

Supplementary Online Content

Schuur JD, Carney DP, Lyn E. et al. A top-five list for emergency medicine: a pilot project to improve the value of emergency care. *JAMA Intern Med*. Published online February 17, 2014. doi:10.1001/jamainternmed.2013.12688.

eAppendix. Web-based survey tool

eTable. Initial 64 items solicited from technical expert panel and provider e-mails

This supplementary material has been provided by the authors to give readers additional information about their work.

Emergency Department Top 5 Quality and Efficiency Improvement Actions

Please complete the survey below.

Thank you!

Thank you for agreeing to participate in the Partners HealthCare Affordable Emergency Care survey. As you know there is immense pressure to reduce the cost of emergency care. We believe there are opportunities to reduce cost without sacrificing quality care - but we need your help. This project aims to identify the "Top 5" practices that we can change in the ED to improve affordability without sacrificing the quality of emergency care. A team of attending physicians and residents including each Partners' ED was convened to develop a preliminary list of practices that have little benefit to patients yet carry real costs. Through a series of meetings and surveys we identified a preliminary set of directives with the potential to improve the affordability of emergency care because they are of little benefit, high cost and highly actionable by emergency care providers. We seek your input as front-line ED providers to narrow down our list to the "Top 5." Your responses will be used to develop a final consensus list of priorities for improving the value of care delivered in Partners HealthCare EDs (and maybe beyond). We thank you for your participation in this survey. If you have any questions regarding the survey or any of the items contained within, do not hesitate to contact your institutional representative listed below. Sincerely, Jeremiah Schuur, MD, MHS JSCHUUR@PARTNERS.ORG Brigham and Women's Hospital Everett Lyn, MD ELYN@PARTNERS.ORG North Shore Medical Center Nicholas Ross, G.,M.D. NGROSS@PARTNERS.ORG North Shore Medical Center Anthony Berner, MD ABERNER@PARTNERS.ORG Newton Wellesley Hospital Richard Larson, MD RLARSON@PARTNERS.ORG Faulkner Hospital Theodore I. Benzer, MD, PhD TBENZER@PARTNERS.ORG Massachusetts General Hospital Arjun K. Venkatesh, MD, MBA AKVENKATESH@PARTNERS.ORG Harvard Affiliated Emergency Medicine Residency

Note: The Partners Institutional Review Board has exempted this survey from requiring patient consent.

Emergency Care Role

- | | |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. What is your current clinical role? | <input type="checkbox"/> Attending Emergency Physician
<input type="checkbox"/> Emergency Medicine Resident
<input type="checkbox"/> Physician's Assistant
<input type="checkbox"/> Nurse Practitioner |
| 2. Current level of residency training | <input type="checkbox"/> Junior Resident (PGY-1 or PGY-2)
<input type="checkbox"/> Senior Resident (PGY-3 or PGY-4) |
| 2. At what institution do you primarily work clinically? | <input type="checkbox"/> Brigham and Women's Hospital
<input type="checkbox"/> Massachusetts General Hospital
<input type="checkbox"/> Newton Wellesley Hospital
<input type="checkbox"/> North Shore Medical Center
<input type="checkbox"/> Faulkner Hospital |
| 3. Years of clinical experience in your current role in the Emergency Department: | <input type="checkbox"/> Trainee/Resident
<input type="checkbox"/> 0 - 2 years
<input type="checkbox"/> 3 - 10 years
<input type="checkbox"/> More than 10 years |

Practice

This survey asks about actions providers should not do -- potential changes to your practice in ordering: labs, medications, diagnostic imaging, disposition status and follow up. We will ask you to rank each of the action statements listed in terms of: (a) the potential benefit/harm to patients, and (b) the degree to which the practice is actionable by emergency providers. Actionability by the emergency provider refers to the degree to which the practice is under the control of the emergency provider (e.g. not other providers, such as trauma consultants or inpatient admitting doctors). For each action statement, please answer the question considering average patients at your primary ED.

Please evaluate the potential for benefit or harm to the patient by following the action statement:

1. Don't order amylase in order to diagnose pancreatitis (just order lipase).

- 1. Very beneficial
- 2. Somewhat beneficial
- 3. Neutral
- 4. Somewhat harmful
- 5. Very harmful

Please evaluate in terms of the potential actionability by emergency care providers:

1. Don't order amylase in order to diagnose pancreatitis (just order lipase).

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

Medications

Please rank the following medications based on: (a) the potential benefit/harm to patients, and (b) the degree to which giving the medication is actionable by emergency providers. Actionability by the emergency provider refers to the degree to which giving the medication is under the control of the emergency provider (e.g. not other providers, such as trauma consultants or inpatient admitting doctors). For each action statement, please answer the question considering average patients at your primary ED.

Please evaluate the potential for benefit or harm to the patient by following the action statement:

1. Don't prescribe brand-name antibiotics for patients with community acquired pneumonia, urinary tract infections, or cellulitis (use generics instead).

- 1. Very beneficial
- 2. Somewhat beneficial
- 3. Neutral
- 4. Somewhat harmful
- 5. Very harmful

2. Don't give IV antibiotics to non-critically ill patients who can tolerate oral antibiotics.

- 1. Very beneficial
- 2. Somewhat beneficial
- 3. Neutral
- 4. Somewhat harmful
- 5. Very harmful

3. Don't give IV fluids to patients with mild dehydration without attempting oral rehydration first.

- 1. Very beneficial
- 2. Somewhat beneficial
- 3. Neutral
- 4. Somewhat harmful
- 5. Very harmful

Please evaluate each statement in terms of the potential actionability by emergency care providers:

1. Don't prescribe brand-name antibiotics for patients with community acquired pneumonia, urinary tract infections, or cellulitis (use generics instead).

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

2. Don't give IV antibiotics to non-critically ill patients who can tolerate oral antibiotics.

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

3. Don't give IV fluids to patients with mild dehydration without attempting oral rehydration first.

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

Labs

Please rank the following labs and procedures based on: (a) the potential benefit/harm to patients, and (b) the degree to which ordering the lab is actionable by emergency providers. Actionability by the emergency provider refers to the degree to which ordering the lab is under the control of the emergency provider (e.g. not other providers, such as trauma consultants or inpatient admitting doctors). For each action statement, please answer the question considering average patients at your primary ED.

Please evaluate the potential for benefit or harm to the patient by following the action statement:

1. Don't order blood cultures for patients with a skin infection (cellulitis, abscess) who aren't septic.

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

2. Don't order coagulation studies for patients without hemorrhage or suspected coagulopathy (e.g. anticoagulated, clinical coagulopathy).

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

3. Don't order screening chest X-Rays for screening purposes for patients being admitted to the hospital.

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

4. Don't order repeat lab tests for patients transferred into the ED that have normal lab results available from the outside hospital.

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

5. Don't order screening labs (e.g. CBC, Chem-7) for patients with uncomplicated gastroenteritis or viral syndromes.

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

6. Don't order urine cultures for healthy patients with uncomplicated UTI.

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

7. Don't order blood cultures for patients with a urinary source of infection (UTI, pyelonephritis) who aren't septic.

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

Please evaluate each statement in terms of the potential actionability by emergency care providers:

1. Don't order blood cultures for patients with a skin infection (cellulitis, abscess) who aren't septic.

1. Very actionable
 2. Somewhat actionable
 3. Neutral
 4. Somewhat inactionable
 5. Very inactionable

2. Don't order coagulation studies for patients without hemorrhage or suspected coagulopathy (e.g. anticoagulated, clinical coagulopathy).

1. Very actionable
 2. Somewhat actionable
 3. Neutral
 4. Somewhat inactionable
 5. Very inactionable

3. Don't order screening chest X-Rays for screening purposes for patients being admitted to the hospital.

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

4. Don't order repeat lab tests for patients transferred into the ED that have normal lab results available from the outside hospital.

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

5. Don't order screening labs (e.g. CBC, Chem-7) for patients with uncomplicated gastroenteritis or viral syndromes.

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

6. Don't order urine cultures for healthy patients with uncomplicated UTI.

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

7. Don't order blood cultures for patients with a urinary source of infection (UTI, pyelonephritis) who aren't septic.

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

Imaging

Please rank the following imaging modalities based on: (a) the potential benefit/harm to patients, and (b) the degree to which ordering the image is actionable by emergency providers. Actionability by the emergency provider refers to the degree to which ordering the image is under the control of the emergency provider (e.g. not other providers, such as trauma consultants or inpatient admitting doctors). For each action statement, please answer the question considering average patients at your primary ED.

Please evaluate the potential for benefit or harm to the patient by following the action statement:

1. Don't order MRI of the lumbar spine for patients with low back pain without "red flags".

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

2. Don't order CT to diagnose pulmonary embolism (PE) without first risk stratifying for PE (pre-test probability and D-dimer if low probability).

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

3. Don't order CT of the cervical spine for patients after trauma who do not meet the NEXUS or Canadian C-Spine Rule.

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

4. Don't order CT of the head for patients with mild traumatic head injury that do not meet New Orleans Criteria or Canadian CT Head Rule.

1. Very beneficial
 2. Somewhat beneficial
 3. Neutral
 4. Somewhat harmful
 5. Very harmful

Please evaluate each statement in terms of the potential actionability by emergency care providers:

1. Don't order MRI of the lumbar spine for patients with low back pain without "red flags".

1. Very actionable
 2. Somewhat actionable
 3. Neutral
 4. Somewhat inactionable
 5. Very inactionable

2. Don't order CT to diagnose pulmonary embolism (PE) without first risk stratifying for PE (pre-test probability and D-dimer if low probability).

1. Very actionable
 2. Somewhat actionable
 3. Neutral
 4. Somewhat inactionable
 5. Very inactionable

3. Don't order CT of the cervical spine for patients after trauma who do not meet the NEXUS or Canadian C-Spine Rule.

1. Very actionable
 2. Somewhat actionable
 3. Neutral
 4. Somewhat inactionable
 5. Very inactionable

4. Don't order CT of the head for patients with mild traumatic head injury that do not meet New Orleans Criteria or Canadian CT Head Rule.

1. Very actionable
 2. Somewhat actionable
 3. Neutral
 4. Somewhat inactionable
 5. Very inactionable

Admissions

Please rank the following admission decisions based on: (a) the potential benefit/harm to patients, and (b) the degree to which the admission decision is actionable by emergency providers. Actionability by the emergency provider refers to the degree to which choosing to admit is under the control of the emergency provider (e.g. not other providers, such as trauma consultants or inpatient admitting doctors). For each action statement, please answer the question considering average patients at your primary ED.

Please evaluate the potential for benefit or harm to the patient by following the action statement:

1. Don't admit patients with low risk syncope to the hospital.

- 1. Very beneficial
- 2. Somewhat beneficial
- 3. Neutral
- 4. Somewhat harmful
- 5. Very harmful

2. Don't admit patients with low risk chest pain (atypical chest pain with a negative troponin and non-ischemic EKG) to the hospital for further evaluation. (Note: evaluating in an ED-run observation unit is not considered admission to the hospital.)

- 1. Very beneficial
- 2. Somewhat beneficial
- 3. Neutral
- 4. Somewhat harmful
- 5. Very harmful

Please evaluate each statement in terms of the potential actionability by emergency care providers:

1. Don't admit patients with low risk syncope to the hospital.

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

2. Don't admit patients with low risk chest pain (atypical chest pain with a negative troponin and non-ischemic EKG) to the hospital for further evaluation. (Note: evaluating in an ED-run observation unit is not considered admission to the hospital.)

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

Follow-Up

Please rank the following follow-up recommendations based on: (a) the potential benefit/harm to patients, and (b) the degree to which the follow-up recommendation is actionable by emergency providers. Actionability by the emergency provider refers to the degree to which the follow-up recommendation is under the control of the emergency provider (e.g. not other providers, such as trauma consultants or inpatient admitting doctors). For each action statement, please answer the question considering average patients at your primary ED.

Please evaluate the potential for benefit or harm to the patient by following the action statement:

1. Don't mandate follow-up wound checks in the ED for patients discharged with uncomplicated abscesses or cellulitis.

- 1. Very beneficial
- 2. Somewhat beneficial
- 3. Neutral
- 4. Somewhat harmful
- 5. Very harmful

Please evaluate each statement in terms of the potential actionability by emergency care providers:

1. Don't mandate follow-up wound checks in the ED for patients discharged with uncomplicated abscesses or cellulitis.

- 1. Very actionable
- 2. Somewhat actionable
- 3. Neutral
- 4. Somewhat inactionable
- 5. Very inactionable

Submission

We want to hear any ideas that you have about how to
can reduce the cost of emergency care without
affecting quality. Please share your ideas here: _____

Thank you very much for taking the time to complete this survey. Please make sure to click submit at the bottom of
this page to ensure your responses are recorded.

Appendix 2. Initial 64 Items Solicited from Technical Expert Panel and Provider Emails

Category	Activity
Blood Product	Transfusing platelets in patients with intracranial hemorrhage who take daily aspirin or NSAIDs
Blood Product	Transfusing recombinant factor VII (NovoSeven) in patients with intracerebral hemorrhage and acquired coagulopathy(warfarin)
Blood Product	Transfusing red cells in patients outside of established transfusion guidelines
Disposition	Consulting specialty services for patients with non-emergent conditions to facilitate follow-up
Disposition	Mandating follow-up for patients without specific indication at discharge from the ED (e.g. ankle sprain)
Disposition	Mandating follow-up wound checks for patients with uncomplicated abscesses and cellulitis
Disposition	Admitting patients that do not require inpatient hospitalization to arrange for home care services
Disposition	Admitting patients with low risk low risk, observable diagnoses (TIA, DVT, CP, Afib) to the inpatient hospital
Disposition	Admitting patients with cellulitis amenable to a trial of outpatient antibiotics to observation
Imaging	Ordering renal CT imaging in patients with recurrent kidney stones with typical presentation and improvement with analgesia
Imaging	Ordering MRI of the lumbar spine in patients with low back pain without red flags
Imaging	Ordering MRI/MRA of the head and neck in patients with isolated vertigo to assess for posterior circulation strokes
Imaging	Ordering CT of the cervical spine in trauma patients who do not meet NEXUS or Canadian criteria
Imaging	Ordering CT of the head in mild traumatic head injury patients that do not meet New Orleans or Canadian Criteria
Imaging	Ordering CT of the head in patients with acute atraumatic headache and no red flags
Imaging	Using CT Pulmonary Angiography in low-pretest probability patients with suspected pulmonary embolism and a negative D-dimer or no D-dimer performed
Imaging	Using Pan-CT Imaging in well-appearing trauma patients
Imaging	Using CT Angiography in patients with acute stroke who are not candidates for iv-TPA or IA intervention
Imaging	Ordering pelvic ultrasounds in patients with 1st trimester bleeding and a known intrauterine pregnancy
Imaging	Ordering a pelvic US for sub-acute, minor pelvic pain in non-pregnant women
Imaging	Ordering a lower extremity ultrasound for suspected DVT in low risk patients (negative D-dimer or no D Dimer done)
Imaging	Ordering ankle radiography in patients with acute ankle injuries that do meet Ottawa Ankle Rule
Imaging	Ordering knee radiography in patients with acute knee trauma that do not meet Ottawa Knee Rule
Imaging	Ordering CXRs in stable patients with atraumatic chest pain
Imaging	Ordering abdominal xrays in patients with non-peritoneal abdominal pain
Imaging	Using nuclear cardiology studies for patients with low risk chest pain (MIBI/PET)
Imaging	Using exercise treadmill testing in patients with atypical or low-risk chest pain
Labs	Ordering screening CXRs and EKGs for patients being routinely admitted to the hospital
Labs	Using IV fluids without trying PO challenge for patients with mild dehydration
Labs	Repeating lab tests in patients with lab results done within 48 hours
Labs	Repeating tests on patients transferred into the ED (esp. high cost imaging and lab tests)
Labs	Ordering routine labs for patients needing psychiatric or detox clearance.

Labs	Ordering routine or screening labs in patients with uncomplicated gastroenteritis/viral syndromes
Labs	Ordering EKGs in patients with noncardiac complaints
Labs	Ordering coagulation studies in patients without suspected or known coagulopathy (anticoagulated, clinical coagulopathy, suspected hemorrhage)
Labs	Ordering BNP in patients with known CHF and previously abnormal BNP
Labs	Ordering a CBC to evaluate "possible infection" in patients that will likely be discharged (cellulitis, gastroenteritis, pharyngitis, UTI)
Labs	Ordering a Rh type in patients with a blood type already documented
Labs	Ordering a comprehensive metabolic panel in patients with abdominal pain without suspicion of biliary or liver disease.
Labs	Ordering a CK/CKMB in addition to Troponin to evaluate patients for ACS (unless the patient had a recent MI or cardiac surgery)
Labs	Ordering a urinalysis in non-elderly patients without urinary symptoms and not systemically ill (e.g. altered MS, sepsis. Etc)
Labs	Ordering blood cultures in patients with a presumed urinary source of infection (UTI, pyelo)
Labs	Ordering blood cultures in patients with cellulitis
Labs	Ordering urine cultures in healthy, non-elderly patients with uncomplicated UTI
Labs	Sending wound cultures after I&Ds of uncomplicated abscesses
Labs	Ordering urine drugs of abuse screening studies in intoxicated patients who provide a detailed history of substance abuse.
Labs	Ordering lab studies on reliable, publicly intoxicated patients without trauma
Medication	Giving IV rather than PO antibiotics for non-critically ill patients
Medication	Giving IV rather than PO steroids for non-critically ill patient with asthma/copd who can tolerate PO
Medication	Giving IV Vancomycin in patients with defined infections e.g.pneumonia
Medication	Giving IV antihypertensives for patients with asymptomatic high blood pressure and no end organ damage
Medication	Giving IV N-acetylcysteine for patients with presumed acetaminophen toxicity awaiting lab results and a clear time of onset
Medication	Prescribing brand name antibiotics for the empiric therapy in patients with community acquired pneumonia, abdominal infections, and cellulitis
Medication	Giving IV ketorolac in patients who can tolerate oral NSAIDS
Medication	Giving lactated ringers instead of normal saline for IV rehydration
Procedure	Deciding to place an IV in patients at the time of blood draw
Transfer to higher care	Transferring patients with non-emergent, hand injuries to a higher level of care
Transfer to higher care	Transferring patients with small, uncomplicated intracranial hemorrhage and normal neuro exam to higher level of care
Transfer to higher care	Transfer of patients with non-operative facial fracture to a higher level of care
Transfer to higher care	Transferring patients with non-operative spine fractures to a higher level of care (e.g. thoracic transverse process fracture)
Transfer to higher care	Transferring non-critically ill patients with burns that do meet burn center criteria to a burn center
Transfer to higher care	Transferring patients with acute stroke who are not candidates for acute intervention to a higher level of care
Utilization	Using ED services for patients with psychiatric illness awaiting psychiatric evaluation and placement (boarding)
Utilization	Using ED services for patients with mild to moderate public intoxication without trauma