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AHC Media

The "Choosing Wisely"® Campaign: An Evidence-Based Review of the Recommendations: Part I

Perhaps like some of you, I was initially skeptical about the Choosing Wisely® campaign. I felt that the issues involved in emergency care, the costs of assessing the undifferentiated patient were not amenable to simple solutions, such as one less test or prescription. Hip replacement surgery or cardiac bypass surgery can be protocolized; it is the same sequence of events, patient after patient. But in the ED, every patient is so different that pathways and protocols are often difficult to design and implement. My natural reluctance has given way to the realization that unless emergency physicians are leading this discussion and produce realistic recommendations, someone else will do it for us, and we won't be happy with the results. So, when the Choosing Wisely® comes to your hospital, be actively involved and lead its implementation. This issue will discuss the first six Choosing Wisely® recommendations created by the American College of Emergency Physicians (ACEP), the other four will be covered in the next issue. After reading these issues, you will be better prepared for issues related to the campaign in your department.

—J. Stephan Stapczynski, MD, Editor

Introduction

The United States health care spending grew about 3.6% in 2013, reaching a staggering \$2.9 trillion, which equates to about \$9255 per person.¹ As a share of the GDP, health care spending accounted for almost 17.4%. By 2023, the National Healthcare Expenditure (NHE) is expected to be about 19.2% of the GDP, with the expected annual growth rate of 5.7% from 2013 to 2023.¹ The average NHE by age demographics are: children age 0-18 years consume an average per capita of \$3626, working adults 19-64 years consume an average per capita of \$6122, while the elderly (65 years and older) consume per capita average of \$18,320.¹ What is staggering about these numbers is the fact that

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EXECUTIVE SUMMARY

- The Choosing Wisely® recommendations are to be used as a starting point for a shared decision-making discussion with patients — the recommendations are not mandates.
- Clinical decision rules can reduce CT utilization after closed head trauma, but important exclusions exist, and, if present, void the reliability of these tools.
- Limit insertion of indwelling urinary catheters — if a urine sample is necessary in a patient unable to spontaneously void without contamination, obtain the urine sample with an in-and-out straight catheter.
- Initiate palliative care consultation for appropriate patients in the ED; do not assume it will be done later during hospitalization.
- Oral antibiotics are unnecessary after incision and drainage of cutaneous abscesses in otherwise healthy patients.
- The low-osmolality WHO rehydration solution is the preferred solution for oral rehydration.
- Head CT scans have low yield for clinically relevant findings in patients with syncope, except for patients in whom a neurologic condition was suspected; trust your clinical judgment.

the elderly consume five times more than children, and three times more than young adults, of the National Healthcare Expenditure (NHE).

The United States health care is the most expensive in the world, and this cost continues to escalate. Several factors contribute to this high cost of healthcare delivery. Some of the expense includes but not exclusive of technology and innovation, prescription drugs, aging population, litigious society, and defensive medicine. As health care cost escalates and becomes unsustainable, there is renewed attention on physicians' critical decision-making. As emergency physicians, the implications of this renewed scrutiny are huge since we are the frontline or the so-called "gatekeeper" of health care resource utilization. We can help initiate the conversation, develop innovative ideas, and embark on a journey to help reduce the cost of health care as it relates to our scope of practice in the emergency department.

How Did We Get Here?

This campaign was first initiated in 2009 by the National Physician Alliance project titled "Five Things You Can Do in Your Practice." This alliance was sponsored by the American Board of Internal Medicine (ABIM) Foundation.

In December 2011, the ABIM Foundation trademarked and launched the Choosing Wisely® campaign to encourage physicians to curtail inappropriate utilization of health care resources.

In August 2011, several other specialties, including the American College of Emergency Physicians (ACEP)

Board of Directors, were asked to join the campaign. However, the ACEP board declined to participate, citing the uniqueness of practicing emergency medicine physicians. The following three concerns were given as the reasons for the unwillingness to participate: emergency medicine physicians are the safety net; they cannot refuse or turn away any patients due to the Emergency Medical Treatment and Active Labor Act (EMTALA); and, lastly, the litigious environment in which we practice medicine.

In April 2012, acting on the request by the members of the ACEP Quality and Performance committee, David Seaberg, MD, (president) convened another committee to look at the Choosing Wisely® campaign. Once again, after prolonged deliberation, this committee also recommended against participating in the campaign.

In February 2013, after exhaustive review by expert panel of emergency physicians, the ACEP Board of Directors elected to participate in the campaign. In the fall of 2013, at the annual ACEP scientific assembly in Seattle, after an extensive multi-step process that included research and input from an expert panel of emergency physicians and the ACEP Board of Directors, ACEP released its first five recommendations of the Choosing Wisely® campaign. Following this initial release, in the fall of 2014, at the annual scientific assembly in Chicago, after a survey of almost 30,000 ACEP members and the convening of a delphi panel, another five recommendations were added to the list.² In all, 10 recommendations are now the cornerstone

of the ACEP Choosing Wisely® campaign.³

The purpose of the campaign is to provide evidence-based recommendations to assist physicians and patients to engage in conversations that will lead to "shared decision making" (SDM) with regard to utilizing health care resources. In addition to SDM, the campaign also encourages physicians to be good steward of health care resources.

The purpose of this paper is to perform a critical review of available evidence regarding each of the 10 recommendations.

Recommendation #1: Avoid computed tomography (CT) scans of the head in emergency department patients with minor head injury who are at low risk based on validated decision rules.

Minor head injury (MHI) or mild traumatic brain injury (mTBI) is a common presentation to the emergency department. It is defined as a blunt head injury with a Glasgow Coma Scale of 13-15 on presentation.⁴ Concussion is the most common type of MHI or mTBI, and may be associated with or without loss of consciousness. An estimated 6.1 million patients visited the emergency department for mTBI from 2005-2009.⁵ According to the Centers for Disease Control and Prevention, an estimated 1.7 million patients suffer traumatic brain injury annually, and 80% of these patients are seen in the emergency department.⁶ Of the patients presenting with MHI, about 63% receive an imaging study.⁵ The increased

Table 1. Canadian CT Head Rule (CCHR)

CT head is only required for minor head injury patients with any one of these findings:

High Risk (for Neurologic Intervention)

1. GCS score < 15 at 2 hours after injury
2. Suspected open or depressed skull fracture
3. Any sign of basal skull fracture
4. Vomiting ≥ 2 episodes
5. Age ≥ 65 years

Medium Risk (for Brain injury on CT)

6. Amnesia before impact ≥ 30 minutes
7. Dangerous mechanism (pedestrian, occupant ejected, fall from elevation)

Rule Not Applicable if:

- Non-trauma cases
- GCS < 13
- Age < 16 years
- Warfarin or other anticoagulant therapy; antiplatelet therapy; or bleeding disorder
- Obvious open skull fracture

Adapted from Stiell IG, et al. The Canadian CT Head Rule for Patients with Minor Head Injury. *Lancet* 2001;357:1391-96.

utilization of imaging studies on these patients carries a significant economic burden and unnecessary exposure to radiation.

Although there are several clinical decision rules (New Orleans Criteria [NOC], Canadian CT Head Rule [CCHR], the National Emergency X-Radiography Utilization Study II [NEXUS II], and CT in Head Injury Patients Rule [CHIP]) for evaluating MHI, they must be used within the parameters of the inclusion criterion. The 2008 ACEP clinical policy on neuroimaging for mTBI discussed the limitations of these decision rules.⁷ A study comparing agreement between routine emergency department care and clinical decision support rules (ACEP 2008 neuroimaging, New Orleans Rule, and the Canadian CT Head Rule) recommended for mild TBI demonstrated that the use of the ACEP 2008 neuroimaging rule resulted in no statistically significant difference in head CT use, the New Orleans rule resulted in an increase in head CT use, while the Canadian CT head rule (*see Table 1*) is the only one that led to a decrease

in head CT use.⁸ Another study that evaluated the impact of clinical decision support embedded in computerized provider order entry (CPOE) on CT head use in patients with mTBI in the ED demonstrated a statistical significant reduction in CT head utilization.⁹

As it stands, there is enough evidence that clinical decision support rules reduce CT head utilization in mTBI patients in the emergency department. With increased scrutiny over the excessive utilization of CT scan in the emergency department, we need to find a way to standardize care using clinical decision support rules. An institutional quality improvement project looking at unnecessary head CT in mTBI in a level 1 trauma center demonstrated that 24.2% of head CTs were unnecessary.¹⁰ A study by Melnick et al demonstrated that almost 10-35% of CT head for mTBI were unnecessary when the guidelines were utilized. In essence, up to an estimated 35% of head CT scans could be eliminated by simple adherence to the guidelines or the clinical decision support recommended for care of mTBI.¹¹

As guidelines for many advance imaging modalities are developed, often by non-emergency specialists, emergency physicians need to be proactive and demonstrate our ability to use imaging studies wisely or we may lose control of our ability to autonomously order such studies. As it stands, ED physicians fall short and are inconsistent with adhering to recommended guidelines and clinical decision support rules. A study by Jones et al demonstrated that even in the presence of coaching and clinical vignette, ED physicians' decision-making was consistent with the guidelines in only 62.8% of the time.¹² This is an opportunity to be champions to reduce CT scan over-utilization in the emergency department, lessen the scrutiny, and engage in shared decision-making conversations with our patients. Although decision rules exist, their applicability should be individualized, and the ultimate decision to scan depends on the clinician's gestalt based on the presenting clinical scenario. The goal of this recommendation is to encourage physicians to at least consider utilizing the clinical decision rules and available guidelines to supplement their clinical gestalt.

Recommendation #2: Avoid placing indwelling catheters in the emergency department for either urine output monitoring in stable patients who can void, or for patient or staff convenience.

Indwelling urinary catheter is commonly utilized in the emergency department in the elderly and in cases of acute urinary retention. During the past few years, though, this utilization has significantly diminished in my institution with education and increased awareness. However, if ACEP Choosing Wisely® is addressing this issue, it is still a common occurrence.

Urinary catheter-related infection is a common problem in hospitals nationwide. As a matter of fact, 36% of all hospital-acquired infections are due to urinary tract infection (UTI), and catheter-associated UTI (CAUTI) accounts for majority of these cases.¹⁴ The estimated cost of a single case of CAUTI

Table 2. Examples of Appropriate Indications for Indwelling Urethral Catheter Use²⁷

1. Patient has acute urinary retention or bladder outlet obstruction
2. Need for accurate measurements of urinary output in critically ill patients
3. Perioperative use for selected surgical procedures:
 - Patients undergoing urologic surgery or other surgery on contiguous structures of the genitourinary tract
 - Anticipated prolonged duration of surgery (catheters inserted for this reason should be removed in PACU)
 - Patients anticipated to receive large-volume infusions or diuretics during surgery
 - Need for intraoperative monitoring of urinary output
4. To assist healing of open sacral or perineal wounds in incontinent patients
5. Patient requires prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures)
6. To improve comfort for end-of-life care if needed

Adapted from: <http://www.cdc.gov/hicpac/pdf/cauti/cautiguide2009final.pdf>

in 2007 was \$758 when adjusted for Consumer Price Index (CPI).¹⁵ According to the CDC Healthcare Associated Infection (HAI) prevalence survey, approximately 93,000 cases of CAUTI occurred in the United States in 2011, and the rate of increased by 6% annually from 2009-2013.¹⁶ A study estimated that CAUTI accounts for 95,483 to 387,550 annual preventable infections in the United States.¹⁷

In 2008, the Centers for Medicare and Medicaid Services (CMS) stopped reimbursing hospitals for any additional cost of care incurred for any patient who developed CAUTI while in the hospital.¹⁸ Because of this potential loss of revenue, hospital systems have taken initiatives to discourage the use of indwelling catheter unless it is absolutely necessary. According to Magill et al, there appears to be a downward trend in the incidence in 2014 when compared to the 6% annual increase from 2009-2013.¹⁶

So why is this an emergency department problem? About 91% of urinary catheter placement within 24 hours of admission originated from the emergency department.¹⁹ Furthermore, nearly half of the catheters placed were inappropriate, and about one third to one half of these catheters placed do not have documented physician orders.^{20,21} A study evaluating urinary catheter use and appropriateness in U.S. emergency departments identified that 2.2-3.3 catheters were placed for every 100

patients, and 64.9% of those placed were inappropriate.²² Here lies the problem: The ED is an important contributor to this problem, and this Choosing Wisely® recommendation is a low hanging fruit that should be intentionally attended to by all ED stakeholders in the country.

As a stakeholder in health care resource utilization, emergency physicians are receptive to ideas that would help eliminate unnecessary interventions. A study looking at providers' perspectives on the use of indwelling urinary catheters in older adults in the ED demonstrated that the providers believe urinary catheters are overutilized, infrequently removed when placed, and often used for staff convenience.²³ With focused group intervention, participants in this study embraced an evidence-based clinical protocol in appropriate placement and management of indwelling catheters.²³ Several studies²⁴⁻²⁶ have demonstrated that the use of evidence-based guideline have shown significant reduction in the use of indwelling urinary catheters in the emergency department. One of those studies shows that the appropriateness of catheter use pre-implementation of an evidence-based clinical protocol was 74%, and 91.4% post-implementation, respectively.²⁴

In 2009, the Healthcare Infection Control Practices Advisory Committee (HICPAC) convened to develop guidelines for prevention of

catheter-associated UTI. The assertions for creating these guidelines are: CAUTI has been associated with increased morbidity, mortality, hospital cost, and length of stay. According to the guideline recommendations, the following are examples of appropriate indications for indwelling urethral catheter use (*see Table 2*).²⁷

Recommendation #3: Don't delay engaging available palliative and hospice care services in the emergency department for patients likely to benefit from it.

Issues related to end-of-life care are always difficult for families and medical professionals. Emergency physicians often manage critically and terminally ill patients. A lot of these patients are often return visitors to the emergency department. The cost for this care is exponential because of the amount of resources required to manage emergently, and subsequent admission to the hospital. In terms of level of care in the hospital, a lot of these patients require a higher level of care and, thus, end up in the intensive care units (ICU) or the progressive care units (PCU). Initiation of hospice and palliative care conversation in the emergency department as part of the shared decision-making concept will foster better coordinated care for these patients and limit the amount of repeated emergency department visits.

To encourage emergency physicians to engage in this conversation in the era of metrics driven, fast-paced, and potential physician profiling practice model (as it relates to door to discharge [D to D] metrics), there need to be a streamlined guidelines and ways to accommodate and not penalize physicians who engage patients in these conversation. Currently, hospice care is an underutilized resource.²⁸ For 2011, the National Hospice and Palliative Care Organization (NHPCO) estimates that approximately 44.6% of all deaths in the United States were under the care of a hospice program.²⁹ A study by Smith et al demonstrated that emergency physicians often experience uncertainty when caring for hospice and palliative care needs patients.³⁰ In addition, the study

identified several barriers expressed by the ED providers (competing demands, communication challenges, long wait times, and conflict between the wishes of the patients and those of the family).³⁰

Presently, the field of emergency medicine has seen the opportunity to be involved in having these conversations, as shown by significant interest in hospice and palliative care medicine. In 2006, the American Board of Emergency Physicians approved the Hospice and Palliative Care fellowship and administered the first certification exam in 2008. Since the approval of this fellowship, several emergency medicine programs have started fellowship programs in hospice and palliative care medicine. The specialty recognizes that open discussions with patients and family members are important to determine the goal of care.

Understanding the goals of care is the first step in establishing coordinated care with a hospital-wide hospice and palliative care team. A study evaluating the cost savings associated with U.S. hospital palliative care consultation programs demonstrated that palliative care patients who were discharged alive from the hospital had an adjusted savings of almost \$1696 per admission, demonstrating that hospital palliative care consultation teams are associated with significant hospital cost savings.³¹ A recent study comparing poor prognosis cancer patients enrolled in a hospice service to those without hospice services concluded that those receiving hospice care had significantly lower rates of hospitalization, intensive care unit admission, invasive procedures at the end of life, along with significantly lower total cost during the last years of life.³²

As the dynamics in health care change with the Affordable Care Act, the establishment of accountable care organizations, and population-based reimbursement models, palliative care will likely play a significant role in end-of-life care. Hospice and palliative care systems provide the most comprehensive, interdisciplinary system to patients, families, and caregivers of terminally ill patients.³³ It is important that emergency clinicians work in coordinated collaboration with palliative medicine,

Table 3. IDSA 2011 Recommendations for Antibiotics in SSTI

1. Severe or extensive disease
2. Rapid progression in the presence of cellulitis
3. Signs and symptoms of systemic illness (T > 38 degrees), tachycardia (HR > 90 beats per minute), tachypnea (RR > 24), abnormal WBC
4. Associated comorbidities or immunosuppression
5. Extremes of age
6. Abscess in areas difficult to drain
7. Associated septic phlebitis
8. Lack of response to incision and drainage

Table 4. IDSA 2014 Classifications of SSTI

Purulent	Nonpurulent
Furuncle Carbuncle Abscesses	Necrotizing infections Cellulitis Erysipelas
Mild (no systemic signs) Moderate (systemic signs) Severe (failed I & D, failed outpatient oral antibiotics, systemic signs)	

subspecialists, local hospice, and social services to assist in fostering seamless care for terminally ill patients. If engaging hospice and palliative medicine early in the care of terminally ill patients in the emergency department decreases overall cost of care, it is definitely a win for the field of emergency medicine. In addition, early involvement of hospice and palliative care assists the patient and family in making informed decisions about care and treatment. To make this successful, institutions will need to take a deliberate approach to educating emergency physicians on how to have these often-difficult conversations.

Recommendation #4: Avoid antibiotics and wound cultures in emergency department patients with uncomplicated skin and soft tissue abscesses after successful incision and drainage and adequate medical follow-up.

Emergency department annual visits for bacterial skin and skin tissue infections (SSTI) exceed 2 million.³⁴ Two types of SSTI exist among ED patients: cellulitis and abscess. The focus of this

recommendation is on the management of simple abscesses utilizing incision and drainage. This recommendation should not be confused with that of the management of acute bacterial skin and skin structure infection (ABSSSI), which is defined as infection with all the characteristics of simple skin infections with the exception of the size that is greater than 75 cm² as defined by the Infectious Diseases Society of America.

Despite the fact that the recommended primary treatment for an abscess based on several studies is incision and drainage alone, clinicians routinely prescribe antibiotics with coverage against community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) for these patients.³⁵⁻³⁹ Furthermore, in addition to routine antibiotic prescriptions, most clinicians often prescribe two antibiotics for so-called “double coverage” (MRSA and beta hemolytic strep).^{40,41} A study performed by Merritt et al evaluating the epidemiology and management of SSTI in three urban emergency departments concluded that *Staphylococcus aureus* is the predominant pathogen in SSTI, and most patients received

Table 5. Composition of Oral Rehydration Solutions

Solution	Osmolality (mOsm/kg)	Dextrose (mmol/L)	Sodium (mmol/L)	Potassium (mmol/L)	Recommended as ORS
WHO	331	111	90	20	Recommended for all ages
Low-Osmolality WHO	245	75	75	20	Recommended for all ages
Pedialyte	250	130	45	20	Recommended for all ages
Gatorade	330	255	20	3	Not recommended for children younger than 2 years old
Apple juice	694	690	0	27	Not recommended
Orange juice	687	680	1	486	Not recommended

Source: Adapted from Sandhu BK; European Society of Gastroenterology, Hepatology, and Nutrition Working Group on Acute Diarrhea

empiric antibiotics after appropriate incision and drainage. Furthermore, multidrug double coverage was pervasive, and the antibiotic utilization patterns varied widely.⁴²

In 2011, the Infectious Diseases Society of America (IDSA) released the guidelines for the management of SSTI in the era of CA-MRSA.⁴³ According to the guideline, cutaneous abscesses should be managed primarily with incision and drainage. However, as it relates to simple abscesses and boils, the guidelines indicate that incision and drainage should suffice, but additional data need to determine the role of antibiotics. The guideline further stipulates the indications for antibiotics. (See Table 3.)

In spite of the above guideline, there is still significant variability in the definition and management of SSTI. To address this issue, the IDSA released an update to the 2011 guideline in 2014.

The 2014 guideline attempts to further simplify and clarify the definition. To accomplish this, SSTI was classified as non-purulent (necrotizing infection, cellulitis, erysipelas), and purulent (furuncle, carbuncle, abscess). (See Table 4.) The non-purulent SSTIs are treated with oral or intravenous antibiotics depending on the severity. On the other hand, the purulent infections were classified as mild, moderate, and severe. The recommended treatment for mild infection (no sign of systemic illness) is incision and drainage. For moderate (with systemic signs of infection), incision and drainage, culture and sensitivity, and antibiotics are indicated. For severe infection (failed incision and drainage,

outpatient oral antibiotics, and signs of systemic illness), incision and drainage, culture and sensitivity, and intravenous antibiotics are the recommended treatment.⁴⁴

After reviewing the available evidence, the Choosing Wisely® campaign recommendation #4 is a plausible one, but it requires clarification of the exact definition of uncomplicated SSTI, since this recommendation was released prior to the 2014 IDSA recommendation. The definition and the classification of SSTI by the 2014 IDSA guideline should help resolve this issue. This recommendation, and the available body of evidence that shows unscrupulous antibiotic utilization for minor SSTI, should encourage emergency physicians to engage in the shared decision-making conversations with those patients presenting to the emergency department requesting antibiotics for minor infections.

Recommendation #5: Avoid instituting intravenous (IV) fluids before doing a trial of oral rehydration therapy in uncomplicated emergency department cases of mild to moderate dehydration in children.

Pediatric dehydration is a common presentation to the emergency department. Illnesses resulting in nausea, vomiting, or diarrhea are the most common causes of dehydration worldwide and are a leading cause of child and infant mortality.⁴⁵ The morbidity or mortality that may arise from dehydration is

generally related to the severity of the dehydration, underlying inciting condition, the duration of the symptom prior to presentation to the emergency department, and the promptness of rehydration.

To effectively manage pediatric patients with dehydration, it is imperative that providers understand the degree of dehydration and the ultimate goals of rehydration therapy. For the emergency physicians, in considering the modality of therapy for rehydration, the efficacy, ease of use, emergency department length of stay, and parental satisfaction are the driving forces.

The impetus behind this ACEP recommendation is due to the variability in the ways emergency physicians manage pediatric patients with mild to moderate dehydration. Despite overwhelming evidence that supports the use of oral rehydration therapy, controversies still exist regarding the modality of rehydration. This might be due to lack of adherence to or familiarity with the guidelines, or what an oral rehydration solution signifies, or the perception that intravenous therapy is superior.

What really is an oral rehydration solution (ORS)? It is an enteral solution for rehydration that contains sodium, potassium, chloride, and bicarbonate, as well as dextrose (glucose). Some of the commonly utilized solutions in the emergency department such as apple juice, orange juice, or Gatorade contain entirely different concentrations than those recommended for oral rehydration by the World Health Organization (WHO). Most of these solutions

contain a high concentration of glucose, extremely low sodium and potassium, and particularly high osmolality. (See Table 5.)

According to the WHO, the American Academy of Pediatrics, and the European Society of Pediatric and Gastroenterology and Nutrition, oral rehydration therapy (ORT) should be used for the treatment of children with mild to moderate dehydration.⁴⁵⁻⁴⁸ Despite the recommendation by these organizations, ORT is still infrequently utilized in United States emergency departments, or used incorrectly.⁴⁹⁻⁵³

A systematic review of the Cochrane database by Hartling et al⁵⁴ demonstrated that for every 25 children who received ORT, one failed and subsequently require intravenous rehydration therapy (IVT). However, if the low osmolality concentration solution recommended by the WHO were utilized, about one child out of every 100 would require intravenous hydration therapy (IVT). Several other studies⁵⁵⁻⁵⁷ in different settings, from the emergency department to the inpatient settings, have concluded that the efficacy of ORT and intravenous therapy (IVT) are similar. Another study evaluating length of stay in the emergency department (which is of particular interest to emergency physicians) based on the rehydration modality demonstrated that the dehydration score at 2 hours (ORT 79% vs. 80% IVT) and at 4 hours (ORT 55% vs. IVT 57%) are practically similar.⁵⁸

This recommendation by ACEP is a “no brainer,” as there is a preponderance of evidence in the literature to validate this recommendation, and enough to resolve any controversies that may still exist regarding the utilization of ORT for mild to moderate dehydration. The bottom line is it works, and we need to be familiar with the recommended oral rehydration solutions, use them appropriately when indicated, with the understanding that each patient is unique, get with the guidelines, and provide a better patient experience for the parents.

Recommendation #6: Avoid CT of the head in asymptomatic adult patients in the emergency

Table 6. Syncope Decision Tools

San Francisco Syncope Rule: Incidence of serious complication with 7 days No factors present: < 1% ≥ 1 Factor present: 15%	C: History of Congestive heart failure H: Hematocrit < 30% E: Abnormal ECG S: Patient complaint of shortness of breath S: Triage systolic BP < 90 mmHg
Risk Stratification of Syncope in the Emergency Department (ROSE) risk score): Incidence of serious complication within 1 month No factors present: 1.5% ≥ 1 Factor present: 16%	<ul style="list-style-type: none"> • Chest pain associated with syncope • Pulse ox ≤ 94% on room air • Bradycardia < 50 beats/min • ECG with Q wave (excluding lead III) • Rectal exam shows fecal blood • Anemia – hemoglobin < 9.0 g/dL • Serum BNP ≥ 300 pg/mL
Osservatorio Epidemiologico sulla Sincope nel Lazio (OESIL) risk score: Mortality within 12 months: 0-1 factors present: < 1% 2-4 factors present: 31%	<ul style="list-style-type: none"> • Age > 65 years • History of cardiovascular disease • Syncope without a prodrome • Abnormal ECG
Evaluation of Guidelines in Syncope Study multivariate (EGSYS-M) score: Accuracy for cardiac causes of syncope: Score ≥ 3 has about 90% sensitivity and 70% specificity for cardiac syncope	<ul style="list-style-type: none"> • Palpitations preceding syncope: 4 points • Cardiomyopathy and/or abnormal electrocardiogram (sinus bradycardia, second or third degree AV block, bundle branch block, acute or old myocardial infarction, supraventricular or ventricular tachycardia, left or right ventricular hypertrophy, ventricular preexcitation, long QT, Brugada pattern): 3 points • Syncope during effort: 3 points • Syncope while supine: 2 points • Precipitating or predisposing factors (warm, crowded place, prolonged orthostasis, pain, emotion, fear): minus 1 point • A prodrome of nausea or vomiting: minus 1 point
Abbreviations: BNP = brain natriuretic peptide	

department with syncope, insignificant trauma, and normal neurological evaluation.

Syncope, fainting spells, or passing out is a common adult presentation to the emergency department. It is estimated to account for about 1-3% of emergency department visits, and almost 6% of hospital admissions.^{59,60} The estimated annual expenditure for syncope evaluation and hospital admissions is about \$2.4 billion.⁶¹ The etiology of this condition ranges from benign to life-threatening conditions.

The evaluation of syncope in adult population that this recommendation is addressing is often fraught with challenges due to the wide variety of potential etiologies. In the era of protocolized medicine, most syncope computerized

physician order entry (CPOE) power plans have CT scan of the head built into them. In busy emergency departments where physicians are constantly encouraged to use these pre-built protocols, physicians may be less inclined to take the time to review these order sets, and uncheck items like CT scan of the brain that may not be indicated. In some instances, emergency department nurses routinely initiate the protocols when the ED is busy. This protocol-driven era of medicine has led to an unintended consequence of contributing to the increase in “avoidable diagnostic imaging.”

What is the diagnostic yield of CT scan of the brain in the evaluation of syncope? A study by Mendu et al⁶² evaluated the yield of diagnostic tests

in evaluating syncope episodes in older patients. Of 1327 patients admitted for syncope who had a CT scan of the brain, only 2% of the patients had clinical findings, and 25 of these 28 patients had clinically suspected neurologic diseases.⁶² Another study by Pires et al demonstrated that of 283 patients diagnosed with syncope that obtained CT scan, only 5 (2%) had positive findings, and these patients had a history consistent with cerebrovascular accident.⁶³ Another study by Goyal et al demonstrated that head CT did not yield any findings that contributed to the evaluation and management of 117 patients who presented to the ED with syncope.⁶⁴ A recently published study that looked at head CT scans in the emergency department for syncope and dizziness reported a diagnostic yield of 6.4%.⁶⁵ The evaluation of the literature and the available data show that the diagnostic yield of CT scan of the head in adult syncope patients is very low.

So why do emergency physicians still order head imaging in the evaluation of syncope? Is it a matter of habit, fear of litigation, or the lack of awareness or adherence to available guidelines?⁶⁶⁻⁶⁸ As it relates to physicians' habits, Melnick et al performed a study to see if physician practice behavior would be influenced after the implementation of a computerized clinical decision support system (CDSS) based upon the recommendations from the 2007 ACEP Clinical Policy on Syncope. The study demonstrated that despite changes in the pre- and post-intervention admission rates (68.1% vs. 60.5%, $P = 0.036$), there was no statistically significant change (39.8% vs. 43.2%, $P = 0.356$) in physician CT ordering behavior.⁶⁹ The findings from this study suggested that some habits are amenable to be influenced while others are difficult to change.

How do we influence practice patterns? Do we encourage the use of decision rules in addition to adhering to the guidelines? Or do we emphasize the predictors of abnormal findings on patients with syncope? A systematic review and meta-analysis of the accuracy and quality of the clinical decision rules for syncope in the emergency department

demonstrated that the methodological quality and prognostic accuracies are limited.⁷⁰ (See Table 6.) Another study by Costantino et al compared syncope risk stratification tools (decision rules) to clinical judgment. The study shows that current decision tools did not show better sensitivity, specificity, or prognostic yield compared with clinical judgment in predicting short-term serious outcome after syncope. They further stipulated that the systemic review performed strengthens the evidence that current prediction tools should not be strictly used in clinical practice.⁷¹

The available body of evidence suggests that decision rules may be limited in utility. Determining the best way to limit "avoidable imaging" will definitely require clinical judgment and understanding the predictors of abnormal findings on CT scan of the head on patients presenting with syncope. Mitsunaga et al evaluated head CT scan in the emergency department for syncope and dizziness. The study identified three predictors of abnormal findings on CT scan: focal neurologic deficit ($p = 0.003$), age greater than 60 years ($p = 0.015$), and acute head trauma ($p = 0.026$).⁶⁵ Although these predictors are statistically significant, the authors contend that using these predictors within a regression model did not increase accuracy.

Analysis of available literature overwhelmingly indicates that we are ordering too many CT scans in the evaluation syncope. The decision rules are fraught with variability. In order to minimize the amount of "avoidable imaging" in the evaluation of syncope patients, physicians need to trust their clinical acumen in order to risk-stratify patients and use CT scanning in the the evaluation of syncope wisely, and policy makers need to address mal-practice reform to minimize the stigma and fear of potential litigation among physicians.

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Upon completion of this educational activity, participants should be able to:

- recognize specific conditions in patients presenting to the emergency department;
- apply state-of-the-art diagnostic and therapeutic techniques to patients with the particular medical problems discussed in the publication;
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CME Questions

- According to the National Healthcare Expenditure (NHE), in 2013, the total health care expenditure reached a whopping \$2.9 trillion. What is the projected percentage of GDP that health care will consume by 2023?
 - 17.3%
 - 23.2%
 - 19.2%
 - 14.8%
 - Less than 10%
- According to the NHE, adults age 65 years and older consume how many times the health care expenditure when compared to working adults ages 19-64 years?
 - 1
 - 2
 - 3
 - 4
 - 5
- With regard to minor head injury (MHI) or mild traumatic brain injury (mTBI) and CT scan utilization, which of the following is *incorrect*?
 - Almost 80% of these patients are seen in the ED.
 - With coaching and clinical vignettes, ED physicians conform with the guideline in 62.8% of the time.
 - Only 5% of CT scans could be eliminated if the guidelines and clinical support systems are followed.
 - About 6.1 million visits to the ED from 2005-2009
 - Almost 63% of the patients receive imaging studies.
- With regard to catheter-related urinary tract infections (CAUTI), which of the following is *incorrect*?
 - About 36% of hospital-acquired UTI are catheter related.
 - About 50% of catheter placements within 24 hours of admission originated from the ED.
 - Almost 64.9% of catheters inserted were inappropriate.
 - Approximately 2.2-3.3 patients per 100 had catheter inserted.
 - According to Fakhri et al, with implementation of the protocol, appropriateness improved from 74% to 91.4%.
- Issues related to end-of-life care are always difficult for families and medical professionals. According to Obermeyer et al, which of the following is *not* due to palliative care consultation?
 - increased rates of hospitalizations
 - decreased intensive care unit admissions
 - decreased invasive procedures
 - significantly lower total cost during last year of life
 - decreased rates of hospitalizations
- Antibiotic utilization for minor skin and skin tissue infection is an increasingly concerning contributor to antibiotic resistance and morbidities. The Infectious Diseases Society of America (IDSA) made some recommendations for antibiotic use. Which of the following is *not* part of these indications for antibiotics?
 - mild to moderate diseases
 - rapid progression in the presence of cellulitis
 - extremes of age
 - lack of response to incision and drainage
 - abscess in areas difficult to drain
- The most effective oral rehydration therapy according to WHO is:
 - Gatorade
 - WHO oral rehydration solution
 - apple juice
 - tap water
 - normal saline
- Which statement regarding oral rehydration therapy in children is *false*?
 - Oral rehydration is as effective as IV hydration in children.
 - The low-osmolality WHO solution is associated with the lowest failure rate.
 - About 10% of oral rehydration attempts will fail and require IV hydration.
 - High-osmolality solutions are not recommended.
- The estimated annual expenditure for syncope evaluation and hospital admissions is about \$2.4 billion. Avoidable imaging is a significant contributor to these expenses. According to a recently published study, what is the diagnostic yield of CT scan of the head in syncope?
 - 14%
 - 6.4%
 - 28%
 - 32%
 - 50%
- Compared to clinical judgment, risk-stratification (decision tools) for syncope are more accurate at predicting short-term outcome.
 - true
 - false

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The “Choosing Wisely”® Campaign: An Evidence-Based Review of the Recommendations: Part I

Canadian CT Head Rule (CCHR)

CT head is only required for minor head injury patients with any one of these findings:

High Risk (for Neurologic Intervention)

1. GCS score < 15 at 2 hours after injury
2. Suspected open or depressed skull fracture
3. Any sign of basal skull fracture
4. Vomiting ≥ 2 episodes
5. Age ≥ 65 years

Medium Risk (for Brain injury on CT)

6. Amnesia before impact ≥ 30 minutes
7. Dangerous mechanism (pedestrian, occupant ejected, fall from elevation)

Rule Not Applicable if:

- Non-trauma cases
- GCS < 13
- Age < 16 years
- Warfarin or other anticoagulant therapy; antiplatelet therapy; or bleeding disorder
- Obvious open skull fracture

Adapted from Stiell IG, et al. The Canadian CT Head Rule for Patients with Minor Head Injury. *Lancet* 2001;357:1391-96.

Examples of Appropriate Indications for Indwelling Urethral Catheter Use

1. Patient has acute urinary retention or bladder outlet obstruction
2. Need for accurate measurements of urinary output in critically ill patients
3. Perioperative use for selected surgical procedures:
 - Patients undergoing urologic surgery or other surgery on contiguous structures of the genitourinary tract
 - Anticipated prolonged duration of surgery (catheters inserted for this reason should be removed in PACU)
 - Patients anticipated to receive large-volume infusions or diuretics during surgery
 - Need for intraoperative monitoring of urinary output
4. To assist healing of open sacral or perineal wounds in incontinent patients
5. Patient requires prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures)
6. To improve comfort for end-of-life care if needed

Adapted from: <http://www.cdc.gov/hicpac/pdf/cauti/cautiguide2009final.pdf>

IDSA 2011 Recommendations for Antibiotics in SSTI

1. Severe or extensive disease
2. Rapid progression in the presence of cellulitis
3. Signs and symptoms of systemic illness (T > 38 degrees), tachycardia (HR > 90 beats per minute), tachypnea (RR > 24), abnormal WBC
4. Associated comorbidities or immunosuppression
5. Extremes of age
6. Abscess in areas difficult to drain
7. Associated septic phlebitis
8. Lack of response to incision and drainage

IDSA 2014 Classification of SSTI

Purulent	Nonpurulent
Furuncle Carbuncle Abscesses	Necrotizing infections Cellulitis Erysipelas
Mild (no systemic signs) Moderate (systemic signs) Severe (failed I & D, failed outpatient oral antibiotics, systemic signs)	

Composition of Oral Rehydration Solutions

Solution	Osmolality (mOsm/kg)	Dextrose (mmol/L)	Sodium (mmol/L)	Potassium (mmol/L)	Recommended as ORS
WHO	331	111	90	20	Recommended for all ages
Low-Osmolality WHO	245	75	75	20	Recommended for all ages
Pedialyte	250	130	45	20	Recommended for all ages
Gatorade	330	255	20	3	Not recommended for children younger than 2 years old
Apple juice	694	690	0	27	Not recommended
Orange juice	687	680	1	486	Not recommended

Source: Adapted from Sandhu BK; European Society of Gastroenterology, Hepatology, and Nutrition Working Group on Acute Diarrhea

Syncope Decision Tools

San Francisco Syncope Rule: Incidence of serious complication with 7 days No factors present: < 1% ≥ 1 Factor present: 15%	C: History of Congestive heart failure H: Hematocrit < 30% E: Abnormal ECG S: Patient complaint of shortness of breath S: Triage systolic BP < 90 mmHg
Risk Stratification of Syncope in the Emergency Department (ROSE) risk score: Incidence of serious complication within 1 month No factors present: 1.5% ≥ 1 Factor present: 16%	<ul style="list-style-type: none"> Chest pain associated with syncope Pulse ox ≤ 94% on room air Bradycardia < 50 beats/min ECG with Q wave (excluding lead III) Rectal exam shows fecal blood Anemia – hemoglobin < 9.0 g/dL Serum BNP ≥ 300 pg/mL
Osservatorio Epidemiologico sulla Sincope nel Lazio (OESIL) risk score: Mortality within 12 months: 0-1 factors present: < 1% 2-4 factors present: 31%	<ul style="list-style-type: none"> Age > 65 years History of cardiovascular disease Syncope without a prodrome Abnormal ECG
Evaluation of Guidelines in Syncope Study multivariate (EGSYS-M) score: Accuracy for cardiac causes of syncope: Score ≥ 3 has about 90% sensitivity and 70% specificity for cardiac syncope	<ul style="list-style-type: none"> Palpitations preceding syncope: 4 points Cardiomyopathy and/or abnormal electrocardiogram (sinus bradycardia, second or third degree AV block, bundle branch block, acute or old myocardial infarction, supraventricular or ventricular tachycardia, left or right ventricular hypertrophy, ventricular preexcitation, long QT, Brugada pattern): 3 points Syncope during effort: 3 points Syncope while supine: 2 points Precipitating or predisposing factors (warm, crowded place, prolonged orthostasis, pain, emotion, fear): minus 1 point A prodrome of nausea or vomiting: minus 1 point
Abbreviations: BNP = brain natriuretic peptide	

Supplement to *Emergency Medicine Reports*, August 9, 2015: "The Choosing Wisely® Campaign: An Evidence-Based Review of the Recommendations: Part I." Author: Ademola Adewale, MD, FAAEM, Assistant Program Director, Director of Research/ Medical Simulation, Florida Hospital Emergency Medicine Residency, Orlando, FL.

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