

HIMSS Davies – VTE Ordering Optimization

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Case Study: VTE Ordering Optimization

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Who We Are



- Set up the first US Multispecialty Hospital Outside North America
- Cultivating a Sustainable Healthcare System
- Supporting the Development of Emiratis in Healthcare



Our Mission and Vision Statements

Mission

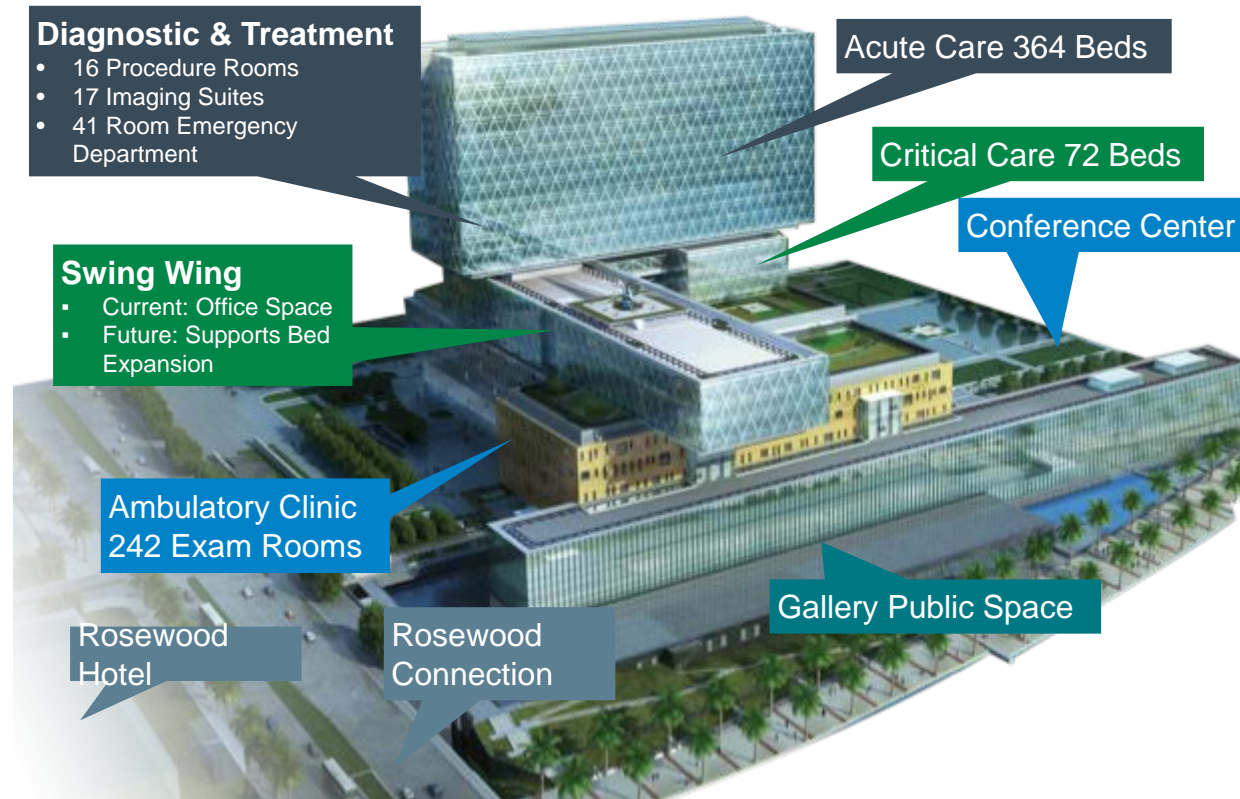
The mission of Cleveland Clinic Abu Dhabi is to provide better care of the sick, investigation into their problems, and further education of those who serve

Vision

Striving to be the world's leader in patient experience, clinical outcomes, research and education in a fiscally responsible manner



A Purpose-Built Medical Campus

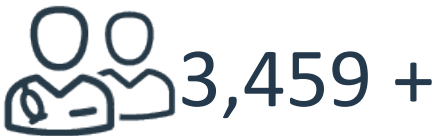


- ✓ 409,234 m2 total gross area on a 23 acre site
- ✓ 364 beds scalable to 496 beds
- ✓ 26 Operating Rooms
- ✓ 1st LEED Gold certified hospital in the GCC

Complex & Critical Care



Our Caregiver Diversity



Clinical & Non Clinical Caregivers

373
Physicians

1,834
Nurses & Allied
Health
Professionals

1,252
Non Clinical
Caregivers



Our Unique Offerings

Patient
Experience

Outcomes &
Performance
Metrics

Innovative
Model
of Care

State-of-the
Art Technology



Patients First

Patient-Centered Institute Model
Offering coordinated, multidisciplinary care

Specialist Physicians
Available 24/7 at the hospital

Integration with Cleveland Clinic Main Campus
Promoting knowledge transfer across all hospital functions

Office of Patient Experience
Monitoring every step of the patient journey

Electronic Medical Records
Supporting a seamless and integrated recovery plan

Cleveland Clinic's Globally-Recognized Standard of Care
Adapted to cater to regional and cultural expectations

- The Patients First philosophy is the core of CCAD
- Patient Experience levels continuously measured
- DOH 'People's Choice Award' winner.



Clinical Firsts

**UAE's
1st Heart Transplant**



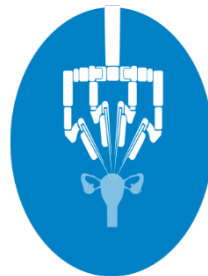
**Cardioband
Mitral Valve Repair**



**UAE's
1st Liver
Transplant**



**UAE's 1st Robotic
Hysterectomy**



**UAE's
1st Lung
Transplant**



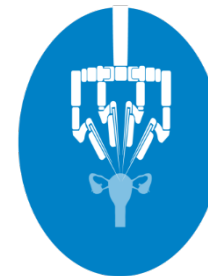
**1st Endoscopic Sleeve
Gastroplasty**



**11 Kidney
Transplants**



**UAE's 1st Robotic
Myomectomy**



CCAD Accomplishments (1)

- DoH designated Teaching and Research Hospital
- Performing the UAE's first and second double lung transplants, and third liver transplant
 - 11 total kidney transplants; 6 living related and 5 cadaveric
- Leading the way in the Department of Health (DoH) survey:
 - CCAD ranked first for overall patient satisfaction in the outpatient and ED
 - ED received the highest score in the most recent DoH audit and is the only ED in Abu Dhabi with 0 deficiencies
- Offering new services in Al Ain:
 - Al Ain achieved licensure to provide Neurology, Pulmonology, Urology and Sleep Medicine
- Distribution of the 2017 State of Clinic report
- Performing the 300th Bariatric operation



CCAD Accomplishments (2)

- Attaining Arab Board accreditation to begin physician residency programs:
 - Offering physician residency programs in Internal Medicine, General Surgery and Ophthalmology
- Regionally novel remote heart monitoring system installed in the Heart and Vascular Institute:
 - CCAD to become the first hospital in the region to adopt this technology



Local Problem

Problem Statement:

- Inadequate compliance with evidenced-based assessment, ordering and administration of VTE prophylaxis in eligible inpatients

Goals Set:

- Improve VTE Prophylaxis assessment, ordering and administration to internal target of $\geq 95\%$ compliance
 - Create tool to facilitate VTE risk assessment
 - Update VTE orders to align with current evidence-based guidelines
 - Refine Best Practice Advisories (BPAs) to optimally support clinical decision making
 - Update nursing flowsheet to ensure discrete documentation of patient refusal
 - Create discrete documentation to flow into data abstractor reports.
- Decrease the post-operative PE/DVT outcomes based on Abu Dhabi Department of Health Quality requirements

VTE Guidelines

- The following evidence-based guidelines were used to optimize VTE ordering:



Antithrombotic Guidelines
9th Edition:AT9 , 2012



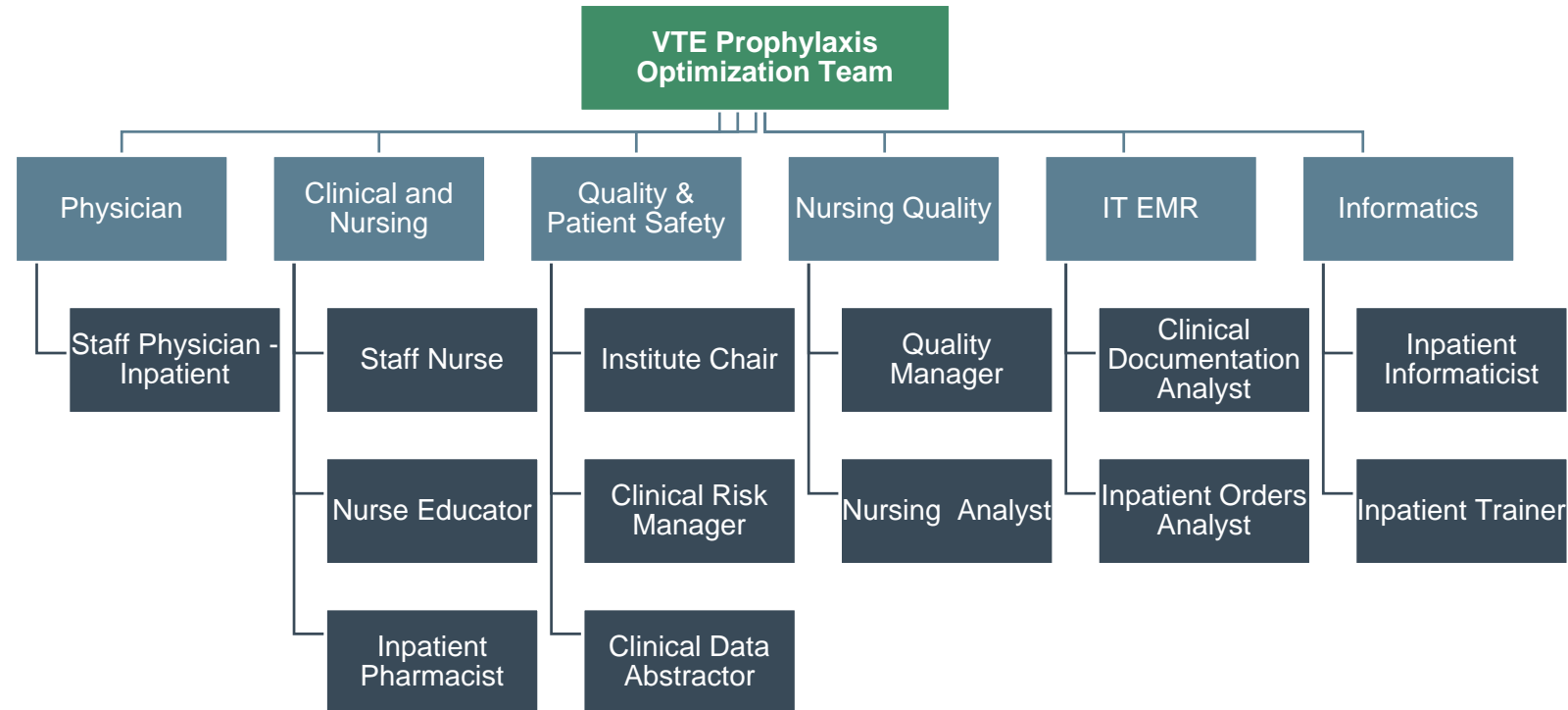
Preventing HA-VTE
A guide to Effective Quality improvement

NICE National Institute for
Health and Care Excellence

NICE guideline [NG89], March 2018



Design and Implementation – Stakeholder Group



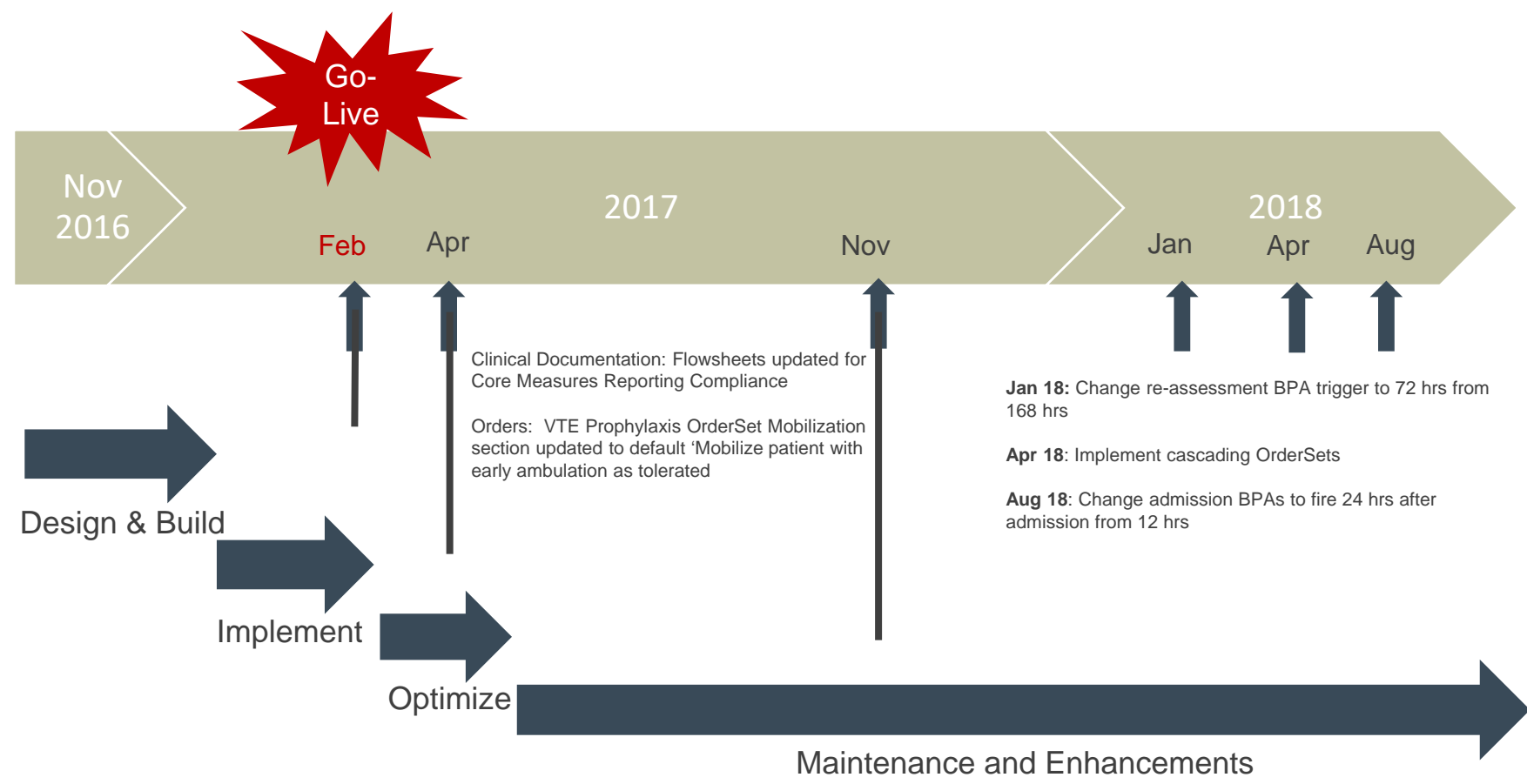
Identification of IT Solution

Solutions Identified:

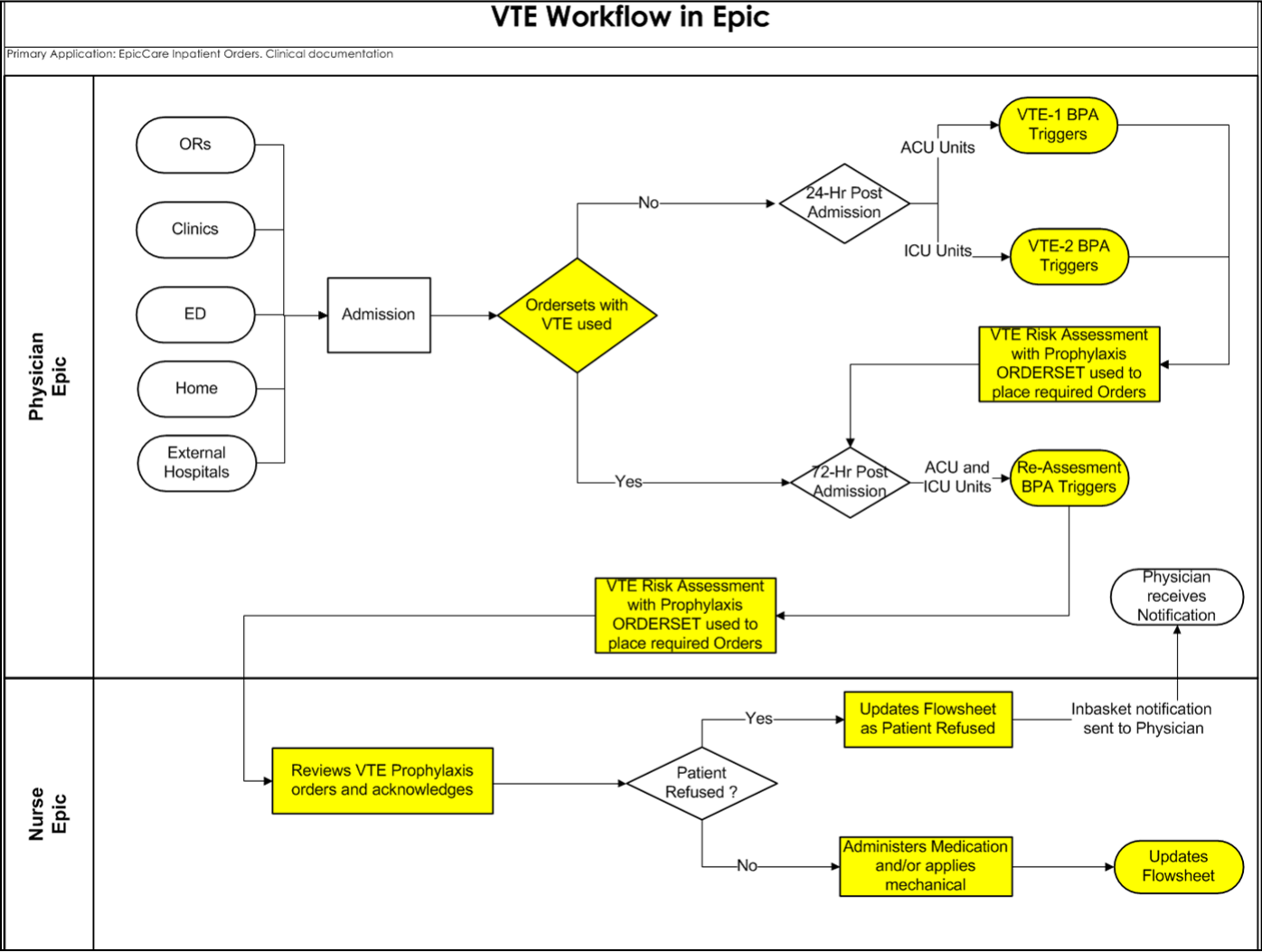
- Risk assessment tools added within the VTE OrderSet to facilitate VTE risk assessment
- VTE orders updated to align with current evidence-based guidelines
- VTE modules added to admission and transfer OrderSets
- VTE assessment and reassessment BPAs refined to optimally support clinical decision making
- Nursing vascular assessment flowsheet modified to include discrete documentation of patient refusal
- Abstractor reports mapped to include discrete documentation from orders, BPAs and nursing documentation flowsheets



Solution Design and Implementation - Timeline



Solution Design – Workflow Enhancements



Solution Design – OrderSets for modification

812 ADMIT TO LONG TERM CARE	3040001107 DDI GS IP POST OP	3040009004 MSI THOR IP LUNG TRANSPLANT ADMISSION PRE OP
3040000226 MSI GENERAL ADULT ADMISSION ACU	3040001113 SSI URO IP GENERAL POST-OP	3040009009 MSI IP LIVER TRANSPLANT ADMISSION PRE OP
3040000672 NI NEU IP STROKE ROUNDING	3040001043 NI NEU NEUROSURGERY CRANIAL POST-OP	3040001135 DDI IP ERCP PRE-PROCEDURE
3040001000 MSI ENDO IP DIABETIC KETOACIDOSIS/HYPERGLYCEMIC HYPEROSMOLAR STATE ADMIT	3040001053 HVI EP IP ELECTROPHYSIOLOGY POST DEVICE IMPLANT ADMISSION	3040001136 DDI IP PEG PRE-PROCEDURE
3040001031 S QPSI IP VTE RISK ASSESSMENT WITH PROPHYLAXIS	3040001180 HVI CAR IP CATHETERIZATION POST-OP	3040000669 DDI IP COLORECTAL PRE-OP
3040001044 SSI URO IP GENERAL ADMISSION	3040001181 HVI CAR IP PERCUTANEOUS CORONARY INTERVENTION POST-OP	3040001109 SSI IP GENERAL PRE-OP
3040001046 DDI IP GASTROINTESTINAL BLEED ADMIT/PROTOCOL	3040001209 HVI CAR CATHETERIZATION / PCI / POST	3040005862 HVI CARDIAC, VASCULAR AND THORACIC PRE-OP
3040001059 HVI EPS IP POST-ELECTROPHYSIOLOGIC PROCEDURE ADMISSION	3040001019 SSI GENERAL POST-OP	3040000282 DDI IP BARIATRIC SURGERY PATHWAY
3040001108 SSI IP SURGERY ADMISSION	3040001083 SSI NEPH IP TXP KIDNEY RECIPIENT TRANSPLANT POST-OP	3040009008 HVI CAR IP TXP CARDIAC TRANSPLANT PRE-OP
3040001119 DDI IP PANCREATITIS ADMISSION	3040001118 SSI PLS IP PLASTICS POST-OP	3040001020 DDI GS IP PRE OP
3040001134 DDI POST PEG/JEJUNOSTOMY ENTERAL FEEDING	3040001139 SSI ENT IP HEAD AND NECK GENERAL POST-OP	
3040001168 NI NEU IP GENERAL NEUROLOGY ADMISSION	3040001141 SSI ENT IP LARYNGOLOGY POST-OP	
3040001170 NI NSR IP CRANIAL/SPINAL ADMISSION	3040001143 SSI ENT IP NEUROTOLOGY POST-OP	
3040001171 NI NEU IP EPILEPSY MONITORING UNIT ADMISSION ORDERS WITH VTE	3040001146 SSI ENT IP ORAL MAXILLOFACIAL POST-OP	
3040001200 HVI CAR IP GENERAL CARDIOLOGY ADMISSION	3040009001 NI NEUROSURGERY SPINAL POSTOP	
3040009005 MSI THOR IP LUNG TRANSPLANT READMISSION	3040009003 SSI PULM IP TXP LUNG RECIPIENT TRANSPLANT POST-OP	
3040005850 RCCI IP GENERAL ADULT ADMISSION ICU	3040009006 MSI LIVER IP TRANSPLANT POST OP	
3040001100 NI NEU IP NEURO NON-THROMBOLYSIS ISCHEMIC STROKE ADMISSION	3040009007 HVI CARD IP TXP CARDIAC RECIPIENT TRANSPLANT POST-OP	
3040001099 NI NEU IP POST-THROMBOLYSIS/INTERVENTION ISCHEMIC STROKE ADMISSION	3040000668 DDI IP COLORECTAL POST-OP	
3040001198 NI NEU IP SUBARACHNOID HEMORRHAGE – SAH (HEMORRHAGIC STROKE ADMISSION)	3040001150 CCAD IP POST CARDIAC SURGERY ADMISSION	
3040001199 NI NEU IP INTRACEREBRAL HEMORRHAGE – ICH (HEMORRHAGIC STROKE ADMISSION)	3040015850 RCCI IP GENERAL ADULT ADMISSION ICU REVAMPED	
3040009010 MSI IP LIVER TRANSPLANT READMISSION		



Solution Design – VTE Risk Reassessment with Links to PADUA and CAPRINI

! VTE Risk Assessment with Prophylaxis Manage My Version ▾ ⤴

▾ General

PADUA Medical Risk Assessment Calculator
CAPRINI Surgical Risk Assessment Calculator

▾ ! VTE Assessment and Orders

- ☐ VTE Risk Category - Medical Low Risk
- ☐ VTE Risk Category - Medical At Risk
- ☐ VTE Risk Category - Moderate Risk Surgery
- ☐ VTE Risk Category - High Risk Surgery

▾ Mobilization

- ☐ Mobilize patient with early ambulation as tolerated
Routine
- ☐ Physical Therapy - Evaluation and Treatment
Routine, Continuous
- ☐ Occupational Therapy - Evaluation and Treatment
Routine, Continuous



Solution Design – VTE Risk Reassessment with Links to PADUA and CAPRINI

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Calculator: Padua score for assessing venous thromboembolism risk in hospitalized adult patients

Calculator: Padua score for assessing venous thromboembolism risk in hospitalized patients

- ☐ Cancer: Active or treated with chemotherapy and or XRT within the last six months (3 points)
- ☐ History of venous thrombotic disease (not to include superficial thromboses) (3 points)
- ☐ Impaired/reduced mobility of at least three days duration (3 points)
- ☐ Preexisting hypercoagulable state (3 points)
- ☐ Trauma or surgery within one month (2 points)
- ☐ Age ≥ 70 years old (1 point)
- ☐ Heart or respiratory failure (1 point)
- ☐ Stroke or acute MI (1 point)
- ☐ Acute infectious disease or rheumatic disease (1 point)
- ☐ Obesity with a body mass index ≥ 30 kg/m² (1 point)
- ☐ Intercurrent hormone replacement treatment (1 point)

Total criteria point count:

[Reset form](#)

Padua score interpretation

0 to 3 points:	Lower risk; 0.3 percent risk of symptomatic VTE*
4 to 20 points:	Higher risk; 11 percent risk of symptomatic VTE*

Notes Close

• XRT: ...

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Topic Feedback



Solution Design – VTE Risk Reassessment with Links to PADUA and CAPRINI

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Modified Caprini risk assessment model for VTE in general surgical patients

Risk score			
1 point	2 points	3 points	5 points
Age 41 to 60 years	Age 61 to 74 years	Age ≥75 years	Stroke (<1 month)
Minor surgery	Arthroscopic surgery	History of VTE	Elective arthroplasty
BMI >25 kg/m ²	Major open surgery (>45 minutes)	Family history of VTE	Hip, pelvis, or leg fracture
Swollen legs	Laparoscopic surgery (>45 minutes)	Factor V Leiden	Acute spinal cord injury (<1 month)
Varicose veins	Malignancy	Prothrombin 20210A	
Pregnancy or postpartum	Confined to bed (>72 hours)	Lupus anticoagulant	
History of unexplained or recurrent spontaneous abortion	Immobilizing plaster cast	Anticardiolipin antibodies	
Oral contraceptives or hormone replacement	Central venous access	Elevated serum homocysteine	
Sepsis (<1 month)		Heparin-induced thrombocytopenia	
Serious lung disease, including pneumonia (<1 month)		Other congenital or acquired thrombophilia	
Abnormal pulmonary function			
Acute myocardial infarction			
Congestive heart failure (<1 month)			
History of inflammatory bowel disease			
Medical patient at bed rest			
Interpretation			



Solution Design – VTE Risk Reassessment with Prophylaxis Cascading OrderSet

▼ General

- PADUA Medical Risk Assessment Calculator
- CAPRINI Surgical Risk Assessment Calculator

▼ VTE Assessment and Orders

☐ VTE Risk Category - Medical Low Risk

☐ VTE Risk Category - Medical At Risk

☐ VTE Risk Category - Moderate Risk Surgery

☒ VTE Risk Category - High Risk Surgery

☒ VTE Risk Category - High Risk Surgery
Continuous starting Today at 14:32 Until Specified, Routine, Older patients (age greater than 60) and known risk factors for VTE or any age patient with spinal cord injury, paralysis, trauma, lower extremity fracture, hip fracture, joint arthroplasty or history of thrombophilia, history of prior VTE, abdominal/pelvic surgery or cancer.

☒ Pharmacologic Prophylaxis

☒ Pharmacological Prophylaxis Indicated

☐ Pharmacologic Prophylaxis Standard

☐ Pharmacologic Prophylaxis Standard Starting Tomorrow

Nested Panels ☒ Special Circumstances - Prophylaxis

☐ Heparin 5000 units SubQ Q8H - thromboembolic prophylaxis
5,000 unit, Subcutaneous, Every 8 hours

☒ enoxaparin (CLEXANE) 30 mg/0.3 mL injection 30 mg
30 mg, Subcutaneous, Daily, First Dose Today at 18:00

☐ Enoxaparin (CLEXANE) 30mg SubQ Q12H - Bariatric/Trauma dosing only
30 mg, Subcutaneous, Every 12 hours

☐ Enoxaparin (CLEXANE) 40mg SubQ Q12H - Bariatric dosing only
40 mg, Subcutaneous, Every 12 hours

☐ Enoxaparin (CLEXANE) 60mg SubQ Q12H - Bariatric dosing only
60 mg, Subcutaneous, Every 12 hours

☐ Pharmacologic Prophylaxis Not Indicated Due To Therapeutic Anticoagulation

☐ Pharmacologic Prophylaxis Contraindicated

☒ VTE Mechanical Prophylaxis Medium to High Risk

Nested Panels ☒ VTE Mechanical Prophylaxis

☐ Intermittent Pneumatic Compression (IPC) Device To Be Worn Continuously Except For Bathing And Skin Assessment Per Nursing Unit Protocol Or Periods Of Active Ambulation
Routine, Once

☒ Graduated Compression Stocking To Be Worn Continuously Except For Bathing And Skin Assessment Per Nursing Unit Protocol



Solution Design – VTE BPA requirements

BestPractice Advisory - [Redacted]

Venous Thromboembolism (VTE-1 Acute Care) prophylaxis.
All patients should have Venous Thromboembolism (VTE) Risk assessed. Based on this assessment, prophylaxis should be ordered or a reason documented why VTE prophylaxis was not given. Please use the recommended order set to order or indicate the reason for not prescribing.

VTE Risk Assessment with Prophylaxis [Preview](#)

[Reason No Order for Recommended Venous Thromboembolism \(VTE\) Prophylaxis](#)

VTE-1 will fire under the following criteria:

- Patient must be 18 years of age +
- Patient is on acute care floor – currently admitted
- Patient does NOT have a Dx of Ischemic stroke
- Patient does not have a contraindication indicated
- Patient does not have an active med prophylaxis order nor has patient received an administration of said order
- Patient does not have documentation in flowsheets of application of mechanical prophylaxis
- Patient does not have an active order for mechanical prophylaxis
- Patient has been admitted for at least 24 hours

VTE-1 does not fire in the ED.

Only fires for physicians and residents



Solution Design – VTE Reassessment BPA requirements

The screenshot shows a 'BestPractice Advisory' window. At the top, a yellow banner contains the text: 'Patient must be reassessed for VTE. All patients should have Venous Thromboembolism (VTE) Risk reassessed at regular intervals as long as they do not have medication and/or mechanical prophylaxis ordered. Please either place the appropriate order or enter a reason for contraindication.' Below this, there are two buttons: 'Open Order Set' (highlighted in blue) and 'Do Not Open'. To the right of these buttons is the text 'VTE Risk Assessment with Prophylaxis' followed by a 'Preview' link. Underneath, there is a section titled 'Acknowledge Reason' with a text input field. Below this field are several buttons for selecting reasons: 'Due to tPA Administration', 'Due to Risk of Hemorrhage or Active Blee...', 'Due to Continuous IV Heparin Therapy', 'Due to Home Anticoagulation / Curren...', 'Due to Therapeutic INR', 'Due to Supratherapeutic INR', 'Due to Thrombocytopenia', and 'Other (enter comment)'. At the bottom right of the window is a green checkmark icon and the word 'Accept'.

Reminder VTE will fire every 72 hours for the following criteria:

- Patient must be 18 years of age +
- Patient does not have documentation in flowsheets of application of mechanical prophylaxis
- Patient does not have an active med prophylaxis order
- Patient has either (COR35 older than 7 days OR COR52 older than 24 hours OR COR 49 older than 7 days OR COR45 older than 7 days)
- Patient does not have an active order for mechanical prophylaxis

VTE reminder does not fire in the ED.
Only fires for physicians and residents



Solution Design – Flowsheet Documentation

Hide All Show All

ASSESSMENT

HEENT

NEUROLOGICAL

PSYCHOSOCIAL

RESPIRATORY

CARDIAC

TELEMETRY

VASCULAR/CIRCULATORY

Vascular Assessment: (WD...

FemoStop

Bilateral Upper Extremities...

Edema Assessment: (WDL ...

GASTROINTESTINAL

GENITOURINARY

MUSCULOSKELETAL

INTEGUMENTARY

FUNCTIONAL

FALL ASSESSMENT (HESTER DAVIS)

FALL PLAN INTERVENTION

Accordion Expanded View All

14:32

Vascular Assessment: (WDL = Distal peripheral pulses present x 4 (dorsalis pedis, rad
oximetry monitor.)

Vascular Assessment (WDL)

Vascular Assessment Location(s)

Antiembolism Stockings

Sequential Compression Device

Sequential Compression Device - Location

FemoStop

FemoStop

Commencement Time

Commencement Date

Status

Pressure

Removal Time

Removal Date

Bilateral Upper Extremities - Vascular Assessment

Temperature

Yes

Selection Form

Left

Right

Bilateral

Contraindicated

Refused

Accept

Cancel



Solution Design – InBasket Message to Physicians

Hyperspace - HOSPITALIST MED HAD - Cleveland Clinic Abu Dhabi

45 ACTION - Results

Epix Patient Lists My Dashboards In Basket Patient Lookup Today's Pts Remind Me Clinical Resources Personalize Patient Education Materials

In Basket New Msg Patient Msg Refresh Edit Pools Settings Search Manage QuickActions Attach Out Properties

My Messages

- ACTION - Results (31)
- Hospital Chart Completion (2)
- Result Notes
- Canceled Ord
- Patient Calls
- Patient Call Back
- ACTION - Incomplete Encounter:
- Cosign Notes (2)
- CC'd Charts (1)
- Nurse Triage
- Letter Queue (3)
- Rfl Notif Ltr
- FYI - Height/Weight Change
- Coding Query (1)
- Cosign Orders (2)
- Medication Messages (3)
- Second Sign Modified
- Second Sign Rejected

Sent Messages

Completed Work

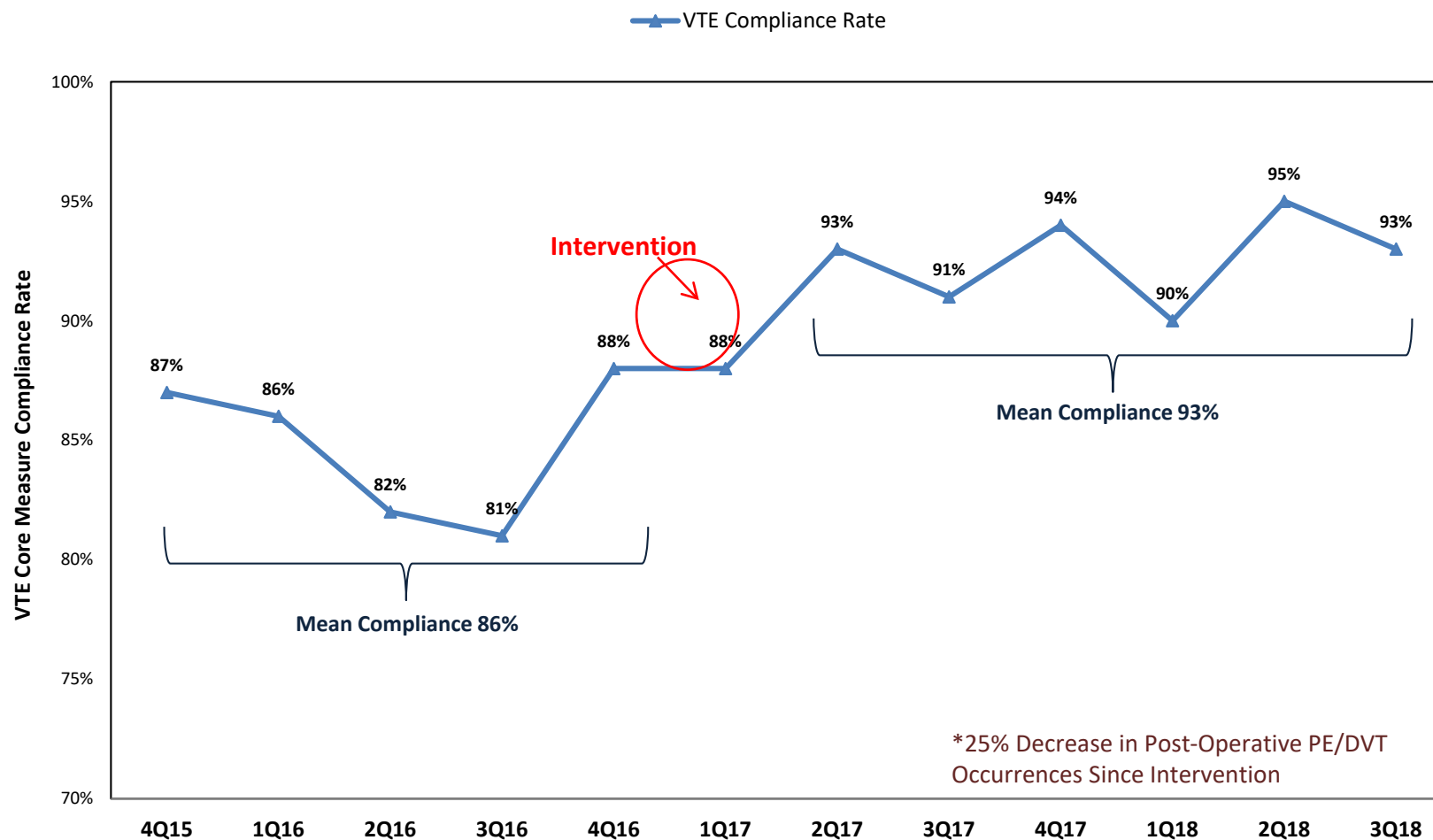
> Medication Messages 3 unread, 30 total

Status	Cmt	Reason	Subject	Patient	Pat Location	C	Order Status	Sent By
Read	Msg Date: 26/04/2018		Patient Refused VTE Pharmac...					Julie Galidan, RN
Read	Msg Date: 15/06/2018		Patient Refused VTE Pharmac...					Julia Byrne, RN
Read	Msg Date: 24/06/2018		Patient Refused VTE Pharmac...					Sibusisiwe Dale, RN
Read	Msg Date: 30/06/2018		Patient Refused VTE Pharmac...					Sophie Payne, RN
Read	Msg Date: 01/07/2018		Patient Refused VTE Pharmac...					Cheenee Feraer, RN
Read	Msg Date: 01/07/2018		Patient Refused VTE Pharmac...					Cheenee Feraer, RN
Read	Msg Date: 10/07/2018		Patient Refused VTE Pharmac...					Fadi Hijazi, MD
Read	Msg Date: 10/07/2018		Patient Refused VTE Pharmac...					Ashley Black, RN
Read	Msg Date: 12/07/2018		Patient Refused VTE Pharmac...					Frances Rute, RN
Read	Msg Date: 12/07/2018		Patient Refused VTE Pharmac...					Shahid Nanji, RN
Read	Msg Date: 12/07/2018		Patient Refused VTE Pharmac...					Katherine Thomas, RN
Read	Msg Date: 12/07/2018		Patient Refused VTE Pharmac...					Regine Doronila, RN
Read	Msg Date: 13/07/2018		Patient Refused VTE Pharmac...					Ayshea Brewis, RN
Read	Msg Date: 13/07/2018		Patient Refused VTE Pharmac...					Maria Gaor, RN
Read			Patient Refused VTE Pharmac...					Regine Doronila, RN



Value Derived – Increased VTE Compliance & Reduced post-op PE/DVT cases

VTE Core Measure Compliance



Value Derived

- Ordering efficiency improved for Physicians
- Reduced gaps in communication between Physicians, Nursing and Pharmacy in relation to VTE ordering
- Revised BPA algorithms have led to less intrusion on Physician daily workflow when it comes to Risk reassessments for longer length of stay patients, without compromising patient safety
- Nursing documentation workflow improved
- Anecdotal feedback of Physician satisfaction due to less ordering time/documentation



Action Plan for Continuous Improvement

- Optimizing Nursing documentation
- Expand PE/DVT outcomes measure reporting for all inpatients
- Broaden education to key stakeholders (Nursing, Physicians and Pharmacy)
- Develop education material for patients refusing Prophylaxis
- Continue analysis of care delivery



Summary Recap

Problem Statement: Inadequate compliance with evidenced-based assessment, ordering and administration of VTE prophylaxis in eligible inpatients

Solution Design and Implementation: VTE workflow was streamlined and automated for Admissions and Transfer, through VTE OrderSet modifications, BPAs and Flowsheet documentation

Result:

- Improved VTE Compliance and working towards consistently meeting the internal target of **95%**
- Improved Clinician workflow for VTE Ordering and Documentation
- Contributed to reducing post-op PE/DVT occurrences



VTE Ordering Optimization

Case Speaker Profiles

Dr Iqbal Binoj, MD

Title: *Physician*

Role: *Responsible for providing Acute Medical care for inpatients as a Hospital Medicine Physician while also being the Lead Physician Champion for VTE Prophylaxis measures, compliance and optimization efforts. He is an Epic super user for VTE Prophylaxis workflow solution adoption among the physician community*

Tori Mehmood

Title: *Clinical Data Abstractor*

Role: *Responsible for review of patient records and abstracting, aggregating, and analyzing process and outcomes measures for outside reporting agencies and internal stakeholders*

Vijai Kolar

Title: *Application Analyst, EMR IT*

Role: *Responsible for providing system build solutions (workflow analysis, build and test) and troubleshoot support related to the Epic modules 'Inpatient Orders' and 'Inpatient ClinDoc' in collaboration with multi-disciplinary teams*



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