



A PROCESS-IMPROVEMENT INITIATIVE AT A TEACHING HOSPITAL'S EMERGENCY DEPARTMENT*

*Information presented is specific to one healthcare facility that requested anonymity in this promotional material. Results may differ from those achieved by other institutions. Information shown is based on this facility at the time of the study.

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BACKGROUND

This hospital is a 489-bed general medical and surgical teaching institution that was part of a regional health system in the mid-south. Providing patient-centric care while remaining at the forefront of research, technology, and treatments, this medical center has become the area's first primary stroke center and dedicated heart hospital.

- ED visits: **65,000 per year**
- ED beds: **48**
- Most common patient presentations: abdominal pain, chest pain, and fever



Primary challenges faced by the ED were hallway boarding of patients, poor patient satisfaction (as reflected by HCAHPS** scores), and slow throughput.

GOALS

The overall goal was to revitalize the ED's systems in order to better serve the community; to this end, LEAN processes were initiated, including new emergent protocols that integrated bedside point-of-care testing. As part of this new protocol, the *i-STAT System CHEM8+* (basic metabolic panel), *cTnl* (troponin I), *CG4+* (blood gas with lactate), and *PT/INR* were implemented in an effort to improve diagnostic efficiency and patient flow.

- **Improve patient throughput**
- **Increase patient satisfaction**
- **Reduce hallway boarding**
- **Increase ED revenue**

**HCAHPS=Hospital Consumer Assessment of Healthcare Providers and Systems.
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POSITIVE IMPACT: INTEGRATION OF THE i-STAT SYSTEM INTO THE PATIENT-CARE PROCESS

Incorporating *i-STAT* CHEM8+, *cTnl*, *CG4+*, and *PT/INR* into nurse-driven emergent protocols made important and measurable advancements in process efficiency to improve patient care.

PATIENT REGISTRATION/TRIAGE

Nurse now stationed at registration to evaluate patients upon arrival

INITIATE PROTOCOL

- Nurse-driven protocol based on symptom evaluation

Chest Pain/ SOB <input checked="" type="checkbox"/>	Stroke/Acute Neuro Defficiate Symptoms <input checked="" type="checkbox"/>	Altered Mental Status <input checked="" type="checkbox"/>	Suspected Overdose <input checked="" type="checkbox"/>	New Onset Seizures <input checked="" type="checkbox"/>	Shortness of Breath <input checked="" type="checkbox"/>	GI Bleed <input checked="" type="checkbox"/>	ETOH Intoxication <input checked="" type="checkbox"/>
Possible Infection <input checked="" type="checkbox"/>	Syncope/ Near Syncope <input checked="" type="checkbox"/>	Hypoglycemia <input checked="" type="checkbox"/>	Suspected Renal Colic <input checked="" type="checkbox"/>	Suspected UTI/ Pyelonephritis <input checked="" type="checkbox"/>	Patients on Coumadin® <input checked="" type="checkbox"/>	Abdominal Pain <input checked="" type="checkbox"/>	Medical Clearance for Psychiatric Evaluation <input checked="" type="checkbox"/>

DIAGNOSTIC TESTING

Based on patient symptomatology:

Nurse draws blood for analysis
i-STAT testing conducted at bedside

CHEM8+

Included in all emergent protocols and with every troponin draw

PT/INR

For monitoring patients on Coumadin® (warfarin)

cTnl

Serial *cTnl* testing performed in the ED at 0, 4, and 8 hours

CG4+

Lactate testing for patients with a temperature >101.5° and over 50 years

CLINICAL INTERVENTION

- The process improvements that were implemented helped the institution improve throughput, reduce hallway boarding, and improve patient satisfaction

OPERATIONAL EXCELLENCE: IMPLEMENTATION OF NURSE-DRIVEN PROTOCOLS*

EMERGENCY DEPARTMENT GUIDELINES				LABEL
NAME	MR#	ENCOUNTER#	DATE	
<i>To initiate guidelines place your initials in the appropriate box (check additional boxes as indicated & select x-rays). Sign the bottom of the form.</i>				
<input type="checkbox"/> CHEST PAIN / SOB presumed cardiac in nature <ul style="list-style-type: none"> STAT EKG 2L O2 via NC, cardiac monitor, pulse oximetry, INT CBC, iSTAT Chem 8, iSTAT Troponin PCXR vs CXR (circle one) Aspirin 324 mg PO chewed (if no Aspirin allergy) Nitroglycerin 0.4 mg SL q 5 min x3 for chest pain (if systolic BP >90) ‡ inquire about recent use of drugs for erectile dysfunction Obtain previous records/ EKG <ul style="list-style-type: none"> iSTAT PT (if on coumadin) BNP (if shortness of breath) <input type="checkbox"/> PLEURITIC CHEST PAIN <ul style="list-style-type: none"> EKG, pulse oximetry, monitor, CXR 	<input type="checkbox"/> STROKE / ACUTE NEURO DEFFICIATE SYMPTOMS Activate hospital protocol <ul style="list-style-type: none"> 2L O2 via NC, cardiac monitor, pulse oximetry, INT EKG CBC, iSTAT Chem 8, PT/PTT, Magnesium send to lab in black bag PCXR CT Head – For acute stroke Swallow Screen HCG (if indicated) 	<input type="checkbox"/> ALTERED MENTAL STATUS <ul style="list-style-type: none"> 2L O2 via NC, cardiac monitor, pulse oximetry, INT EKG Fingerstick blood glucose CBC, iSTAT Chem 8, iSTAT Troponin, UA CT Head PCXR UDS, ETOH (if indicated) <input type="checkbox"/> HEAD INJURY <ul style="list-style-type: none"> CT Head ‡ (only if loss of consciousness; or on Coumadin; or over 65 years; or subsequent altered mental status) 	<input type="checkbox"/> SUSPECTED OVERDOSE <ul style="list-style-type: none"> 2L O2 via NC, cardiac monitor, pulse oximetry, INT EKG Finger stick blood glucose CBC, iSTAT Chem 8, UDS, ETOH, Acetaminophen level, Salicylate level, TCA level, Serum osmol PCXR Green gown HCG (if indicated) 	
<input type="checkbox"/> KNOWN SEIZURE DISORDER <ul style="list-style-type: none"> Pulse oximetry, monitor, INT Fingerstick blood glucose Drug levels as appropriate <input type="checkbox"/> NEW ONSET SEIZURES Interventions listed above plus <ul style="list-style-type: none"> iSTAT Chem 8, UDS, ETOH CT Head 	<input type="checkbox"/> SHORTNESS OF BREATH - non cardiac in nature <ul style="list-style-type: none"> O2 via NC, pulse oximetry monitor, INT CXR vs PCXR (circle one) Respiratory therapy consult CBC, iSTAT Chem 8 BCx2 (if febrile or otherwise indicated) 	<input type="checkbox"/> GI BLEED <ul style="list-style-type: none"> 2L O2 via NC, cardiac monitor, pulse oximetry, large bore INT CBC, iSTAT Chem 8, iSTAT PT Orthostatics T & S (if indicated) IV NS at KVO (if actively bleeding) 	<input type="checkbox"/> ETOH INTOXICATION <ul style="list-style-type: none"> Pulse oximetry, INT Fingerstick blood glucose ETOH, UDS Green gown CBC, iSTAT Chem 8, UA 	
<input type="checkbox"/> POSSIBLE SEPSIS: TEMP > 101.5° AND OVER 50 YEARS <ul style="list-style-type: none"> 2L O2 via NC, cardiac monitor, pulse oximetry, INT CBC, iSTAT Chem 8, UA, Urine C&S, BCx2 CXR (reason: fever) Notify Transplant service if indicated HCG (if indicated) iSTAT Lactate Acetaminophen 1g PO/PR for T > 101.5° Reverse isolation (if patient is immunocompromised) 	<input type="checkbox"/> SYNCOPE/ NEAR SYNCOPE <ul style="list-style-type: none"> 2L O2 via NC, cardiac monitor, pulse oximetry, INT EKG Fingerstick blood glucose CBC, iSTAT Chem 8, iSTAT Troponin, UA PCXR vs CXR (circle one) HCG (if indicated) 	<input type="checkbox"/> HYPOGLYCEMIA <ul style="list-style-type: none"> Fingerstick blood glucose every hour cardiac monitor, pulse oximetry, INT iSTAT Chem 8 Diet tray amp D50 IV x1 for BS < 50 	<input type="checkbox"/> HYPERGLYCEMIA – (blood glucose > 400) <ul style="list-style-type: none"> Fingerstick blood glucose CBC, iSTAT Chem 8, UA IV NS 1L Finger stick blood glucose 30 min post intervention, then every hour 	
<input type="checkbox"/> ALLERGIC REACTION <ul style="list-style-type: none"> cardiac monitor, pulse oximetry, INT RT consult (if indicated) Notify MD STAT for severe reaction 	<input type="checkbox"/> SUSPECTED RENAL COLIC <ul style="list-style-type: none"> INT CBC, iSTAT Chem 8, UA HCG (if indicated) 	<input type="checkbox"/> SUSPECTED UTI/ PYELONEPHRITIS <ul style="list-style-type: none"> UA Urine C&S HCG (if indicated) CBC, iSTAT Chem 8, BCx1 (if febrile) 	<input type="checkbox"/> PATIENTS ON COUMADIN <ul style="list-style-type: none"> Pulse oximetry, INT CBC, iSTAT PT 	
<input type="checkbox"/> LOWER ABD PAIN AND/OR VAGINAL BLEEDING – pre menopausal female <ul style="list-style-type: none"> CBC, UA Serum HCG (if patient is known to be < 16 weeks pregnant) ABO Rh if vaginal bleeding AND suspected to be pregnant T & S (if indicated) Fetal heart tones if > 12 weeks pregnant 	<input type="checkbox"/> ABDOMINAL PAIN <ul style="list-style-type: none"> INT CBC, iSTAT Chem 8, UA HCG (if indicated) Lipase (if pain in upper quadrants) EKG (if indicated, upper abd) Liver Profile (if indicated) 	<input type="checkbox"/> MEDICAL CLEARANCE FOR PSYCHIATRIC EVALUATION <ul style="list-style-type: none"> Green gown CBC, iSTAT Chem 8, UDS, ETOH HCG (if indicated) Notify nursing supervisor if patient is suicidal and/or homicidal 	<input type="checkbox"/> LACERATIONS <ul style="list-style-type: none"> Irrigate wound with normal saline x-ray injured area (if suspected foreign body or fracture) Suture cart to bedside Tetanus-diphtheria 0.5 mL IM (if indicated) 	
<input type="checkbox"/> EXTREMITY INJURY <ul style="list-style-type: none"> Determine mechanism and exact location of pain. ORDER APPROPRIATE X-RAY Immobilize, elevate, ice Right / Left (circle)- _____ Right / Left (circle)- _____ INT (if indicated) 	<input type="checkbox"/> PRN Medication (with MD order) <ul style="list-style-type: none"> Tylenol 1g PO/PR for T>101.5 Ondansetron (Zofran)4mg IV/IM x 1 for NV Albuterol/ Atrovent nebulizer treatment per respiratory therapy for SOB 	<input type="checkbox"/> DRUG LEVELS (with MD order) <ul style="list-style-type: none"> Digoxin Theophylline Phenytoin (Dilantin) Carbamayepine (Tegretol) Valproic Acid (Depakote) 	<input type="checkbox"/> ADDITIONAL LABS (with MD order) <ul style="list-style-type: none"> iSTAT PT BNP Urine HCG D-mier Ammonia iSTAT Lactate Liver Profile 	
RN Print/ Initials	Time	MD Signature	Time	

CHALLENGES MET WITH SOLUTIONS:

HIGH NUMBER OF NURSING END-USERS:

84 nurses were successfully trained and certified to use the *i-STAT System*. The staff is excelling, with error rates well below 3%

COMPREHENSIVE METABOLIC PANEL (CMP) REPLACED BY *i-STAT CHEM8+* (BASIC METABOLIC PANEL):

The clinical staff agreed that, for most patients, a CMP was not necessary. When it was necessary, an *i-STAT CHEM8+* was run and a liver panel was sent to the lab

COLLABORATION:

The culture at this hospital embraced change and the ED and lab worked together to find solutions that were in the best interest of the patient

QUALITATIVE OBSERVATIONS

“The nurses have really embraced the *i-STAT System*. Because such dramatic improvements have been made, this facility has applied for Nursing Magnet status.”
 – ED Nurse Manager

MEASURABLE RESULTS: PROCESS CHANGE AT A BUSY MID-SOUTH TEACHING HOSPITAL'S ED

GOALS	RESULTS	*Q1 2011 data **Q3 2011 data
IMPROVE THROUGHPUT	Prior to process change: After process change: Improvement:	5621 patients/month* 6146 patients/month** 9.3%
INCREASE PATIENT SATISFACTION	HCAHPS score prior to process change: HCAHPS GOAL for process change: HCAHPS score after process change: Improvement:	50% 84.5% 88.7% 38.7%
REDUCE HALLWAY BOARDING	Prior to process change: After process change: Improvement:	2751 hours* 1156 hours** 57.9%
INCREASE ED REVENUE	Prior to process change: After process change: Improvement:	\$99/hour/bed* \$160/hour/bed** 61.6%

With new nurse-driven protocols that included the i-STAT System, the ED staff was empowered to accelerate diagnosis, treatment, and disposition of patients—and substantially improve patient satisfaction while increasing ED revenue by more than 60%.

Intended Use

The *i-STAT cardiac troponin I (cTnI)* test is an in vitro diagnostic test for the quantitative measurement of cardiac troponin I (cTnI) in whole blood or plasma. Measurements of cardiac troponin I are used in the diagnosis and treatment of myocardial infarction and as an aid in the risk stratification of patients with acute coronary syndromes with respect to their relative risk of mortality.

The *i-STAT PT*, a prothrombin time test, is useful for monitoring patients receiving oral anticoagulation therapy such as Coumadin or warfarin.

The test for lactate, as part of the *i-STAT System*, is intended for use in the in vitro quantification of lactate in arterial, venous, or capillary whole blood. The *i-STAT* lactate test is useful for (1) the diagnosis and treatment of lactic acidosis in conjunction with measurements of blood acid/base status, (2) monitoring tissue hypoxia and strenuous physical exertion, and (3) diagnosis of hyperlactatemia.

For *in vitro* diagnostic use only. See CTI Sheets at www.pointofcare.abbott for full details.

Not all products are available in all regions. Check with your local representative for availability in specific regions.

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i-STAT is a trademark of the Abbott group of companies in various jurisdictions.
65,000 ED Visits/Year Medical Center Snapshot 1556.1 07/18

