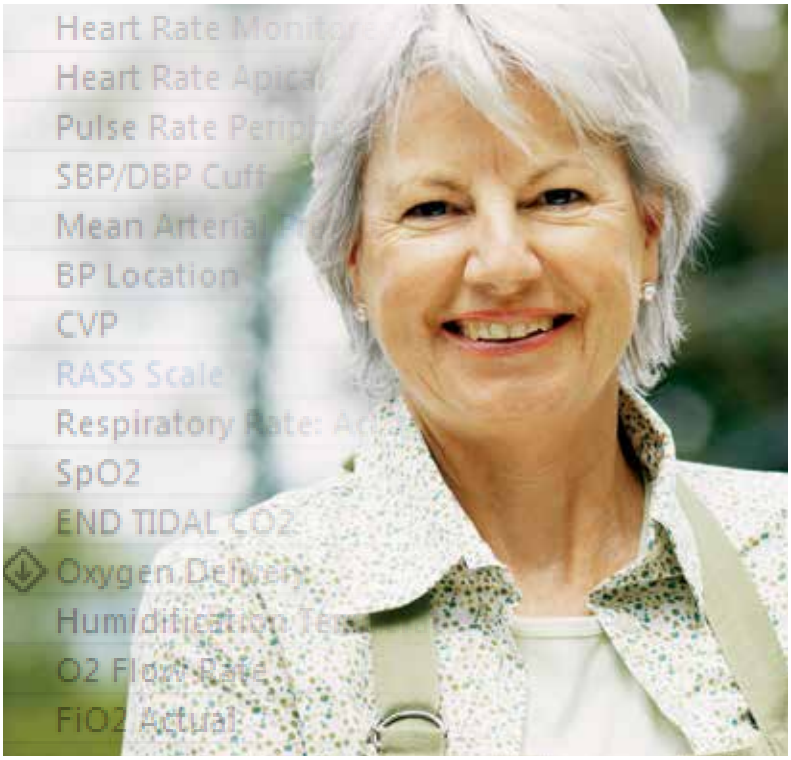
Staying on top of COPD

Chronic Obstructive Pulmonary Disease (COPD) doesn't show up by age, appearance or gender. So when patients like Harper, who's managed her symptoms for more than 10 years, require urgent or emergent care, the following improvements help doctors to stay on top of her condition:

New, computerized Provider Order Entry in Ambulatory Clinics CA

Supportive enhancements to the Respiratory Therapy iView Band, the Nursing Intervention - Airway Management iView section and the Physical Therapy iView Band CA OCT

New Respiratory PowerNote, along with Healthy Lifestyles Consult CA OCT



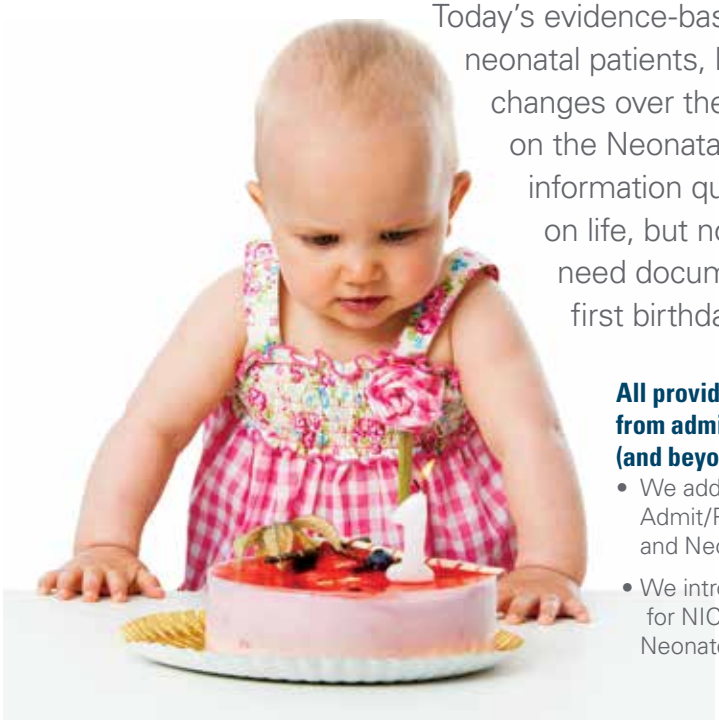
Plugging patients deeper into their own health

Today's patients require more than just great care; they want to be plugged into their health through the latest technologies. When Tristin, who takes his health and his social life very seriously, turns to VCU Health clinics for his proactive screenings, he wants to communicate with doctors online, the same way he does friends and family. The Patient Portal makes that option interactive and easy. These days Tristin can check his test results and communicate with doctors as easily as he checks his social media feeds. If only two-way communication with his girlfriend were so easy!

Staying up to date requires instant results and two-way communication.

- We connected "Open Notes" (online provider documentation) to the Patient Portal, providing enrollees with more timely access to their providers' outpatient visit notes, including access to additional diagnostic test results, like radiology, cardiology and endoscopy. Patients also may now provide comments to their providers, helping to improve accuracy for the documentation in the EMR. CA OCT

Speeding up care through enhanced functionality



Today's evidence-based care happens quickly — especially in the lives of neonatal patients, like Zelena, who generate volumes of information and rapid changes over the course of just a few weeks. For this reason, professionals on the Neonatal Intensive Care Unit (NICU) need to create and access information quickly and accurately. Zelena may have gotten an early start on life, but now she's playful and full of energy. The only first steps that need documenting these days are the ones that came on her first birthday.

All providers need to be connected, from admissions through delivery (and beyond).

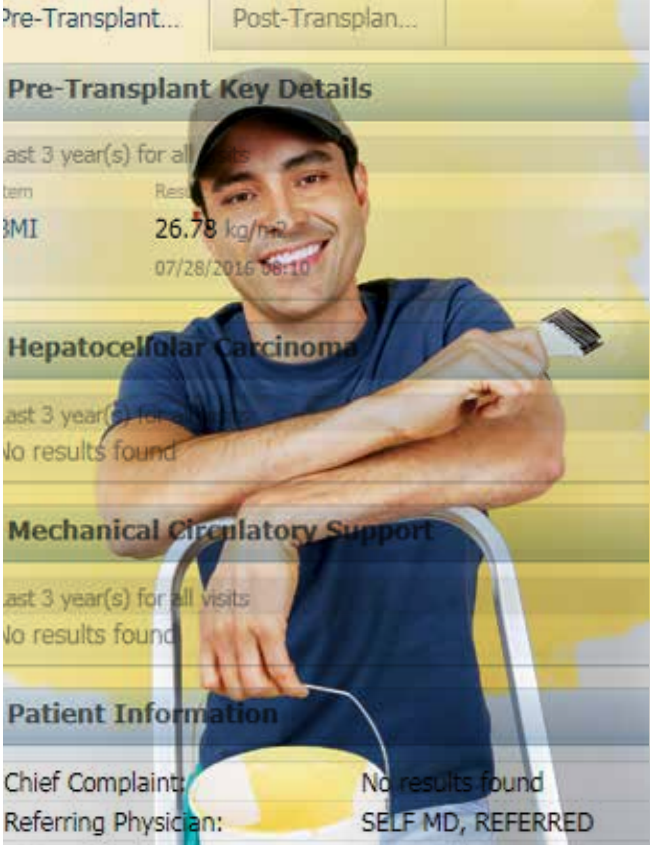
- We added notes for NICU Admit/Progress, NICU Delivery and Neonatology Consult. CA CI
- We introduced a new PowerPlan for NICU <30-week Premature Neonate Admissions. CI

Needs must be communicated, starting with the very first moments of care.

- An updated iView now supports workflow, including critical first-hour steps of care. CA CI OCT
- A new Neonatal/Infant Ventilator PowerPlan sub-phase improves communication of needs to Respiratory Therapists. CI

Connecting patient needs to bigger data

From the time that a need for organ transplant arises, to the moment when physicians perform those life-saving operations, VCU Health providers must track and tap into broad-reaching data. As a second-generation U.S. citizen with Colombian ancestry, Emile knew his demographic came with the possibility for diabetes. But when life circumstances interfered with his diet, exercise and medications, his condition advanced to End Stage Renal Disease. When patients like Emile turn to VCU Health, physicians have to launch a nationwide search for donors and act quickly. Following his transplant and via the life changes that VCU Health has helped him to make, Emile is on his way to a full recovery.



With kidney transplantation, often immediate dialysis is needed.

- We updated online dialysis documentation to make things quick and easy. CA CI OCT

To track down donors, physicians must be connected to available data.

- We negotiated and implemented data transfers between UNOS (United Network for Organ Sharing) and VCU Health, to track transplant data in the data warehouse and make information available to the Quality Assurance/Performance Improvement (QAPI) initiative. EA
- Transplant flag reports were created. CA

When it comes to transplants, electronic data adds life-saving speed.

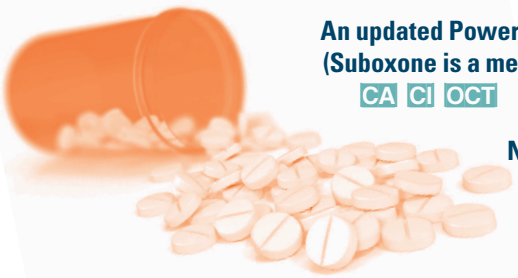
- Following more than a year's worth of design recommendations, we converted all Transplant Department paper documentation for pre- and post-lung, heart and kidney/pancreas operations to the Cerner EMR, including the creation of 12 iView bands that include more than 1,500 new fields and two MPages (a tool that allows customized information to be delivered to the computer immediately) with 17 custom widgets and six specialty views. CA CI OCT
- Electronic Data Interface for Transplantation (EDIT) went live in March 2015, supporting workflow improvements in solid organ transplantation. CA CI IDS

Kidney transplant patients like Emile need a Foley catheter as part of their care.

- We established Foley Rules/Clinical Decision Report, ensuring that the timing of Foley removal is evidence based. CA CI OCT

Beating addiction with information

Helping those who suffer from opioid addiction to overcome their diseases requires keeping everyone on the same page. To help guide Sissy to her nine months of being opioid free, we added the following improvements:



An updated PowerPlan with "Suboxone Opioid Withdrawal Treatment" (Suboxone is a medication used in the treatment of opioid withdrawal.) CA CI OCT

New "Related Results" functionality, showing providers the latest relevant labs, weights or other pertinent information when writing medication orders CA CI OCT

As technology increasingly serves as the lifeblood for not only VCU Health, but all health care communities, our work in Information Systems grows more important with every passing year. As we strive to make our mark, we focus not only on the lives and experiences of patients, but also on the workers and providers we serve throughout the university and its health care communities.

For this reason, in the appendix of our report, you'll find a system-by-system account of our improvements, along with how they contribute to VCU's ability to serve as a world-class research institution and health care provider, as well as a top-flight source for interdisciplinary education.

From the next healthy newborns, to graduating physicians — we view our role as an integral part of not only constant improvement, but of a growing community.

Supplemental information

Clinical

- Instrumental in developing and adapting the interdisciplinary plan of care (IPOC) to changes identified in the Joint Commission Survey, developing the remediation plan and measures of success and then supporting the achievement of >90% compliance throughout three-month reporting period
- 56,000 portal users, Notes and Depart Summaries through December 2015, with 5,330 views and 4,895 downloads
- Reconfigured LACE (risk assessments) scoring for readmissions
- Successful implementation of numerous processes allowing VCU Health providers to meet CMS-required quality and functionality measures
- Successful conversion from ICD-9 to ICD-10, per federal regulations, with the goals of meeting regulatory requirements while also being revenue neutral (resulting in enhanced diagnosis data)
- Recertification of Inpatient Stay form and rules
- Placed first Dynamic PowerPlan for Trauma into production
- RAM Care team delivered first comprehensive electronic audit to address 100% of patients for 100% of best practices identified by team
- Reports delivered for ambulatory diabetes and neonates born less than 30-weeks gestation
- New iView band for Language Services division allows interpreters to document services provided

Systems Integration and Departmental Systems

- Implementation of the SurgiNet anesthesia solution as a replacement for Innovian implementation, including Biomedical Medical Device Interface (BMDI) connections for tying anesthesiology devices to Cerner
- Epidemiology expansion, including the addition of case extraction from SurgiNet to TheraDoc, reducing manual data collection and reporting responsibilities
- Stabilization of HPD support requirements, including use of external firm (TCSC) for application support (in 2015 the system was stable)
- Majority of HPD upgrade planned phases implemented to modernize system and increase maintainability, usability and stability, including:
  - Support for onboarding of residents
  - Support for conversion of credentialing to Morrissey MSOW, including implementation of interface required for feeding provider data from Morrissey into HPD
- Final interfaces moved from e*Gate to Ensemble (including retirement of e*Gate)
- Additional interfaces created:
  - Trauma Flag
  - Audiology
  - Cardiology
  - Space Trax for interventional radiology

Enterprise Analytics

- Redesigned the Teletracking reporting package after database upgrades to display pre-admissions on the real-time occupancy dashboard
- Launched real-time Hospital and ED Occupancy dashboard using data from Teletracking and FirstNet, giving users live looks at current state of throughput and capacity
- New series of daily ED throughput reports created for measuring critical timestamps in the ED patient movement process
- Per specifications from the chief medical officer: Operations dashboard developed to show trending in strategic efficiency measures over time (Inpatient Returns, Discharges by Noon, Average Length of Stay)
- Process developed for helping Care Coordination Discharge Planning Assistants (DPA) identify patients in need of Important Message from Medicare; process consists of seven dashboards and reports, monthly and weekly compliance reports and paging events, using Teletracking and IDX
- Daily inpatient reports created for tracking patients with SIRS (sepsis) alerts, as well as patients currently taking anticoagulant medications
- Partnership between EA and the Office of Clinical Transformation (Steve Rothemich, M.D.) for developing a set of monthly reports, tracking patients with diabetes by clinic location and primary care provider
- Partnership between Enterprise Analytics and Performance Improvement teams to help automate portions of the PQRS Quality Reporting attestation process

Supplemental information

Information Security

Phishing training

- One of the newest threats that organizations face is phishing. This type of attack is designed to fool our user base with deceptive emails, convincing them to either click on a link to infect a workstation, or to enter personal information.
- The Security Team organized an event sending out two "fake" email campaigns, training users on how to react and notify the proper support group of suspicious email activity.

Technology refresh

- Over the course of 2015, the Information Security Department has performed a significant technology refresh, including systematic review of every system within our portfolio for evaluation against current threats.

Incident response

- In the past year, we were able to detect and stop 114 issues from becoming serious threats to VCU Health systems.

Service desk

- New chat feature provides customers with an additional method to interact with the service desk, resulting in improved handling of increased demand
- Channels established allowing employees to chat with service desk analysts regarding customer-related questions (popular feature available via the employee web ticket portal)
- Amid increasing VCU Health and IT projects and 66% increases in service desk ticket volumes (from 89,374 total in 2014 to 135,321 in 2015), 63,712 cases closed
- 74% of tickets initiated or routed through the service desk successfully resolved through first contact
- Post-resolution satisfaction rates among surveyed team members (employees) of 92.8% (rated "extremely satisfied" or "satisfied") following service desk and IT staff engagement

Office of Telemedicine

- Video teleconferencing systems installed into 11 conference rooms (three at Main Hospital, two at One Cap, one each at CCH, Willow Lawn, CHoR, 701 Franklin, Stony Point and VTCC)
- Two Computers on Wheels systems with video teleconferencing added to Unique Pathogen Unit
- Added HIPAA-compliant (telemedicine) video teleconferencing systems to 18 care provider workplaces/PCs

Project Management Office (PMO)

Major projects completed in 2015

- Nurse staffing and scheduling
- MSO for the web upgrade of credentialing software
- SurgiNet perioperative and anesthesia software
- Meaningful Use Stage 2™
  - Public health reporting - immunization registry clinical quality measures
  - Summary of care
  - Ambulatory CPOE
  - Clinical quality measures for eligible providers and eligible hospitals
  - BCMA

Revenue system

- ICD10 System Changes (including custom code for Dual Coding)
- Inbound Charge HL7 Interface
- Streamlined Charge Interfaces Reconciliation Reporting
- Implemented Electronic Data Interface (EDI) 277CA file
- Implemented two ETM Workflows (a tool that helps manage information for quicker decisions)
- Enhanced three ETM Workflows
- Implemented Form Letter Product for Billing and Accounts Receivable software (BAR) billing
- Implemented alerts for Pre-Financial TOP Initiative (a GE Alerts Manager, which creates a worklist of visits for patients missing critical information)

Business systems

- Introduced bar-coded patient armbands to in-bed environments, in support of Bar Code Meds Administration (BCMA)
- Implemented SurgiNet Sched Interface for GE/IDX
- GE/IDX application upgraded to version 5.1.1
- Transitioned to new appointment reminder vendor and implemented text message reminders
- Completed Midas upgrade in preparation for ICD10
- Implemented social security number masking in GE/IDX
- ImageNow/Kofax upgrade for Accounts Payable solution
- 3M upgrade performed in preparation for Computer Assisted Coding

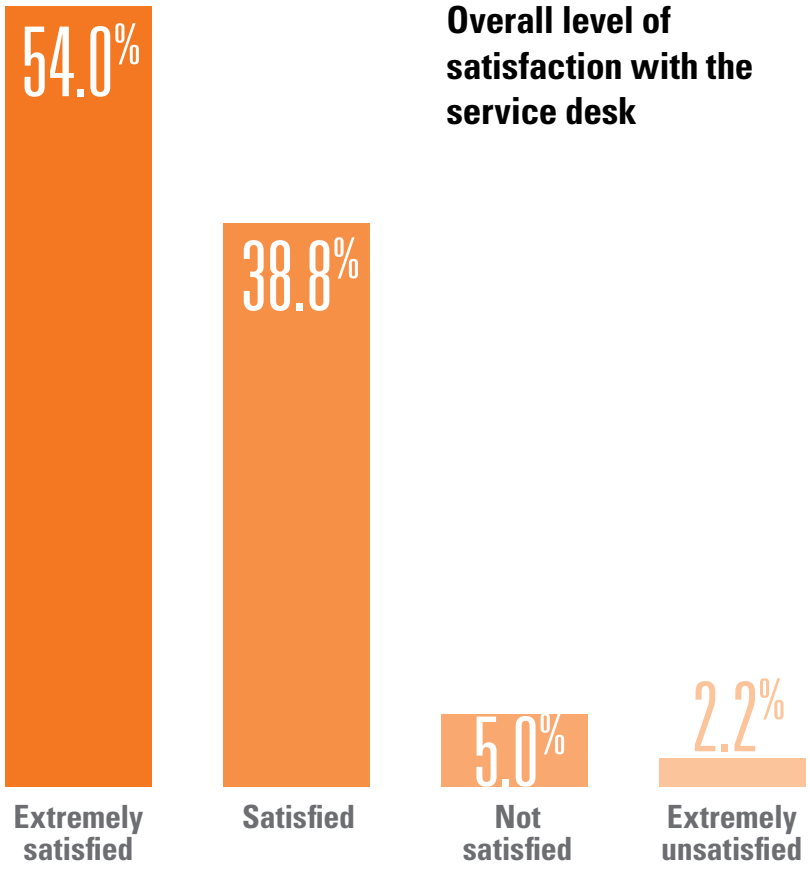
Service desk statistics

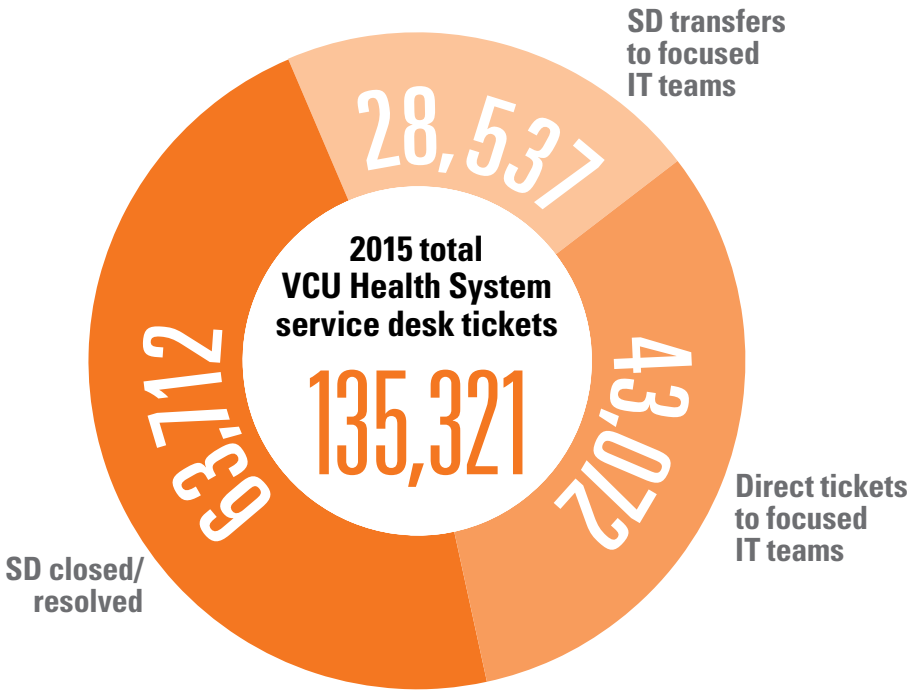
- In order to aid with increased customer demand, a new communication pathway with the service desk (chat) was created.
- Employees can chat with a service desk analyst to quickly address customer questions.
  - This popular feature is available via the employee web ticket portal.
- As VCU Health and IT projects grew, the volume of tickets managed by the service desk increased 66 percent — from 89,374 total tickets in 2014 to 135,321 in 2015. The service desk closed 63,712.
- Seventy-four percent of the tickets initiated or routed through the service desk were successfully resolved during first contact.
- Customer satisfaction results were extremely positive, with 92.8 percent of employees surveyed being extremely satisfied or satisfied with their interaction with service desk and IT staff.

Office of Telemedicine

- Installed video teleconferencing systems in 11 conference rooms (three at Main Hospital, two at One Cap, one at CCH, one at Willow Lawn, one at CHoR, one at 701 Franklin, one at Stony Point and one at VTCC).
- Enabled two Computers on Wheels with video teleconferencing in the Unique Pathogen unit.
- Enabled 18 care provider workplaces/ PCs with HIPAA-compliant (telemedicine) video teleconferencing.

Overall level of satisfaction with the service desk





Supplemental information

Human resources

New hires

Andrea Clanton, *financial application staff*

Shanta Turner, *clinical application associate*

Russel Hannan, *clinical application associate*

Edward Cotter, *senior clinical application staff*

Antoine Morton, *clinical application staff*

April Hord, *clinical application staff*

Frank Bowden, *clinical application staff*

James (Matt) Haines, *information services manager*

Sandra Dorrier, *senior systems administrator*

Bradley Cochran, *technical training staff*

Phillip Andy, *senior application developer*

Tess Brooks, *senior administrative assistant*

Christy St. John, *director of nursing informatics*

Jason Campbell, *senior platform systems staff*

John Bauer, *senior platform systems staff*

Terry Zacharias, *network services*

Kevin Tome, *data security specialist*

Michael Vida, *information security manager*

Brad Cochran, *technical training staff*

Grace Childress, *senior clinical transformation tech*

Promotions

Peggy Condrey, *financial applications staff*

Nancy Harrison, *information services manager*

Kathy Cobert, *information services manager*

David (Brady) Wampler, *financial applications analyst*

Amy Smith-Caplinger, *senior clinical informatics*

Leslie Petersen, *senior technical trainer*

Degrees

Terri Wilson, *B.S. in information systems management*

Michelle Bailey, *B.S. in information technology*

Melissa Wimmer, *master's in health informatics and data analytics*

Michael Vida, *M.S. in information security and assurance*

Donna Winborne, *Master of Health Administration*

Paula Spencer, *Master of Health Administration*

5 Years of Service

Colin Banas, M.D.

Charissa Augustine

Katherine Ingram

Ronald Gillum

Marie Paige

Ormary Aponte

Kenneth Johnson

Jacqueline Young

Elizabeth Locus

Kim Pollock

10 Years of Service

Leslie Sormberger

Ying Guo

Valerie Webb

Michele Jackson

Jeffrey Gordon

Karen Wilson

Laura Weller

Donna Winborne

15 Years of Service

Christopher Suleske

Andre Leale

Michael Lee

Peter Ring

Darlene Hill-Clarke

Rita Ciavarelli

20 Years of Service

Deborah Jolly

Nadine Carter

25 Years of Service

Dayton Williams

Naomi Benoit

John Wilson

Elizabeth Ingram

Sandra Butts

Ted Prince

Ronnie Pegram

Robert Wilkins

30 Years of Service

Diane Curry

David Thomas

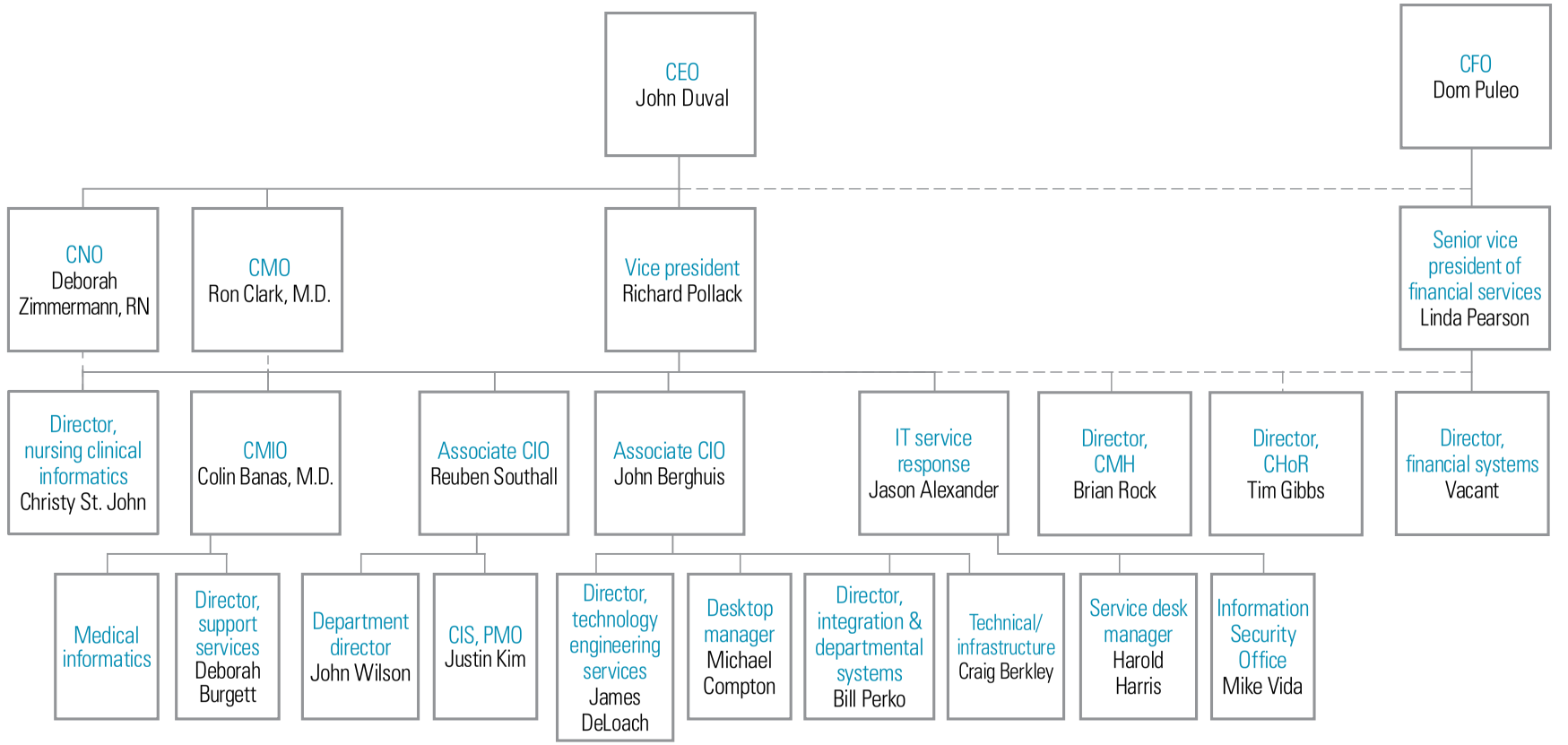
Frank Green

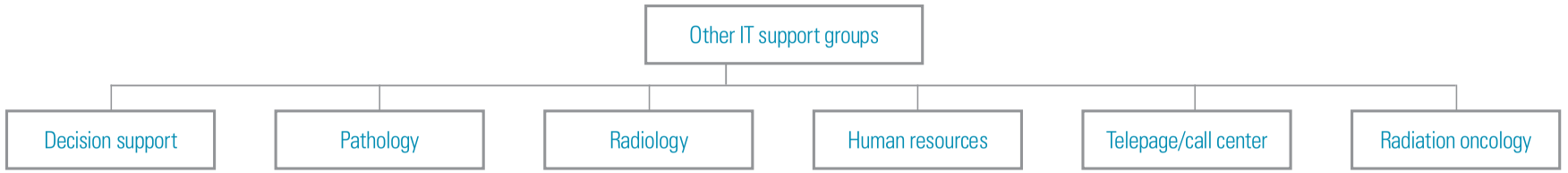
35 Years of Service

Nancy Hopkins

Millicent Oliver

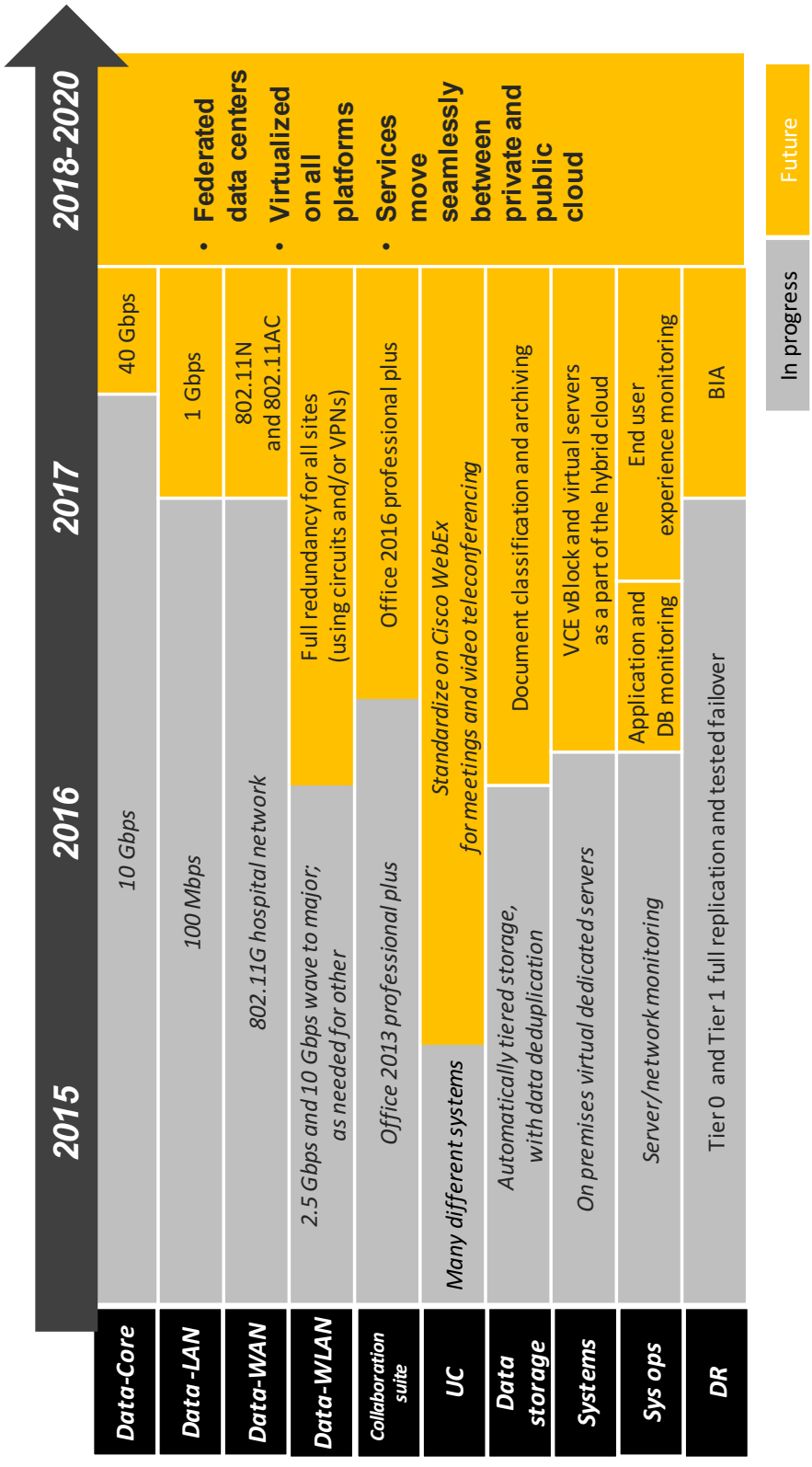
IS organizational chart





Supplemental information

Strategic direction – Overview



Clinical information technology EMR road map

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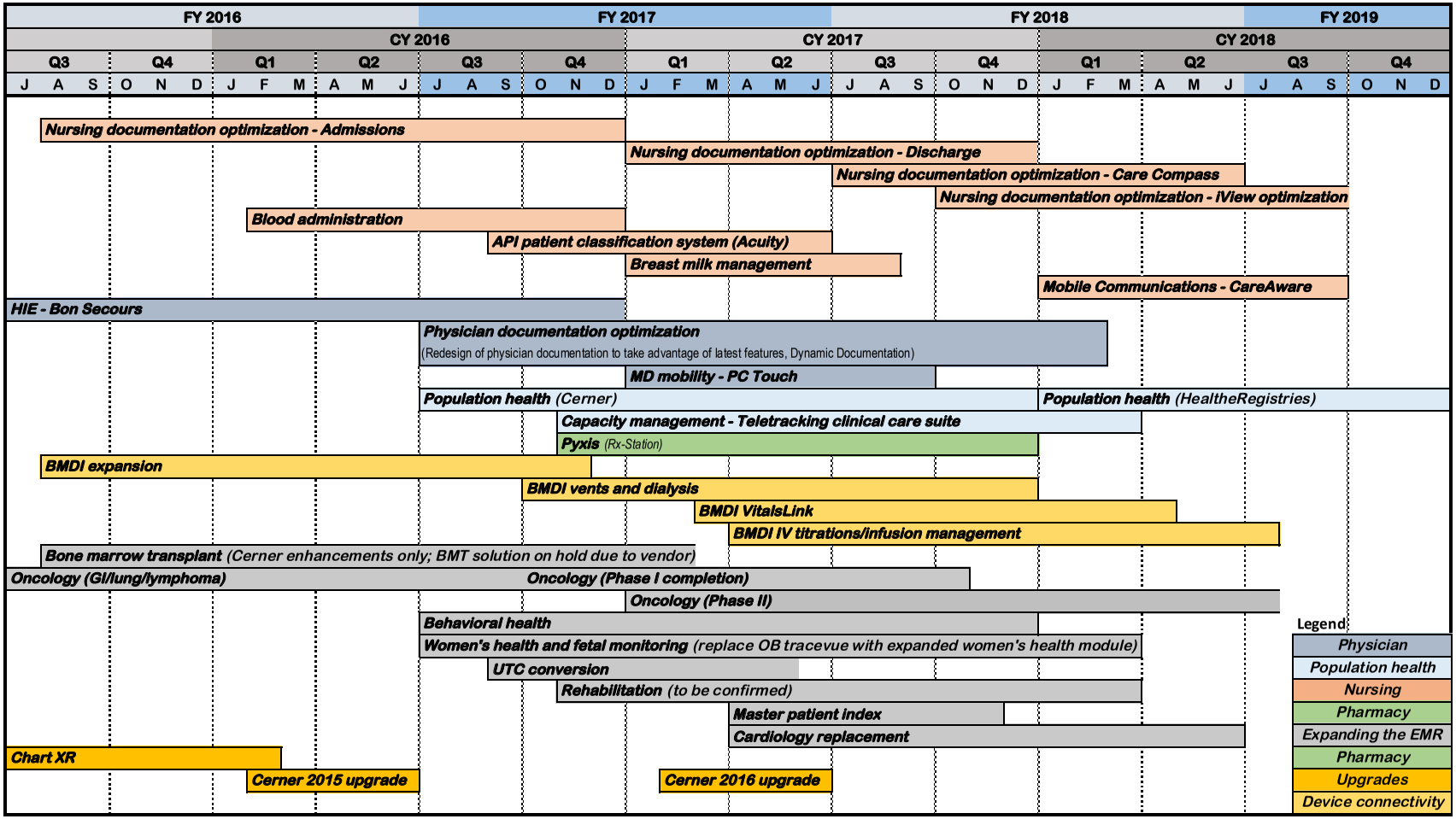
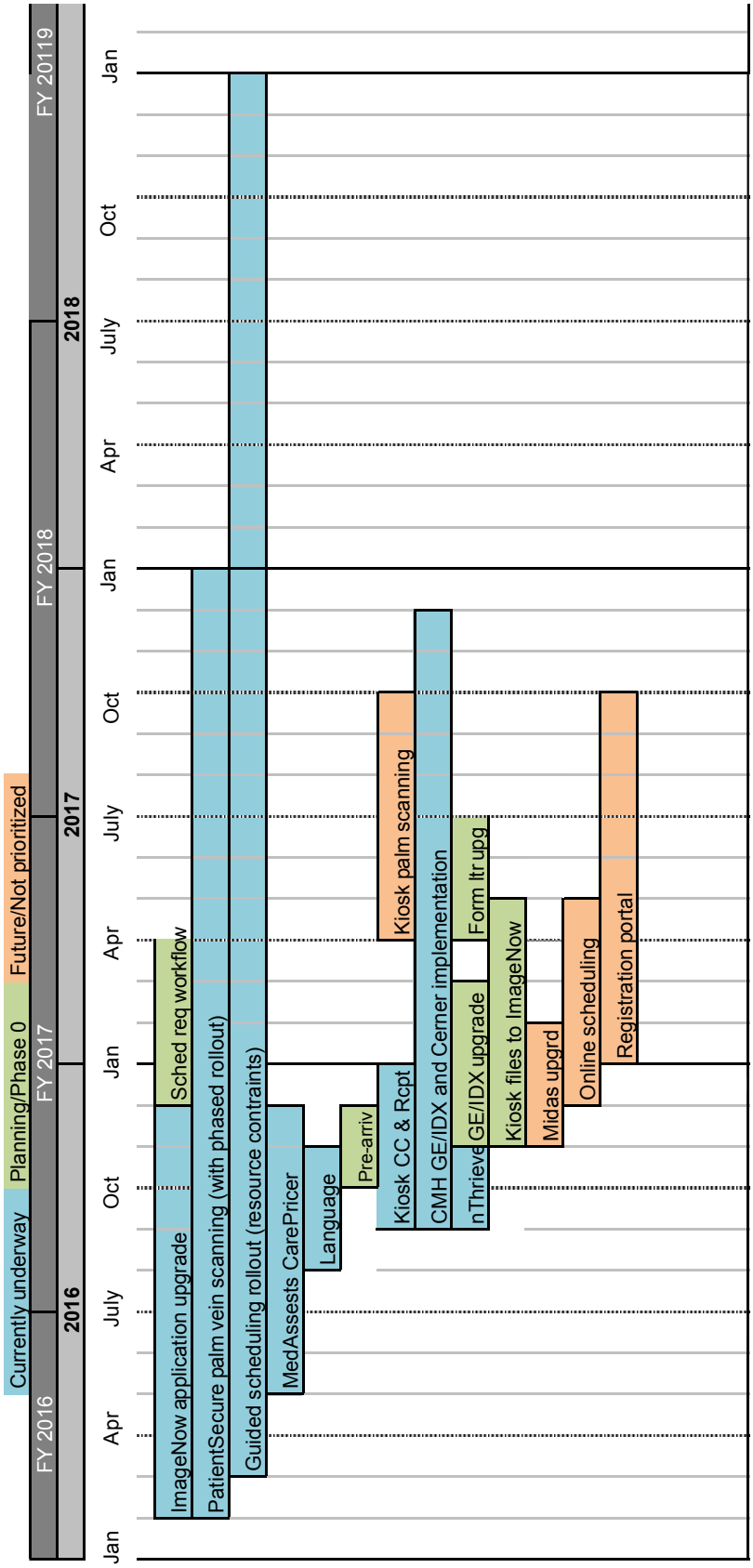


Supplemental information

PAIS IT road map project timeline



Information security road map

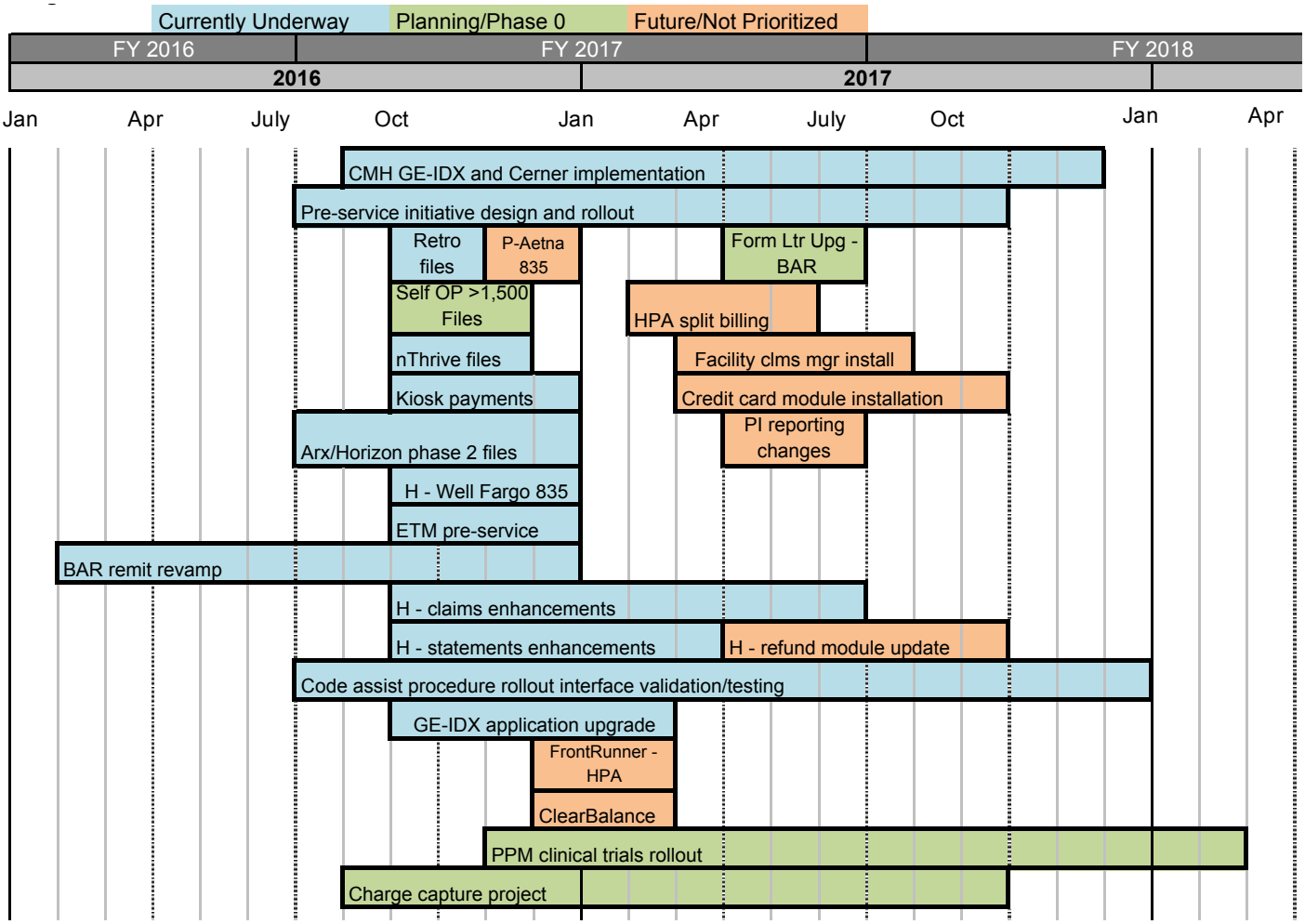
	FY15				FY16			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Risk/governance								
New information security framework	Integration with VCU and SOM							
Improved assessment process		Improved framework/focus on highest-risk areas			New assessments/process			
Network access control								
Mobile device security								
PCI	Ongoing PCI self assessments as necessary/Tokenization of credit card system							
Asset management and assessment								
Disaster recovery								
Internal audit - collaboration/tracking		Issue tracking and followup						
Vulnerability management						New vulnerability scanner		
Access management								
Courion - password reset		Self-service password reset						
Courion - AD provisioning		Active directory provisioning						
Courion - Cerner provisioning					Cerner provisioning			
Courion - IDX provisioning							IDX provisioning	
Two-factor authentication			Admin 2FA					
Incident response								
Incident response procedure							New IOC prodcedures	
Mitigation of issues								
Endpoint security	Ensure endpoint rollout complete						Triumfant deployment	
Rogue detection/management	Rogue policy/process development							
Absolute recovery	Expand to all systems							
Forensics/E-discovery					Implement technology		Evidence collection as necessary	
SIEM			MSS review		SIEM RFP			
Compliance monitoring (P2/fair warning)				Turn over to compliance				
Malware analysis					New tool implementation			
Network firewalls					Palo Alto upgrade			
Proxy servers								Implement Proxy Servers
Intrusion detection								

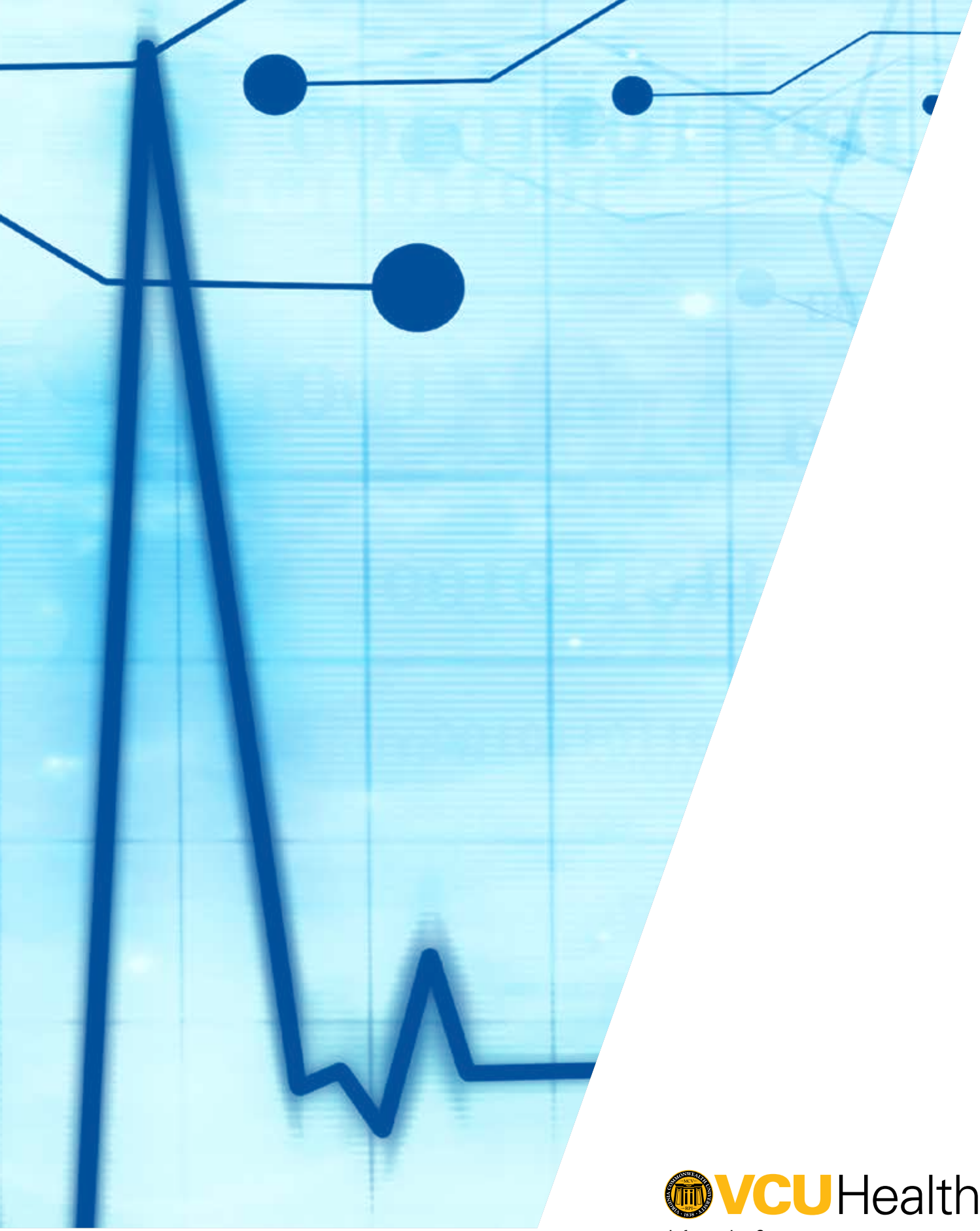
KEY

- Funded / In Progress
- Funded / Not Started
- Not Funded / Not Started
- No Current Activity / Possible Risk
- Completed

Supplemental information

Revenue systems IT road map project timeline





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