ULTRASOUND
Ocular Ultrasound in the ED
SEE PAGE 13

THE CAMP FIRE
Trapped in Paradise
SEE PAGE 16

SMALL GROUP PRACTICE
Building a Community ED Practice
SEE PAGE 18

WILEY

American College of Emergency Physicians®
ADVANCING EMERGENCY CARE

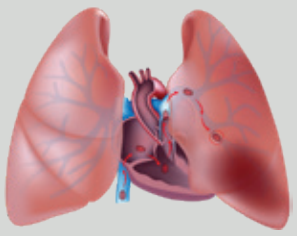
ACEP Now

The Official Voice of Emergency Medicine

MARCH 2019 Volume 38 Number 3 FACEBOOK/ACEPFAN TWITTER/ACEPNOW ACEPNOW.COM

PLUS

TOX Q&A
BAD NEWS BEANS
SEE PAGE 8



EM CASES
A RATIONAL APPROACH TO PE TESTING
SEE PAGE 26

FIND IT ONLINE
For more clinical stories and practice trends, plus commentary and opinion pieces, go to:
www.acepnow.com

DISASTER TELEMEDICINE

Hurricane Florence and the use of telemedicine

by BOBBY PARK, MD; CHELSEA RAEGEN; SCOTT CAFLISCH; AND MICHAEL GRANOVSKY, MD

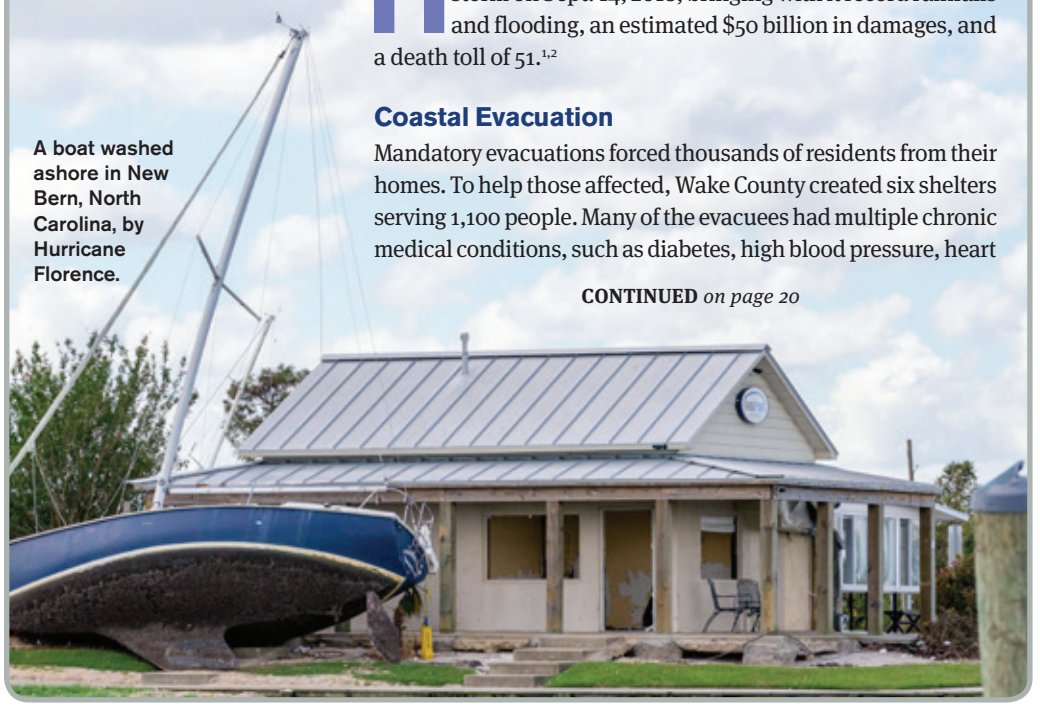
A Devastating Storm

Hurricane Florence struck North Carolina as a Category 1 storm on Sept. 14, 2018, bringing with it record rainfalls and flooding, an estimated $50 billion in damages, and a death toll of 51.[1,2]

Coastal Evacuation

Mandatory evacuations forced thousands of residents from their homes. To help those affected, Wake County created six shelters serving 1,100 people. Many of the evacuees had multiple chronic medical conditions, such as diabetes, high blood pressure, heart

CONTINUED *on page 20*



A boat washed ashore in New Bern, North Carolina, by Hurricane Florence.

FEMA/LIZ ROLL

A SCRIBE'S JOURNEY

For one medical student, a job as a scribe was the pathway to medicine

by SKYLER E. SMITH

I turned 18 in the emergency department. The charge nurse surprised me with a cake, and as the clock struck midnight, I celebrated my entry into adulthood, and legal overtime, with my emergency department family.

I began work as a scribe roughly two weeks after I graduated from high school. I suppose that I, more or less, grew up in the emergency department. My father was the medical director of our local department, and I was quite familiar with afternoons spent at "Daddy's house." My first shift in the emergency department was filled with sheer excitement rather than nervousness; I was finally working among the heroes. I had so much to learn! Over the course of four years and 4,500 hours in our hospital, I would forgo many other life events. I have no regrets; working is learning, and learning is addictive. Each shift and each physician brought a new set of skills and life

CONTINUED *on page 15*

PERIODICAL

ACEP Now The Official Voice of Emergency Medicine

JOHN WILEY & SONS, INC.
Journal Customer Services
111 River Street
Hoboken, NJ 07030-5790

If you have changed your address or wish to contact us, please visit our website *www.wileycustomerhelp.com*

Are you aware of the variety of support resources available for ELIQUIS patients?

Think ELIQUIS for the treatment of DVT/PE.

DVT: deep vein thrombosis; PE: pulmonary embolism.

INDICATIONS

ELIQUIS is indicated for the treatment of deep vein thrombosis (DVT) and pulmonary embolism (PE), and to reduce the risk of recurrent DVT and PE following initial therapy.

IMPORTANT SAFETY INFORMATION

WARNING: (A) PREMATURE DISCONTINUATION OF ELIQUIS INCREASES THE RISK OF THROMBOTIC EVENTS, (B) SPINAL/EPIDURAL HEMATOMA

(A) Premature discontinuation of any oral anticoagulant, including ELIQUIS, increases the risk of thrombotic events. If anticoagulation with ELIQUIS is discontinued for a reason other than pathological bleeding or completion of a course of therapy, consider coverage with another anticoagulant.

(B) Epidural or spinal hematomas may occur in patients treated with ELIQUIS who are receiving neuraxial anesthesia or undergoing spinal puncture. These hematomas may result in long-term or permanent paralysis. Consider these risks when scheduling patients for spinal procedures. Factors that can increase the risk of developing epidural or spinal hematomas in these patients include:

- **use of indwelling epidural catheters**
- **concomitant use of other drugs that affect hemostasis, such as nonsteroidal anti-inflammatory drugs (NSAIDs), platelet inhibitors, other anticoagulants**
- **a history of traumatic or repeated epidural or spinal punctures**
- **a history of spinal deformity or spinal surgery**
- **optimal timing between the administration of ELIQUIS and neuraxial procedures is not known**

Monitor patients frequently for signs and symptoms of neurological impairment. If neurological compromise is noted, urgent treatment is necessary.

Consider the benefits and risks before neuraxial intervention in patients anticoagulated or to be anticoagulated.

IMPORTANT SAFETY INFORMATION

CONTRAINDICATIONS

- Active pathological bleeding
- Severe hypersensitivity reaction to ELIQUIS (e.g., anaphylactic reactions)

WARNINGS AND PRECAUTIONS

- **Increased Risk of Thrombotic Events after Premature Discontinuation:** Premature discontinuation of any oral anticoagulant, including ELIQUIS, in the absence of adequate alternative anticoagulation increases the risk of thrombotic events. An increased rate of stroke was observed during the transition from ELIQUIS to warfarin in clinical trials in atrial fibrillation patients. If ELIQUIS is discontinued for a reason other than pathological bleeding or completion of a course of therapy, consider coverage with another anticoagulant.
- **Bleeding Risk:** ELIQUIS increases the risk of bleeding and can cause serious, potentially fatal, bleeding.
  - Concomitant use of drugs affecting hemostasis increases the risk of bleeding, including aspirin and other antiplatelet agents, other anticoagulants, heparin, thrombolytic agents, SSRIs, SNRIs, and NSAIDs.
  - Advise patients of signs and symptoms of blood loss and to report them immediately or go to an emergency room. Discontinue ELIQUIS in patients with active pathological hemorrhage.
  - The anticoagulant effect of apixaban can be expected to persist for at least 24 hours after the last dose (i.e., about two half-lives). An agent to reverse the anti-factor Xa activity of apixaban is available. Please visit www.andexxa.com for more information on availability of a reversal agent.
- **Spinal/Epidural Anesthesia or Puncture:** Patients treated with ELIQUIS undergoing spinal/epidural anesthesia or puncture may develop an epidural or spinal hematoma which can result in long-term or permanent paralysis.

  The risk of these events may be increased by the postoperative use of indwelling epidural catheters or the concomitant use of medicinal products affecting hemostasis. Indwelling epidural or intrathecal catheters should not be removed earlier than

Eliquis® (apixaban) tablets 5mg 2.5mg

In the hospital. At discharge. At home.
Consider ELIQUIS.

To learn more about transition of care resources, contact your ELIQUIS representative or call

1-855-ELIQUIS

IMPORTANT SAFETY INFORMATION

WARNINGS AND PRECAUTIONS (cont'd)

24 hours after the last administration of ELIQUIS.
The next dose of ELIQUIS should not be administered earlier than 5 hours after the removal of the catheter. The risk may also be increased by traumatic or repeated epidural or spinal puncture. If traumatic puncture occurs, delay the administration of ELIQUIS for 48 hours.

Monitor patients frequently and if neurological compromise is noted, urgent diagnosis and treatment is necessary. Physicians should consider the potential benefit versus the risk of neuraxial intervention in ELIQUIS patients.

- **Prosthetic Heart Valves:** The safety and efficacy of ELIQUIS have not been studied in patients with prosthetic heart valves and is not recommended in these patients.
- **Acute PE in Hemodynamically Unstable Patients or Patients who Require Thrombolysis or Pulmonary Embolectomy:** Initiation of ELIQUIS is not recommended as an alternative to unfractionated heparin for the initial treatment of patients with PE who present with hemodynamic instability or who may receive thrombolysis or pulmonary embolectomy.

ADVERSE REACTIONS

- The most common and most serious adverse reactions reported with ELIQUIS were related to bleeding.

TEMPORARY INTERRUPTION FOR SURGERY AND OTHER INTERVENTIONS

- ELIQUIS should be discontinued at least 48 hours prior to elective surgery or invasive procedures with a moderate or high risk of unacceptable or clinically significant bleeding. ELIQUIS should be discontinued at least 24 hours prior to elective surgery or invasive procedures with a low risk of bleeding or where the bleeding would be noncritical in location and easily controlled. Bridging anticoagulation during the 24 to 48 hours after stopping ELIQUIS and prior to the intervention is not generally required. ELIQUIS should be restarted after the surgical or other procedures as soon as adequate hemostasis has been established.

IMPORTANT SAFETY INFORMATION

DRUG INTERACTIONS

- **Combined P-gp and Strong CYP3A4 Inhibitors:** Inhibitors of P-glycoprotein (P-gp) and cytochrome P450 3A4 (CYP3A4) increase exposure to apixaban and increase the risk of bleeding. For patients receiving ELIQUIS doses of 5 mg or 10 mg twice daily, reduce the dose of ELIQUIS by 50% when ELIQUIS is coadministered with drugs that are combined P-gp and strong CYP3A4 inhibitors (e.g., ketoconazole, itraconazole, or ritonavir). In patients already taking 2.5 mg twice daily, avoid coadministration of ELIQUIS with combined P-gp and strong CYP3A4 inhibitors.

  Clarithromycin
  Although clarithromycin is a combined P-gp and strong CYP3A4 inhibitor, pharmacokinetic data suggest that no dose adjustment is necessary with concomitant administration with ELIQUIS.
- **Combined P-gp and Strong CYP3A4 Inducers:** Avoid concomitant use of ELIQUIS with combined P-gp and strong CYP3A4 inducers (e.g., rifampin, carbamazepine, phenytoin, St. John's wort) because such drugs will decrease exposure to apixaban.
- **Anticoagulants and Antiplatelet Agents:** Coadministration of antiplatelet agents, fibrinolytics, heparin, aspirin, and chronic NSAID use increases the risk of bleeding. APPRAISE-2, a placebo-controlled clinical trial of apixaban in high-risk post-acute coronary syndrome patients treated with aspirin or the combination of aspirin and clopidogrel, was terminated early due to a higher rate of bleeding with apixaban compared to placebo.

PREGNANCY CATEGORY B

- There are no adequate and well-controlled studies of ELIQUIS in pregnant women. Treatment is likely to increase the risk of hemorrhage during pregnancy and delivery. ELIQUIS should be used during pregnancy only if the potential benefit outweighs the potential risk to the mother and fetus.

Please see Brief Summary of Full Prescribing Information, including **Boxed WARNINGS**, on adjacent pages.

Bristol-Myers Squibb Pfizer

ELIQUIS® (apixaban) tablets, for oral use ℞ **ONLY**

Brief Summary of Prescribing Information. For complete prescribing information consult official package insert.

WARNING: (A) PREMATURE DISCONTINUATION OF ELIQUIS INCREASES THE RISK OF THROMBOTIC EVENTS

(B) SPINAL/EPIDURAL HEMATOMA

(A) PREMATURE DISCONTINUATION OF ELIQUIS INCREASES THE RISK OF THROMBOTIC EVENTS

Premature discontinuation of any oral anticoagulant, including ELIQUIS, increases the risk of thrombotic events. If anticoagulation with ELIQUIS is discontinued for a reason other than pathological bleeding or completion of a course of therapy, consider coverage with another anticoagulant *[see Dosage and Administration, Warnings and Precautions, and Clinical Studies (14.1) in full Prescribing Information]*.

(B) SPINAL/EPIDURAL HEMATOMA

Epidural or spinal hematomas may occur in patients treated with ELIQUIS who are receiving neuraxial anesthesia or undergoing spinal puncture. These hematomas may result in long-term or permanent paralysis. Consider these risks when scheduling patients for spinal procedures. Factors that can increase the risk of developing epidural or spinal hematomas in these patients include:

- **use of indwelling epidural catheters**
- **concomitant use of other drugs that affect hemostasis, such as nonsteroidal anti-inflammatory drugs (NSAIDs), platelet inhibitors, other anticoagulants**
- **a history of traumatic or repeated epidural or spinal punctures**
- **a history of spinal deformity or spinal surgery**
- **optimal timing between the administration of ELIQUIS and neuraxial procedures is not known**

[see Warnings and Precautions]

Monitor patients frequently for signs and symptoms of neurological impairment. If neurological compromise is noted, urgent treatment is necessary *[see Warnings and Precautions]*.

Consider the benefits and risks before neuraxial intervention in patients anticoagulated or to be anticoagulated *[see Warnings and Precautions]*.

INDICATIONS AND USAGE

Reduction of Risk of Stroke and Systemic Embolism in Nonvalvular Atrial Fibrillation— ELIQUIS® (apixaban) is indicated to reduce the risk of stroke and systemic embolism in patients with nonvalvular atrial fibrillation.

Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery— ELIQUIS is indicated for the prophylaxis of deep vein thrombosis (DVT), which may lead to pulmonary embolism (PE), in patients who have undergone hip or knee replacement surgery.

Treatment of Deep Vein Thrombosis—ELIQUIS is indicated for the treatment of DVT.

Treatment of Pulmonary Embolism—ELIQUIS is indicated for the treatment of PE.

Reduction in the Risk of Recurrence of DVT and PE—ELIQUIS is indicated to reduce the risk of recurrent DVT and PE following initial therapy.

DOSAGE AND ADMINISTRATION (Selected information)

Temporary Interruption for Surgery and Other Interventions

ELIQUIS should be discontinued at least 48 hours prior to elective surgery or invasive procedures with a moderate or high risk of unacceptable or clinically significant bleeding *[see Warnings and Precautions]*. ELIQUIS should be discontinued at least 24 hours prior to elective surgery or invasive procedures with a low risk of bleeding or where the bleeding would be non-critical in location and easily controlled. Bridging anticoagulation during the 24 to 48 hours after stopping ELIQUIS and prior to the intervention is not generally required. ELIQUIS should be restarted after the surgical or other procedures as soon as adequate hemostasis has been established. (For complete *Dosage and Administration* section, see full Prescribing Information.)

CONTRAINDICATIONS

ELIQUIS is contraindicated in patients with the following conditions:

- Active pathological bleeding *[see Warnings and Precautions and Adverse Reactions]*
- Severe hypersensitivity reaction to ELIQUIS (e.g., anaphylactic reactions) *[see Adverse Reactions]*

WARNINGS AND PRECAUTIONS

Increased Risk of Thrombotic Events after Premature Discontinuation

Premature discontinuation of any oral anticoagulant, including ELIQUIS, in the absence of adequate alternative anticoagulation increases the risk of thrombotic events. An increased rate of stroke was observed during the transition from ELIQUIS to warfarin in clinical trials in atrial fibrillation patients. If ELIQUIS is discontinued for a reason other than pathological bleeding or completion of a course of therapy, consider coverage with another anticoagulant *[see Dosage and Administration (2.4) and Clinical Studies (14.1) in full Prescribing Information]*.

Bleeding

ELIQUIS increases the risk of bleeding and can cause serious, potentially fatal, bleeding *[see Dosage and Administration (2.1) in full Prescribing Information and Adverse Reactions]*.

Concomitant use of drugs affecting hemostasis increases the risk of bleeding. These include aspirin and other antiplatelet agents, other anticoagulants, heparin, thrombolytic agents, selective serotonin reuptake inhibitors, serotonin norepinephrine reuptake inhibitors, and nonsteroidal anti-inflammatory drugs (NSAIDs) *[see Drug Interactions]*.

Advise patients of signs and symptoms of blood loss and to report them immediately or go to an emergency room. Discontinue ELIQUIS in patients with active pathological hemorrhage.

Reversal of Anticoagulant Effect

An agent to reverse the anti-factor Xa activity of apixaban is available. The pharmacodynamic effect of ELIQUIS can be expected to persist for at least 24 hours after the last dose, i.e., for about two drug half-lives. Prothrombin complex concentrate (PCC), activated prothrombin complex concentrate or recombinant factor VIIa may be considered, but have not been evaluated in clinical studies *[see Clinical Pharmacology (12.2) in full Prescribing Information]*. When PCCs are used, monitoring for the anticoagulation effect of apixaban using a clotting test (PT, INR, or aPTT) or anti-factor Xa (FXa) activity is not useful and is not recommended. Activated oral charcoal reduces absorption of apixaban, thereby lowering apixaban plasma concentration *[see Overdosage]*.

Hemodialysis does not appear to have a substantial impact on apixaban exposure *[see Clinical Pharmacology (12.3) in full Prescribing Information]*. Protamine sulfate and vitamin K are not expected to affect the anticoagulant activity of apixaban. There is no experience with antifibrinolytic agents (tranexamic acid, aminocaproic acid) in individuals receiving apixaban. There is no experience with systemic hemostatics (desmopressin and aprotinin) in individuals receiving apixaban, and they are not expected to be effective as a reversal agent.

Spinal/Epidural Anesthesia or Puncture

When neuraxial anesthesia (spinal/epidural anesthesia) or spinal/epidural puncture is employed, patients treated with antithrombotic agents for prevention of thromboembolic complications are at risk of developing an epidural or spinal hematoma which can result in long-term or permanent paralysis.

The risk of these events may be increased by the postoperative use of indwelling epidural catheters or the concomitant use of medicinal products affecting hemostasis. Indwelling epidural or intrathecal catheters should not be removed earlier than 24 hours after the last administration of ELIQUIS. The next dose of ELIQUIS should not be administered earlier than 5 hours after the removal of the catheter. The risk may also be increased by traumatic or repeated epidural or spinal puncture. If traumatic puncture occurs, delay the administration of ELIQUIS for 48 hours.

Monitor patients frequently for signs and symptoms of neurological impairment (e.g., numbness or weakness of the legs, or bowel or bladder dysfunction). If neurological compromise is noted, urgent diagnosis and treatment is necessary. Prior to neuraxial intervention the physician should consider the potential benefit versus the risk in anticoagulated patients or in patients to be anticoagulated for thromboprophylaxis.

Patients with Prosthetic Heart Valves

The safety and efficacy of ELIQUIS (apixaban) have not been studied in patients with prosthetic heart valves. Therefore, use of ELIQUIS is not recommended in these patients.

Acute PE in Hemodynamically Unstable Patients or Patients who Require Thrombolysis or Pulmonary Embolectomy

Initiation of ELIQUIS is not recommended as an alternative to unfractionated heparin for the initial treatment of patients with PE who present with hemodynamic instability or who may receive thrombolysis or pulmonary embolectomy.

ADVERSE REACTIONS

The following serious adverse reactions are discussed in greater detail in other sections of the prescribing information.

- Increased risk of thrombotic events after premature discontinuation *[see Warnings and Precautions]*
- Bleeding *[see Warnings and Precautions]*
- Spinal/epidural anesthesia or puncture *[see Warnings and Precautions]*

Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

Reduction of Risk of Stroke and Systemic Embolism in Patients with Nonvalvular Atrial Fibrillation

The safety of ELIQUIS was evaluated in the ARISTOTLE and AVERROES studies *[see Clinical Studies (14) in full Prescribing Information]*, including 11,284 patients exposed to ELIQUIS 5 mg twice daily and 602 patients exposed to ELIQUIS 2.5 mg twice daily. The duration of ELIQUIS exposure was ≥12 months for 9375 patients and ≥24 months for 3369 patients in the two studies. In ARISTOTLE, the mean duration of exposure was 89 weeks (>15,000 patient-years). In AVERROES, the mean duration of exposure was approximately 59 weeks (>3000 patient-years).

The most common reason for treatment discontinuation in both studies was for bleeding-related adverse reactions; in ARISTOTLE this occurred in 1.7% and 2.5% of patients treated with ELIQUIS and warfarin, respectively, and in AVERROES, in 1.5% and 1.3% on ELIQUIS and aspirin, respectively.

Bleeding in Patients with Nonvalvular Atrial Fibrillation in ARISTOTLE and AVERROES

Tables 1 and 2 show the number of patients experiencing major bleeding during the treatment period and the bleeding rate (percentage of subjects with at least one bleeding event per 100 patient-years) in ARISTOTLE and AVERROES.

Table 1: Bleeding Events in Patients with Nonvalvular Atrial Fibrillation in ARISTOTLE*

	ELIQUIS N=9088 n (per 100 pt-year)	Warfarin N=9052 n (per 100 pt-year)	Hazard Ratio (95% CI)	P-value
Major†	327 (2.13)	462 (3.09)	0.69 (0.60, 0.80)	<0.0001
Intracranial (ICH)‡	52 (0.33)	125 (0.82)	0.41 (0.30, 0.57)	-
Hemorrhagic stroke§	38 (0.24)	74 (0.49)	0.51 (0.34, 0.75)	-
Other ICH	15 (0.10)	51 (0.34)	0.29 (0.16, 0.51)	-
Gastrointestinal (GI)¶	128 (0.83)	141 (0.93)	0.89 (0.70, 1.14)	-
Fatal**	10 (0.06)	37 (0.24)	0.27 (0.13, 0.53)	-
Intracranial	4 (0.03)	30 (0.20)	0.13 (0.05, 0.37)	-
Non-intracranial	6 (0.04)	7 (0.05)	0.84 (0.28, 2.15)	-

* Bleeding events within each subcategory were counted once per subject, but subjects may have contributed events to multiple endpoints. Bleeding events were counted during treatment or within 2 days of stopping study treatment (on-treatment period).
† Defined as clinically overt bleeding accompanied by one or more of the following: a decrease in hemoglobin of ≥2 g/dL, a transfusion of 2 or more units of packed red blood cells, bleeding at a critical site: intracranial, intraspinal, intraocular, pericardial, intra-articular, intramuscular with compartment syndrome, retroperitoneal or with fatal outcome.
‡ Intracranial bleed includes intracerebral, intraventricular, subdural, and subarachnoid bleeding. Any type of hemorrhagic stroke was adjudicated and counted as an intracranial major bleed.
§ On-treatment analysis based on the safety population, compared to ITT analysis presented in Section 14.
¶ GI bleed includes upper GI, lower GI, and rectal bleeding.
** Fatal bleeding is an adjudicated death with the primary cause of death as intracranial bleeding or non-intracranial bleeding during the on-treatment period.

In ARISTOTLE, the results for major bleeding were generally consistent across most major subgroups including age, weight, $CHADS_2$ score (a scale from 0 to 6 used to estimate risk of stroke, with higher scores predicting greater risk), prior warfarin use, geographic region, and aspirin use at randomization (Figure 1). Subjects treated with apixaban with diabetes bled more (3.0% per year) than did subjects without diabetes (1.9% per year).

Table 2: Bleeding Events in Patients with Nonvalvular Atrial Fibrillation in AVERROES

	ELIQUIS (apixaban) N=2798 n (%/year)	Aspirin N=2780 n (%/year)	Hazard Ratio (95% CI)	P-value
Major	45 (1.41)	29 (0.92)	1.54 (0.96, 2.45)	0.07
Fatal	5 (0.16)	5 (0.16)	0.99 (0.23, 4.29)	-
Intracranial	11 (0.34)	11 (0.35)	0.99 (0.39, 2.51)	-

Events associated with each endpoint were counted once per subject, but subjects may have contributed events to multiple endpoints.

Other Adverse Reactions

Hypersensitivity reactions (including drug hypersensitivity, such as skin rash, and anaphylactic reactions, such as allergic edema) and syncope were reported in <1% of patients receiving ELIQUIS.

Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery

The safety of ELIQUIS has been evaluated in 1 Phase II and 3 Phase III studies including 5924 patients exposed to ELIQUIS 2.5 mg twice daily undergoing major orthopedic surgery of the lower limbs (elective hip replacement or elective knee replacement) treated for up to 38 days.

In total, 11% of the patients treated with ELIQUIS 2.5 mg twice daily experienced adverse reactions.

Bleeding results during the treatment period in the Phase III studies are shown in Table 3. Bleeding was assessed in each study beginning with the first dose of double-blind study drug.

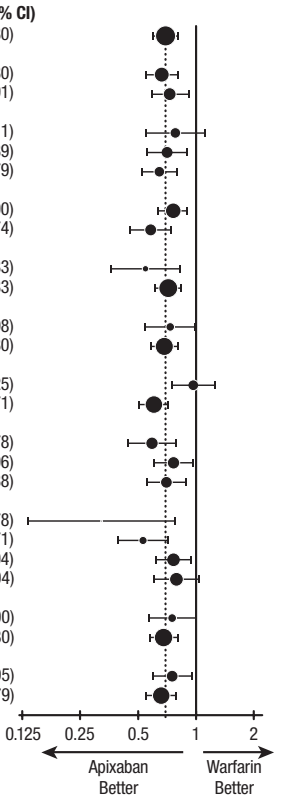
Table 3: Bleeding During the Treatment Period in Patients Undergoing Elective Hip or Knee Replacement Surgery

Bleeding Endpoint*	ADVANCE-3 Hip Replacement Surgery		ADVANCE-2 Knee Replacement Surgery		ADVANCE-1 Knee Replacement Surgery	
	ELIQUIS 2.5 mg po bid 35±3 days	Enoxaparin 40 mg sc qd 35±3 days	ELIQUIS 2.5 mg po bid 12±2 days	Enoxaparin 40 mg sc qd 12±2 days	ELIQUIS 2.5 mg po bid 12±2 days	Enoxaparin 30 mg sc q12h 12±2 days
	First dose 12 to 24 hours post surgery	First dose 9 to 15 hours prior to surgery	First dose 12 to 24 hours post surgery	First dose 9 to 15 hours prior to surgery	First dose 12 to 24 hours post surgery	First dose 12 to 24 hours post surgery
All treated	N=2673	N=2659	N=1501	N=1508	N=1596	N=1588
Major (including surgical site)	22 (0.82%)†	18 (0.68%)	9 (0.60%)‡	14 (0.93%)	11 (0.69%)	22 (1.39%)
Fatal	0	0	0	0	0	1 (0.06%)
Hgb decrease ≥2 g/dL	13 (0.49%)	10 (0.38%)	8 (0.53%)	9 (0.60%)	10 (0.63%)	16 (1.01%)
Transfusion of ≥2 units RBC	16 (0.60%)	14 (0.53%)	5 (0.33%)	9 (0.60%)	9 (0.56%)	18 (1.13%)
Bleed at critical site§	1 (0.04%)	1 (0.04%)	1 (0.07%)	2 (0.13%)	1 (0.06%)	4 (0.25%)
Major + CRNM¶	129 (4.83%)	134 (5.04%)	53 (3.53%)	72 (4.77%)	46 (2.88%)	68 (4.28%)
All	313 (11.71%)	334 (12.56%)	104 (6.93%)	126 (8.36%)	85 (5.33%)	108 (6.80%)

* All bleeding criteria included surgical site bleeding.
† Includes 13 subjects with major bleeding events that occurred before the first dose of apixaban (administered 12 to 24 hours post-surgery).
‡ Includes 5 subjects with major bleeding events that occurred before the first dose of apixaban (administered 12 to 24 hours post-surgery).
§ Intracranial, intraspinal, intraocular, pericardial, an operated joint requiring re-operation or intervention, intramuscular with compartment syndrome, or retroperitoneal. Bleeding into an operated joint requiring re-operation or intervention was present in all patients with this category of bleeding. Events and event rates include one enoxaparin-treated patient in ADVANCE-1 who also had intracranial hemorrhage.
¶ CRNM = clinically relevant nonmajor.

Figure 1: Major Bleeding Hazard Ratios by Baseline Characteristics – ARISTOTLE Study

Subgroup	n of Events / N of Patients (% per year) Apixaban	Warfarin	Hazard Ratio (95% CI)
All Patients	327 / 9088 (2.1)	462 / 9052 (3.1)	0.69 (0.60, 0.80)
Prior Warfarin/VKA Status			
Experienced (57%)	185 / 5196 (2.1)	274 / 5180 (3.2)	0.66 (0.55, 0.80)
Naive (43%)	142 / 3892 (2.2)	188 / 3872 (3.0)	0.73 (0.59, 0.91)
Age			
<65 (30%)	56 / 2723 (1.2)	72 / 2732 (1.5)	0.78 (0.55, 1.11)
≥65 and <75 (39%)	120 / 3529 (2.0)	166 / 3501 (2.8)	0.71 (0.56, 0.89)
≥75 (31%)	151 / 2836 (3.3)	224 / 2819 (5.2)	0.64 (0.52, 0.79)
Sex			
Male (65%)	225 / 5868 (2.3)	294 / 5879 (3.0)	0.76 (0.64, 0.90)
Female (35%)	102 / 3220 (1.9)	168 / 3173 (3.3)	0.58 (0.45, 0.74)
Weight			
≤60 kg (11%)	36 / 1013 (2.3)	62 / 965 (4.3)	0.55 (0.36, 0.83)
>60 kg (89%)	290 / 8043 (2.1)	398 / 8059 (3.0)	0.72 (0.62, 0.83)
Prior Stroke or TIA			
Yes (19%)	77 / 1687 (2.8)	106 / 1735 (3.9)	0.73 (0.54, 0.98)
No (81%)	250 / 7401 (2.0)	356 / 7317 (2.9)	0.68 (0.58, 0.80)
Diabetes Mellitus			
Yes (25%)	112 / 2276 (3.0)	114 / 2250 (3.1)	0.96 (0.74, 1.25)
No (75%)	215 / 6812 (1.9)	348 / 6802 (3.1)	0.60 (0.51, 0.71)
$CHADS_2$ Score			
≤1 (34%)	76 / 3093 (1.4)	126 / 3076 (2.3)	0.59 (0.44, 0.78)
2 (36%)	125 / 3246 (2.3)	163 / 3246 (3.0)	0.76 (0.60, 0.96)
≥3 (30%)	126 / 2749 (2.9)	173 / 2730 (4.1)	0.70 (0.56, 0.88)
Creatinine Clearance			
<30 mL/min (1%)	7 / 136 (3.7)	19 / 132 (11.9)	0.32 (0.13, 0.78)
30-50 mL/min (15%)	66 / 1357 (3.2)	123 / 1380 (6.0)	0.53 (0.39, 0.71)
>50-80 mL/min (42%)	157 / 3807 (2.5)	199 / 3758 (3.2)	0.76 (0.62, 0.94)
>80 mL/min (41%)	96 / 3750 (1.5)	119 / 3746 (1.8)	0.79 (0.61, 1.04)
Geographic Region			
US (19%)	83 / 1716 (2.8)	109 / 1693 (3.8)	0.75 (0.56, 1.00)
Non-US (81%)	244 / 7372 (2.0)	353 / 7359 (2.9)	0.68 (0.57, 0.80)
Aspirin at Randomization			
Yes (31%)	129 / 2846 (2.7)	164 / 2762 (3.7)	0.75 (0.60, 0.95)
No (69%)	198 / 6242 (1.9)	298 / 6290 (2.8)	0.66 (0.55, 0.79)



Note: The figure above presents effects in various subgroups, all of which are baseline characteristics and all of which were prespecified, if not the groupings. The 95% confidence limits that are shown do not take into account how many comparisons were made, nor do they reflect the effect of a particular factor after adjustment for all other factors. Apparent homogeneity or heterogeneity among groups should not be over-interpreted.

Adverse reactions occurring in ≥1% of patients undergoing hip or knee replacement surgery in the 1 Phase II study and the 3 Phase III studies are listed in Table 4.

Table 4: Adverse Reactions Occurring in ≥1% of Patients in Either Group Undergoing Hip or Knee Replacement Surgery

	ELIQUIS (apixaban), n (%) 2.5 mg po bid N=5924	Enoxaparin, n (%) 40 mg sc qd or 30 mg sc q12h N=5904
Nausea	153 (2.6)	159 (2.7)
Anemia (including postoperative and hemorrhagic anemia, and respective laboratory parameters)	153 (2.6)	178 (3.0)
Contusion	83 (1.4)	115 (1.9)
Hemorrhage (including hematoma, and vaginal and urethral hemorrhage)	67 (1.1)	81 (1.4)
Postprocedural hemorrhage (including postprocedural hematoma, wound hemorrhage, vessel puncture-site hematoma and catheter-site hemorrhage)	54 (0.9)	60 (1.0)
Transaminases increased (including alanine aminotransferase increased and alanine aminotransferase abnormal)	50 (0.8)	71 (1.2)
Aspartate aminotransferase increased	47 (0.8)	69 (1.2)
Gamma-glutamyltransferase increased	38 (0.6)	65 (1.1)

Less common adverse reactions in apixaban-treated patients undergoing hip or knee replacement surgery occurring at a frequency of ≥0.1% to <1%:

Blood and lymphatic system disorders: thrombocytopenia (including platelet count decreases)

Vascular disorders: hypotension (including procedural hypotension)

Respiratory, thoracic, and mediastinal disorders: epistaxis

Gastrointestinal disorders: gastrointestinal hemorrhage (including hematemesis and melena), hematochezia

Hepatobiliary disorders: liver function test abnormal, blood alkaline phosphatase increased, blood bilirubin increased

Renal and urinary disorders: hematuria (including respective laboratory parameters)

Injury, poisoning, and procedural complications: wound secretion, incision-site hemorrhage (including incision-site hematoma), operative hemorrhage

Less common adverse reactions in apixaban-treated patients undergoing hip or knee replacement surgery occurring at a frequency of <0.1%:

Gingival bleeding, hemoptysis, hypersensitivity, muscle hemorrhage, ocular hemorrhage (including conjunctival hemorrhage), rectal hemorrhage

Treatment of DVT and PE and Reduction in the Risk of Recurrence of DVT or PE

The safety of ELIQUIS has been evaluated in the AMPLIFY and AMPLIFY-EXT studies, including 2676 patients exposed to ELIQUIS 10 mg twice daily, 3359 patients exposed to ELIQUIS 5 mg twice daily, and 840 patients exposed to ELIQUIS 2.5 mg twice daily.

Common adverse reactions (≥1%) were gingival bleeding, epistaxis, contusion, hematuria, rectal hemorrhage, hematoma, menorrhagia, and hemoptysis.

AMPLIFY Study

The mean duration of exposure to ELIQUIS was 154 days and to enoxaparin/warfarin was 152 days in the AMPLIFY study. Adverse reactions related to bleeding occurred in 417 (15.6%) ELIQUIS-treated patients compared to 661 (24.6%) enoxaparin/warfarin-treated patients. The discontinuation rate due to bleeding events was 0.7% in the ELIQUIS-treated patients compared to 1.7% in enoxaparin/warfarin-treated patients in the AMPLIFY study.

In the AMPLIFY study, ELIQUIS was statistically superior to enoxaparin/warfarin in the primary safety endpoint of major bleeding (relative risk 0.31, 95% CI [0.17, 0.55], P-value <0.0001).

Bleeding results from the AMPLIFY study are summarized in Table 5.

Table 5: Bleeding Results in the AMPLIFY Study

	ELIQUIS N=2676 n (%)	Enoxaparin/Warfarin N=2689 n (%)	Relative Risk (95% CI)
Major	15 (0.6)	49 (1.8)	0.31 (0.17, 0.55) p<0.0001
CRNM*	103 (3.9)	215 (8.0)	
Major + CRNM	115 (4.3)	261 (9.7)	
Minor	313 (11.7)	505 (18.8)	
All	402 (15.0)	676 (25.1)	

* CRNM = clinically relevant nonmajor bleeding.
Events associated with each endpoint were counted once per subject, but subjects may have contributed events to multiple endpoints.

Adverse reactions occurring in ≥1% of patients in the AMPLIFY study are listed in Table 6.

Table 6: Adverse Reactions Occurring in ≥1% of Patients Treated for DVT and PE in the AMPLIFY Study

	ELIQUIS N=2676 n (%)	Enoxaparin/Warfarin N=2689 n (%)
Epistaxis	77 (2.9)	146 (5.4)
Contusion	49 (1.8)	97 (3.6)
Hematuria	46 (1.7)	102 (3.8)
Menorrhagia	38 (1.4)	30 (1.1)
Hematoma	35 (1.3)	76 (2.8)
Hemoptysis	32 (1.2)	31 (1.2)
Rectal hemorrhage	26 (1.0)	39 (1.5)
Gingival bleeding	26 (1.0)	50 (1.9)

AMPLIFY-EXT Study

The mean duration of exposure to ELIQUIS was approximately 330 days and to placebo was 312 days in the AMPLIFY-EXT study. Adverse reactions related to bleeding occurred in 219 (13.3%) ELIQUIS-treated patients compared to 72 (8.7%) placebo-treated patients. The discontinuation rate due to bleeding events was approximately 1% in the ELIQUIS-treated patients compared to 0.4% in those patients in the placebo group in the AMPLIFY-EXT study.

Bleeding results from the AMPLIFY-EXT study are summarized in Table 7.

Table 7: Bleeding Results in the AMPLIFY-EXT Study

	ELIQUIS (apixaban) 2.5 mg bid N=840 n (%)	ELIQUIS 5 mg bid N=811 n (%)	Placebo N=826 n (%)
Major	2 (0.2)	1 (0.1)	4 (0.5)
CRNM*	25 (3.0)	34 (4.2)	19 (2.3)
Major + CRNM	27 (3.2)	35 (4.3)	22 (2.7)
Minor	75 (8.9)	98 (12.1)	58 (7.0)
All	94 (11.2)	121 (14.9)	74 (9.0)

* CRNM = clinically relevant nonmajor bleeding.
Events associated with each endpoint were counted once per subject, but subjects may have contributed events to multiple endpoints.

Adverse reactions occurring in ≥1% of patients in the AMPLIFY-EXT study are listed in Table 8.

Table 8: Adverse Reactions Occurring in ≥1% of Patients Undergoing Extended Treatment for DVT and PE in the AMPLIFY-EXT Study

	ELIQUIS 2.5 mg bid N=840 n (%)	ELIQUIS 5 mg bid N=811 n (%)	Placebo N=826 n (%)
Epistaxis	13 (1.5)	29 (3.6)	9 (1.1)
Hematuria	12 (1.4)	17 (2.1)	9 (1.1)
Hematoma	13 (1.5)	16 (2.0)	10 (1.2)
Contusion	18 (2.1)	18 (2.2)	18 (2.2)
Gingival bleeding	12 (1.4)	9 (1.1)	3 (0.4)

Other Adverse Reactions

Less common adverse reactions in ELIQUIS-treated patients in the AMPLIFY or AMPLIFY-EXT studies occurring at a frequency of ≥0.1% to <1%:

Blood and lymphatic system disorders: hemorrhagic anemia

Gastrointestinal disorders: hematochezia, hemorrhoidal hemorrhage, gastrointestinal hemorrhage, hematemesis, melena, anal hemorrhage

Injury, poisoning, and procedural complications: wound hemorrhage, postprocedural hemorrhage, traumatic hematoma, periorbital hematoma

Musculoskeletal and connective tissue disorders: muscle hemorrhage

Reproductive system and breast disorders: vaginal hemorrhage, metrorrhagia, menometrorrhagia, genital hemorrhage

Vascular disorders: hemorrhage

Skin and subcutaneous tissue disorders: ecchymosis, skin hemorrhage, petechiae

Eye disorders: conjunctival hemorrhage, retinal hemorrhage, eye hemorrhage

Investigations: blood urine present, occult blood positive, occult blood, red blood cells urine positive

General disorders and administration-site conditions: injection-site hematoma, vessel puncture-site hematoma

DRUG INTERACTIONS

Apixaban is a substrate of both CYP3A4 and P-gp. Inhibitors of CYP3A4 and P-gp increase exposure to apixaban and increase the risk of bleeding. Inducers of CYP3A4 and P-gp decrease exposure to apixaban and increase the risk of stroke and other thromboembolic events.

Combined P-gp and Strong CYP3A4 Inhibitors

For patients receiving ELIQUIS 5 mg or 10 mg twice daily, the dose of ELIQUIS should be decreased by 50% when coadministered with drugs that are combined P-gp and strong CYP3A4 inhibitors (e.g., ketoconazole, itraconazole, ritonavir) *[see Dosage and Administration (2.5) and Clinical Pharmacology (12.3) in full Prescribing Information]*.

For patients receiving ELIQUIS at a dose of 2.5 mg twice daily, avoid coadministration with combined P-gp and strong CYP3A4 inhibitors *[see Dosage and Administration (2.5) and Clinical Pharmacology (12.3) in full Prescribing Information]*.

Clarithromycin

Although clarithromycin is a combined P-gp and strong CYP3A4 inhibitor, pharmacokinetic data suggest that no dose adjustment is necessary with concomitant administration with ELIQUIS *[see Clinical Pharmacology (12.3) in full Prescribing Information]*.

Combined P-gp and Strong CYP3A4 Inducers

Avoid concomitant use of ELIQUIS with combined P-gp and strong CYP3A4 inducers (e.g., rifampin, carbamazepine, phenytoin, St. John's wort) because such drugs will decrease exposure to apixaban *[see Clinical Pharmacology (12.3) in full Prescribing Information]*.

Anticoagulants and Antiplatelet Agents

Coadministration of antiplatelet agents, fibrinolytics, heparin, aspirin, and chronic NSAID use increases the risk of bleeding.

APPRAISE-2, a placebo-controlled clinical trial of apixaban in high-risk, post-acute coronary syndrome patients treated with aspirin or the combination of aspirin and clopidogrel, was terminated early due to a higher rate of bleeding with apixaban compared to placebo. The rate of ISTH major bleeding was 2.8% per year with apixaban versus 0.6% per year with placebo in patients receiving single antiplatelet therapy and was 5.9% per year with apixaban versus 2.5% per year with placebo in those receiving dual antiplatelet therapy.

In ARISTOTLE, concomitant use of aspirin increased the bleeding risk on ELIQUIS from 1.8% per year to 3.4% per year and concomitant use of aspirin and warfarin increased the bleeding risk from 2.7% per year to 4.6% per year. In this clinical trial, there was limited (2.3%) use of dual antiplatelet therapy with ELIQUIS.

USE IN SPECIFIC POPULATIONS

Pregnancy

Pregnancy Category B

There are no adequate and well-controlled studies of ELIQUIS in pregnant women. Treatment is likely to increase the risk of hemorrhage during pregnancy and delivery. ELIQUIS should be used during pregnancy only if the potential benefit outweighs the potential risk to the mother and fetus.

Treatment of pregnant rats, rabbits, and mice after implantation until the end of gestation resulted in fetal exposure to apixaban, but was not associated with increased risk for fetal malformations or toxicity. No maternal or fetal deaths were attributed to bleeding. Increased incidence of maternal bleeding was observed in mice, rats, and rabbits at maternal exposures that were 19, 4, and 1 times, respectively, the human exposure of unbound drug, based on area under plasma-concentration time curve (AUC) comparisons at the maximum recommended human dose (MRHD) of 10 mg (5 mg twice daily).

Labor and Delivery

Safety and effectiveness of ELIQUIS during labor and delivery have not been studied in clinical trials. Consider the risks of bleeding and of stroke in using ELIQUIS in this setting *[see Warnings and Precautions]*.

Treatment of pregnant rats from implantation (gestation Day 7) to weaning (lactation Day 21) with apixaban at a dose of 1000 mg/kg (about 5 times the human exposure based on unbound apixaban) did not result in death of offspring or death of mother rats during labor in association with uterine bleeding. However, increased incidence of maternal bleeding, primarily during gestation, occurred at apixaban doses of ≥25 mg/kg, a dose corresponding to ≥1.3 times the human exposure.

Nursing Mothers

It is unknown whether apixaban or its metabolites are excreted in human milk. Rats excrete apixaban in milk (12% of the maternal dose).

Women should be instructed either to discontinue breastfeeding or to discontinue ELIQUIS (apixaban) therapy, taking into account the importance of the drug to the mother.

Pediatric Use

Safety and effectiveness in pediatric patients have not been established.

Geriatric Use

Of the total subjects in the ARISTOTLE and AVERROES clinical studies, >69% were 65 years of age and older, and >31% were 75 years of age and older. In the ADVANCE-1, ADVANCE-2, and ADVANCE-3 clinical studies, 50% of subjects were 65 years of age and older, while 16% were 75 years of age and older. In the AMPLIFY and AMPLIFY-EXT clinical studies, >32% of subjects were 65 years of age and older and >13% were 75 years of age and older. No clinically significant differences in safety or effectiveness were observed when comparing subjects in different age groups.

Renal Impairment

Reduction of Risk of Stroke and Systemic Embolism in Patients with Nonvalvular Atrial Fibrillation

The recommended dose is 2.5 mg twice daily in patients with at least two of the following characteristics *[see Dosage and Administration (2.1) in full Prescribing Information]*:

- age greater than or equal to 80 years
- body weight less than or equal to 60 kg
- serum creatinine greater than or equal to 1.5 mg/dL

Patients with End-Stage Renal Disease on Dialysis

Clinical efficacy and safety studies with ELIQUIS did not enroll patients with end-stage renal disease (ESRD) on dialysis. In patients with ESRD maintained on intermittent hemodialysis, administration of ELIQUIS at the usually recommended dose *[see Dosage and Administration (2.1) in full Prescribing Information]* will result in concentrations of apixaban and pharmacodynamic activity similar to those observed in the ARISTOTLE study *[see Clinical Pharmacology (12.3) in full Prescribing Information]*. It is not known whether these concentrations will lead to similar stroke reduction and bleeding risk in patients with ESRD on dialysis as was seen in ARISTOTLE.

Prophylaxis of Deep Vein Thrombosis Following Hip or Knee Replacement Surgery, and Treatment of DVT and PE and Reduction in the Risk of Recurrence of DVT and PE

No dose adjustment is recommended for patients with renal impairment, including those with ESRD on dialysis *[see Dosage and Administration (2.1) in full Prescribing Information]*. Clinical efficacy and safety studies with ELIQUIS did not enroll patients with ESRD on dialysis or patients with a CrCl <15 mL/min; therefore, dosing recommendations are based on pharmacokinetic and pharmacodynamic (anti-FXa activity) data in subjects with ESRD maintained on dialysis *[see Clinical Pharmacology (12.3) in full Prescribing Information]*.

Hepatic Impairment

No dose adjustment is required in patients with mild hepatic impairment (Child-Pugh class A). Because patients with moderate hepatic impairment (Child-Pugh class B) may have intrinsic coagulation abnormalities and there is limited clinical experience with ELIQUIS in these patients, dosing recommendations cannot be provided *[see Clinical Pharmacology (12.2) in full Prescribing Information]*. ELIQUIS is not recommended in patients with severe hepatic impairment (Child-Pugh class C) *[see Clinical Pharmacology (12.2) in full Prescribing Information]*.

OVERDOSAGE

Overdose of ELIQUIS increases the risk of bleeding *[see Warnings and Precautions]*.

In controlled clinical trials, orally administered apixaban in healthy subjects at doses up to 50 mg daily for 3 to 7 days (25 mg twice daily for 7 days or 50 mg once daily for 3 days) had no clinically relevant adverse effects.

In healthy subjects, administration of activated charcoal 2 and 6 hours after ingestion of a 20-mg dose of apixaban reduced mean apixaban AUC by 50% and 27%, respectively. Thus, administration of activated charcoal may be useful in the management of apixaban overdose or accidental ingestion. An agent to reverse the anti-factor Xa activity of apixaban is available.

PATIENT COUNSELING INFORMATION

Advise patients to read the FDA-approved patient labeling (Medication Guide).

Advise patients of the following:

- Not to discontinue ELIQUIS without talking to their physician first.
- That it might take longer than usual for bleeding to stop, and they may bruise or bleed more easily when treated with ELIQUIS. Advise patients about how to recognize bleeding or symptoms of hypovolemia and of the urgent need to report any unusual bleeding to their physician.
- To tell their physicians and dentists they are taking ELIQUIS, and/or any other product known to affect bleeding (including nonprescription products, such as aspirin or NSAIDs), before any surgery or medical or dental procedure is scheduled and before any new drug is taken.
- If the patient is having neuraxial anesthesia or spinal puncture, inform the patient to watch for signs and symptoms of spinal or epidural hematomas *[see Warnings and Precautions]*. If any of these symptoms occur, advise the patient to seek emergent medical attention.
- To tell their physicians if they are pregnant or plan to become pregnant or are breastfeeding or intend to breastfeed during treatment with ELIQUIS *[see Use in Specific Populations]*.
- How to take ELIQUIS if they cannot swallow, or require a nasogastric tube *[see Dosage and Administration (2.6) in full Prescribing Information]*.
- What to do if a dose is missed *[see Dosage and Administration (2.2) in full Prescribing Information]*.

Marketed by:
Bristol-Myers Squibb Company
Princeton, New Jersey 08543 USA
and
Pfizer Inc
New York, New York 10017 USA

Rev June 2018

432US1801820-04-01

ACEP Now
The Official Voice of Emergency Medicine

INFORMATION FOR SUBSCRIBERS

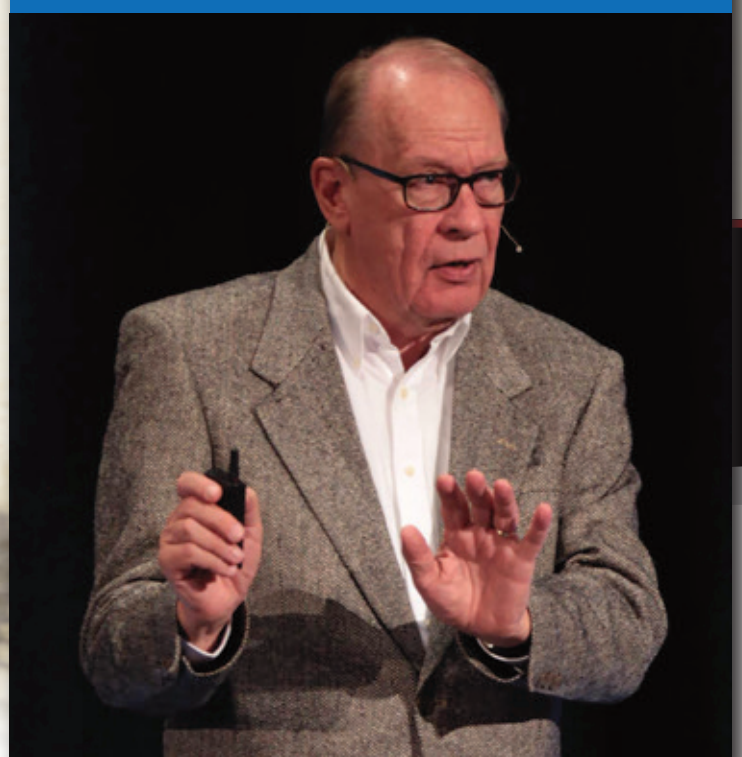
Subscriptions are free for members of ACEP and SEMPA. Free access is also available online at www.acepnow.com. Paid subscriptions are available to all others for $295/year individual. To initiate a paid subscription, email cs-journals@wiley.com or call (800) 835-6770. ACEP Now (ISSN: 2333-259X print; 2333-2603 digital) is published monthly on behalf of the American College of Emergency Physicians by Wiley Subscription Services, Inc., a Wiley Company, 111 River Street, Hoboken, NJ 07030-5774. Periodical postage paid at Hoboken, NJ, and additional offices. Postmaster: Send address changes to ACEP Now, American College of Emergency Physicians, P.O. Box 619911, Dallas, Texas 75261-9911. Readers can email address changes and correspondence to acepnow@acep.org. Printed in the United States by Hess Print Solutions (HPS), Brimfield, OH.

2019 Course Topics

- Concussion - ED Essentials
- Importance of Coronary Risk Scores
- The ED's Role in Treating Opioid Addiction
- Important Pregnancy Factoids
- Learn to Love High Sensitivity Troponins
- Pediatric Fever - Part 1: Diagnostic Testing
- Pediatric Fever - Part 2: Taking It to the Bedside
- Stroke Guideline Controversies 2018 - Part 1
- Stroke Guideline Controversies 2018 - Part 2
- The Geriatric Emergency Department
- Serious Diseases, Outpatient Treatment - Part 1
- Serious Diseases, Outpatient Treatment - Part 2
- Cannabinoids in the ED
- Pediatric Thoracic Trauma
- 2019 Sepsis Update - Part 1
- 2019 Sepsis Update - Part 2
- The 2018 ATLS Guidelines: "What's New"?
- Trauma Care Controversies
- Pearls from *ED Leadership Monthly*
- Pearls from *Risk Management Monthly*
- Intravenous Fluid Controversies
- Pediatric Emergency Medicine Pearls - Part 1
- Pediatric Emergency Medicine Pearls - Part 2
- Telemedicine and the Emergency Physician
- What's New in ED Respiratory Support?
- The Consequences of Shift Work
- Visual Diagnosis Challenges - Part 1
- Visual Diagnosis Challenges - Part 2
- Important Recent EM Literature - Part 1*
- Important Recent EM Literature - Part 2*
- Optimizing ED Operations*
- Diagnostic and Therapeutic Controversies*

*Topics listed with an asterisk (*) are 90-minute faculty panel discussions; all other topics are 30 minutes.

Experience the Course Enjoyed by Over 48,000 of Your Colleagues!



EARLY BIRD DISCOUNT!
Save $50 when you register at least 6 weeks before the live course.

38th Annual Series

Emergency Medicine & Acute Care / 2019

A Critical Appraisal

- ✔ *28 State-of-the-Art Topics*
- ✔ *Four 90-Minute Faculty Panels*
- ✔ *Seasoned Clinical Faculty*
- ✔ *Focused on Clinical Questions*
- ✔ *Literature-Derived Evidence*
- ✔ *Top Dates & Destinations*

Island, Bahamas
February 11 - 15, 2019

enix, Arizona
February 21 - 24, 2019

West, Florida
ruary 25 - March 1, 2019

aui, Hawaii
March 4 - 8, 2019

ville, Tennessee
March 11 - 14, 2019

d, Colorado
March 18 - 22, 2019

Las Vegas, Nevada
April 1 - 4, 2019


San Francisco, California
April 11 - 14, 2019

Orlando, Florida
April 15 - 18, 2019 (Easter Week)


New Orleans, Louisiana
May 1 - 4, 2019 (Jazz Fest)


Hilton Head, South Carolina
May 8 - 11, 2019


San Diego, California
June 4 - 7, 2019


New York, New York
June 13 - 16, 2019


Vancouver, BC, Canada
June 23 - 26, 2019

Learn More Online, Visit **www.EMACourse.com**
or Call **1-800-458-4779**
(9:00am-4:30pm ET, M-F)

Jointly Sponsored by

The Center For Medical Education

CEME
Center for Emergency Medical Educatio

UPDATES AND ALERTS FROM ACEP

NEWS FROM THE COLLEGE

ACEP Presents Framework to Protect Emergency Patients from Out-of-Network Billing

On Jan. 28, 2019, ACEP released a framework of proposed solutions to protect emergency patients from surprise billing. The proposed solutions include:

- Prohibit balance billing
- Streamline the process to ensure patients only have a single point of contact for emergency medical billing and payment
- Ensure the patient responsibility for out-of-network emergency care is no higher than it would be in network
- Require insurers to more clearly convey beneficiary plan details
- Require insurers to more clearly explain policyholders' rights related to emergency care
- Take the patient out of insurer-provider billing disputes

Read the full release with more details about this framework at newsroom.acep.org.

ACEP Board Considers Firearm Safety, Leadership Diversity, and More During January Meeting

In late January, the ACEP Board of Directors met and considered several issues related to practice trends and clinical topics. Among their decisions, they voted in favor of:

- Donating $20,000 to the American Foundation for Firearm Injury Reduction in Medicine (AFFIRM). ACEP has been an inaugural supporter for AFFIRM, a not-for-profit organization founded and led by emergency physicians, and the Emergency Medicine Foundation is offering two grants with AFFIRM this year on firearm injury prevention research.
- Approving two policy statements, "Reporting of Vaccine-Related Adverse Events" and "Autonomous Self-Driving Vehicles," which will be available online soon.
- Approving the joint policy statement "Pediatric Readiness in EMS System," a collaboration with the American Academy of Pediatrics, the National Association of EMS Physicians, the Emergency Nurses Association, the Pediatric Emergency Medicine Committee, the EMS Committee, and other stakeholders. It will be available after all groups approve the final draft.
- Accepting a final report from the Leadership Diversity Task Force that outlines many steps taken to increase diversity in ACEP leadership positions, including:
  - » Tracking and reporting diversity data pertaining to ACEP leadership.
  - » Recommending that the Council Steering Committee eliminate campaign-related travel, which is seen as an economic- and time-related hardship and deterrent for some candidates.
  - » Recommending that the Nominating Committee expand the Council Standing Rules to include additional facets of diversity as considerations when reviewing potential candidates.
  - » Codifying the Leadership Development Advisory Committee.
  - » Naming two College awards after pioneering female emergency physicians: the Judith E. Tintinalli Award for Outstanding Contribution in Education and the Pamela P. Benson Trailblazer Award.

ACEP is Launching New EM Journal, Seeks New Editor-in-Chief

ACEP is launching a new open-access journal in 2020 and is seeking applicants for editor-in-chief. The editor will participate in the full-scale launch of the journal, including creation of the editorial board and strategic editorial plans. Applications are due March 25. Find more details at www.acep.org/education/journals--publications/annals-of-em/editor-in-chief.

ACEP Members Receive IFEM Awards

Ashley Bean, MD, FACEP, and Gary Gaddis, MD, PhD, FACEP, were honored with the Order of the International Federation for Emergency Medicine (IFEM) during the Congress on Emergency Medicine in Mexico City in June 2018. The Order of the IFEM is given biennially to individuals who have demonstrated an extensive and continuous commitment to the emergency medicine specialty in their country while supporting the development of IFEM. IFEM is an international consortium of more than 60 emergency medicine organizations, including ACEP.

Dr. Bean, associate professor at the University of Arkansas for Medical Sciences in Little Rock, is involved in global health initiatives. She has presented emergency medicine and ultrasound lectures and workshops across five continents and has completed medical service trips to Latin America and Haiti. Dr. Bean serves as a reviewer for the *European Journal of Emergency Medicine* and the *African Journal of Emergency Medicine*, and she's an ACEP International Ambassador.

Dr. Gaddis, a professor of emergency medicine and resident research director at Washington University in St. Louis, is a longtime contributor to emergency medicine in North America, South America, Europe, and Asia. He has chaired conferences, reviewed manuscripts, directed courses, and served on international scientific committees. Dr. Gaddis serves as course director for Emergency Medicine Basic Research Skills (EMBRS).

Comment on Clinical Policy Draft for Acute Headache

The draft "Clinical Policy: Critical Issues in the Evaluation and Management of Adult Patients Presenting to the Emergency Department with Acute Headache," is in the review stage of development and is open for comments until April 1. Submit your comments at www.acep.org/patient-care/clinical-policies/comment-forms/cp-commentform-acute headache.

Make Plans for LAC19

The Leadership & Advocacy Conference (LAC) is coming up May 5–8, 2019, in Washington, D.C., and it's a great opportunity for emergency physicians to advocate for the profession, engage with members of Congress, and connect with other emergency medicine leaders. The first sessions offer leadership training and a deeper dive into policy, and then attendees will take that knowledge to Capitol Hill to meet face-to-face with legislators about key issues affecting emergency medicine. The conference will close with the Solutions Forum, covering emergency medicine–led solutions related to telemedicine and mental health.

New for 2019: ACEP is offering emergency medicine–specific Medication Assisted Treatment Waiver Training and the ED Acute Pain Management Bootcamp at the tail end of LAC. Register at www.acep.org/lac.

TOXICOLOGY Q&A

Bad News Beans

by JASON HACK, MD

QUESTION: Which causes toxicity from this plant: the beans or the oil?

CONTINUED *on page 10*

smith&nephew

RAPID RHINO◇

Epistaxis Products

For epistaxis events, there's only **one** right answer:

RAPID RHINO product by Smith & Nephew.

Smith and Nephew (November)

- Easy placement
- Lubricated removal
- Anterior and posterior options

Reach for RAPID RHINO Epistaxis Products.

Contact your local sales representative or call **1.800.797.6520**.
www.smith-nephew.com/ent
Supporting healthcare professionals for over 150 years.

Toxicology Q&A Answer

QUESTION ON PAGE 8

ANSWER: Both!

The castor plant is a beautiful, large semi-woody shrub that can grow to 40-feet tall in the right environment. The star-shaped leaves can grow more than 2.5 feet across. Each lobed leaf has serrated edges and prominent central veins that vary in color from green to red to white. Many species have glossy green leaves; others can be purplish, dark red, or maroon. The stems are often a striking red color.

The female flower develops a bundle of seed capsules, each about the size of a large walnut, which are covered with soft flexible spines after pollination. They have notable colors of coral pink or red that fade to brown with maturity.

To protect and defend themselves from herbivores, some plants develop innate immune systems. These defense mechanisms include lectins and proteins that act to make the threatening animals ill after ingestion, resulting in future plant avoidance.

Properties

The castor plant has been recognized for thousands of years as having properties that can be used for health benefit but may also be harmful. The two major components are castor oil and ricin.

Ricin: The Poison

Ricin is a poison found naturally in castor beans. A nonmalicious exposure might occur if a castor bean is chewed and swallowed. Mastication releases ricin and causes injury.

Ricin is a natural product that is created from waste material when processing castor beans. It is a heat-labile powder, dissolvable in water or weak acid.

Ricin is a toxalbumin (protein toxin) that is composed of two chains, A and B (the "killer" and the "key"). As a group, they are referred to as ribosome-inactivating proteins (RIPs).

The B chain (key) is a lectin that binds to cell membrane surface glycoproteins and glycolipids, which causes endocytosis and allows ricin to access the cell. Once inside, the A chain (killer) irreversibly inactivates RNA, stopping protein synthesis, leading to cell death.

Ricin is estimated to be 6,000 times more poisonous than cyanide and 12,000 times more poisonous than rattlesnake venom.

One milligram of ricin can kill an adult. The symptoms of human poisoning begin within a few hours of ingestion.

Exposure Route

After ingestion, nonspecific symptoms—including nausea, vomiting, diarrhea, and abdominal pain—develop after approximately 12 hours. Ultimately, this progresses to hypotension, liver failure, renal dysfunction, and may progress to death due to multiple organ failure or cardiovascular collapse. After inhalation, symptoms develop within eight hours and include cough, dyspnea, arthralgias, and fever, which may progress to respiratory distress and death, without other organ system manifestations.

Castor Oil

Castor oil, historically known as Oleum Palmae Christi, comes from the seeds of the *Ricinus communis* plant and has been used therapeutically for centuries. No ricin is thought to remain in the oil and it would be inactivated during extraction due to heating of the oil.

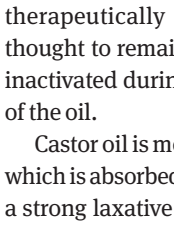
Castor oil is metabolized to ricinoleic acid, which is absorbed in the intestine. This acts as a strong laxative that has been used medicinally dating back to ancient cultures. Castor oil can also induce labor but has a poor safety profile and thus is not used clinically.

Treatment

There is no antidote and no specific treatment for ricin poisoning. The treatment is supportive for the organs affected.

Interesting Facts

- The name *Ricinus* is a Latin word for tick because the seed of the plant has markings and a bump at the end that resemble certain ticks.
- This plant is commonly regarded as one of the most poisonous in the world.
- Four seeds can kill an average-sized adult, while ingestion of lesser amounts has resulted in gastrointestinal symptoms and convulsions.
- Ricin is suspected to have been the poisonous agent used to assassinate Georgi Markov, a Bulgarian journalist who spoke out against the Bulgarian government, in 1978. He was stabbed with the point of an umbrella while waiting at a bus stop in London. His autopsy revealed a perforated metallic pellet embedded in his leg that presumably contained ricin.
- It is advisable to keep children away from the castor bean plant or necklaces made with its seeds.
- Ricin has been used experimentally in medicine to kill cancer cells.



DR. HACK (OLEANDER PHOTOGRAPHY) is an emergency physician and medical toxicologist who enjoys taking photographs of beautiful toxic, medicinal, and benign flowers that he stumbles upon or grows in his garden. Contact him at ToxInRI@gmail.com.

© JASON HACK (OLEANDER PHOTOGRAPHY)

CASTOR BEAN PLANT

Ricinus Communis

COMMON NAMES: **locoweed, angel's trumpet, thorn apple, devil's trumpet, mad apple, stinkweed, sacred datura, green dragon, and devil's trumpet**

RESOURCES FOR FURTHER READING

- Al-Tamimi FA, Hegazi AE. A case of castor bean poisoning. *Sultan Qaboos Univ Med J.* 2008;8(1):83-87.
- Audi J, Belson M, Patel M, et al. Ricin poisoning, a comprehensive review. *JAMA.* 2005;294(18):2342-2351
- Olsnes S. The history of ricin, abrin and related toxins. *Toxicon.* 2004;44:361-370.
- Ricin toxin from Ricinus communis (castor beans). Centers for Disease Control and Prevention website. Available at: https://emergency.cdc.gov/agent/ricin/facts.asp. Accessed Feb. 15, 2019.
- Tunaru S, Althoff TF, Nüsing RM, et al. Castor oil induces laxation and uterus contraction via ricinoleic acid activating prostaglandin EP3 receptors. *Proc Natl Acad Sci U S A.* 2012;109(23):9179-9184.

qSOFA, POCUS, tPA, REBOA, ECPR
Do you KNOW the Resuscitation alphabet?

» Intensive, concise updates to your practice
» Learn the latest guidelines, algorithms and care pathways for your most critical patients
» Avoid pitfalls and learn practical pearls
» Innovative, new curriculum that includes the KEY topics in resuscitation & acute care

Optional Critical Care **Bootcamp** focused on caring for the **ICU boarder** in **YOUR ED**
Optional Cadaver Labs focused on **airway and life-saving procedures**
Optional Advanced **Ultrasound and Echo Workshops**

Learn more and register now at www.resus2019.com

resuscitation
June 25-28, 2019 | Baltimore, MD

ACEP Issues Membership Suspension

Dr. Diane M. Sixsmith has been suspended for violating expert witness guidelines, Code of Ethics

The ACEP Board of Directors suspended Diane M. Sixsmith, MD, FACEP, from ACEP membership for a period of 12 months beginning Jan. 1, 2019, for violations of ACEP's *Expert Witness Guidelines for the Specialty of Emergency Medicine* and the *Code of Ethics for Emergency Physicians*.

Pursuant to ACEP's *Procedures for Addressing Charges of Ethical Violations and Other Misconduct*, any ACEP member may transmit to the Executive Director a request for information regarding the disciplinary actions taken by the College. Such letter shall specify the name of the member or former member who is the subject of the request.

Procedures for Addressing Charges of Ethical Violations and Other Misconduct

ACEP has a formal procedure for reviewing complaints and addressing charges of ethical violations or other misconduct. The procedures can be found online at **www.acep.org/ethicalcomplaints**.

The following is a summary of the procedures:

- A complaint of ethical violations and/or other misconduct may be initiated by an ACEP member, chapter, committee, or section.
- The ACEP Executive Director, in consultation with the ACEP President and the chair of the Bylaws or Ethics Committee, reviews the complaint and determines whether it is frivolous or alleges conduct that may constitute a violation of ACEP Bylaws or a policy or principle included in ACEP's Code of Ethics. If the complaint meets this criterion, it is forwarded to the Bylaws or Ethics Committee, or an appointed subcommittee, for review.
- The respondent is provided with a copy of the complaint, along with any attachments, and has 30 days to respond and submit evidence in his or her defense.
- The appropriate committee, or its subcommittee, will consider whether the alleged action(s) violates the ACEP Bylaws or current ACEP ethics policies, such as the Code of Ethics, which includes ACEP's Expert Witness Guidelines. If it is determined that a violation has occurred, the group will make a recommendation to the Board of Directors as to whether the alleged conduct warrants private censure, public censure, suspension, or expulsion from ACEP.
- The Board of Directors then receives the recommendation of the appropriate committee, the complaint, response, and any submitted supporting documentation, and at a Board meeting determines whether a violation has occurred and if disciplinary action is warranted. The respondent is notified of the decision and may either request a hearing or accept the Board's decision.
- If a hearing is requested, the complainant and respondent each may be represented by counsel or any other person of their choice at the proceedings. The Board will then render a final decision based on the hearing and provide written notice of its decision, along with its basis, to the respondent.

Possible Disciplinary Actions and Disclosure to ACEP Members

- Censure
  - » **Private Censure:** A private letter of censure informs a member that his or her conduct does not conform with the College's ethical standards. ACEP may confirm the censure at the request of an ACEP member. However, contents of the letter will not be provided.
  - » **Public Censure:** A letter of censure shall detail the manner in which the censured member has been found to violate the College's ethical standards. The censure shall be announced in an appropriate ACEP publication. The published announcement shall also state which ACEP bylaw or policy was violated by the member and shall inform ACEP members that they may request further information about the disciplinary action.
- Suspension from ACEP membership shall be for a period of 12 months, after which the suspended member may request reinstatement. The suspension shall be announced in an appropriate ACEP publication. The published announcement shall also state which ACEP bylaw or policy was violated by the member and shall inform ACEP members that they may request further information about the disciplinary action.
- Expulsion from ACEP membership shall be for a period of five years, after which the expelled member may petition the Board for readmission to membership. The expulsion shall be announced in an appropriate ACEP publication. The published announcement shall also state which ACEP bylaw or policy was violated by the member and shall inform ACEP members that they may request further information about the disciplinary action.

GLOBAL POCUS

High-yield ocular ultrasound applications in the emergency department: Part 1

by KATRINA D'AMORE, DO, MPH; SARAH BOLAN, MD; AND NICOLE YUZUK, DO

Part 1 of a 3-part series.

The Case

Monday, 23:00—Your first patient of the night is a 65-year-old male with "no medical problems" who reports loss of vision in his right eye for the past two days. He thought it might just "go away," but now that it hasn't, he has placed his vision in your hands. A quick visual acuity test reveals 20/200 in the affected eye, and your attempt at a funduscopic exam reveals what you would describe as a blur of yellow and red. You have a sense of what is going on with this patient. However, you want more objective information before you speak with the ophthalmologist.

Discussion

The use of ocular ultrasonography for the evaluation of emergency patients has been well-established in the emergency medicine literature. The anatomy of the eye is very complex, but luckily, point-of-care ultrasound (POCUS) can identify the key structures. The eye is a fluid-filled structure, which makes for an easy organ to visualize. With practice, POCUS can easily be incorporated into the workup of patients with ocular complaints to avoid lengthy consultation or other diagnostic tests.

The first application of diagnostic ocular ultrasound was reported by Mundt and Hughes in 1956 when diagnosing an eye tumor. Prior to ultrasound, in vivo ocular lengths and other measurements proved difficult to obtain. However, all the measurements of an eye can now be obtained by a handheld transducer.[1] Today, POCUS is beyond savvy and can essentially replace the dilated funduscopic eye exam for emergency physicians. We will review the normal eye anatomy on ultrasound, techniques for the exam, as well as some high-yield ED applications on our tour of the globe!

Common Emergency Department Application

Structure: Retina

Evaluate for: Retinal Detachment

The retina is a crucial structure to evaluate for patients with visual complaints. In a normal eye, the retina cannot be distinguished from

CONTINUED *on page 15*

Anatomy

When discussing anatomy, the eye is divided into two segments: anterior and posterior. The anterior segment is composed of the cornea, iris, ciliary body, and lens, while the posterior segment contains the vitreous body, posterior layers of the eye (retina, choroid, sclera), and the optic nerve (see Figure 1).

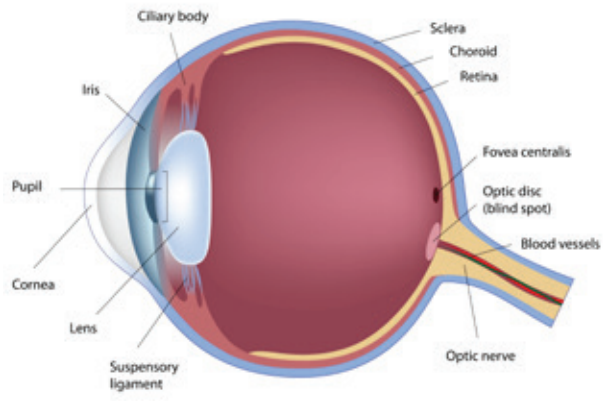


FIGURE 1: Anatomy of the eye.

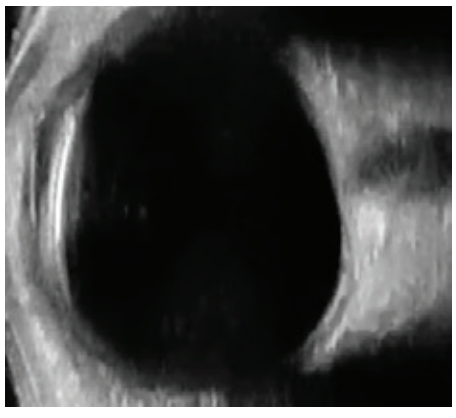


ILLUSTRATION: SHUTTERSTOCK.COM | PHOTOS: NICOLE YUZUK

FIGURE 2: The fluid-filled vitreous body should appear anechoic (black) on ultrasound.

When utilizing POCUS, the majority of your time will be spent visualizing the posterior segment. It is important to note that since the vitreous body is a fluid-filled structure, it should appear anechoic (black) on ultrasound. Hyperechoic (bright white) densities, if not artifact, should alert you to potential pathology (see Figure 2).

Ultrasound Technique

1 Explain this bedside procedure to your patient prior to starting. As this is a dynamic scan, the patient will have to move his or her eyes side to side and up and down to allow complete visualization of the posterior segment.

2 The orbit is a superficial structure. Therefore, a high-frequency linear transducer should be used.

3 For comfort and to prevent a mess, place a Tegaderm film dressing over the patient's closed eye and gently press out any pockets of air. Remember, air is the enemy of ultrasound.

4 When performing ocular ultrasound, a copious amount of gel should be used, which will prevent contact of the transducer with the eyelid and minimize direct pressure. The gel can be applied directly over the Tegaderm (see Figure 3).

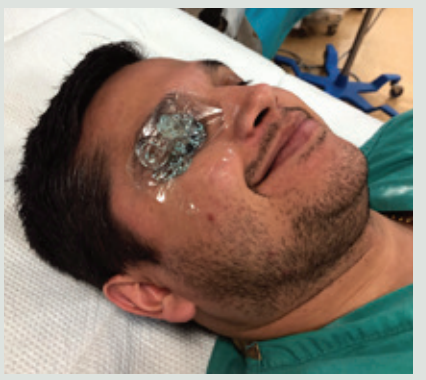


FIGURE 3: Place a Tegaderm film dressing over the patient's closed eye, gently press out any pockets of air, and apply a copious amount of gel directly over the Tegaderm.

5 Visualize the orbit in both transverse (see Figure 4) and longitudinal planes. After scanning through, the patient should be asked to move his or her eye right to left and up and down. A combination of still images and dynamic scanning clips will best document your exam.

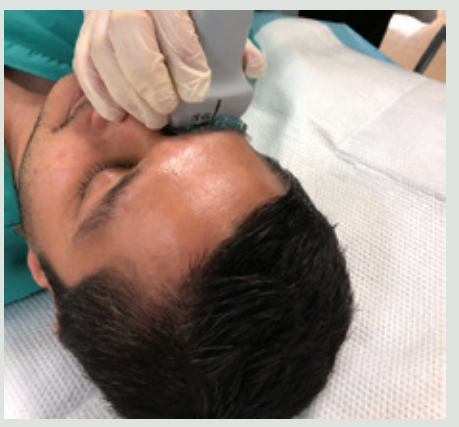


FIGURE 4: Transverse visualization of the orbit.

6 Repeat these steps on the unaffected eye.

7 Contraindications to the exam include high suspicion of globe rupture.

8 Always supplement your ocular POCUS exam with a visual acuity and intraocular pressure measurement for a well-rounded emergency eye exam.

TIPS & TRICKS

Stabilize your scanning hand by placing your thumb or pinky finger (whichever is medial) on the bridge of the patient's nose (see Figure 5). This will also prevent you from applying too much pressure.

FIGURE 5: Stabilize your scanning hand by placing your pinky finger on the bridge of the patient's nose.

ILLUSTRATION: CHRIS WHISSEN PHOTO: ACEP & SHUTTERSTOCK.COM

LET'S EAT!

The Joint Commission clarifies that physicians can eat and drink at ED workstations

by JORDAN GRANTHAM

After concern from ACEP on behalf of our members, The Joint Commission (TJC) has clarified that emergency physicians, contrary to popular belief, can eat and drink at their ED workspaces.

Most emergency physicians have suffered on the job, unable to eat and drink to maintain the energy necessary for long shifts in the emergency department. Caring about our members' well-being, ACEP worked with TJC to issue a formal clarification in the March issue of its newsletter *Perspectives* that explains how the Occupational Safety and Health Administration (OSHA), hospital, and TJC policies work together to protect both clinicians and patients.

"Our job is so hard, for people to make it harder is just unfair," said Sandy Schneider, MD, FACEP, a practicing emergency physician and ACEP's associate executive director of practice. "I think it seems like such a small thing, but ACEP has really done something huge here. Not only has ACEP helped clarify that we can eat and drink, ACEP has also said, 'When we can, we're going to make things better for you.'"

In the article, TJC explained its role in regulating food and drinks in the emergency department. TJC's responsibility is twofold: 1) to make sure facilities are conforming with OSHA regulations and 2) to help enforce each hospital's own internal policies.

TJC standards do not specifically address where staff can have food and drink in work areas. OSHA also does **not** have a prohibition against the consumption of food and beverages at workstations, including those in the emergency department.

"When I started out practicing, we were able to eat and drink during our shift, within reason. Gradually, that was taken away from us, " Dr. Schneider said. "We weren't sure where this was coming from. They kept saying it was The Joint Commission, it was OSHA, we had to do this, it was against the law, etc.

"All I know is ... after a shift, I was tired. My hips and knees hurt. I'd come home and just go to bed. Now, [at my current job], I have a place to eat and drink. I actually work a longer shift, and I see more patients! It's interesting. Just the ability to eat and drink makes you feel more human."

OSHA does have a bloodborne pathogen regulation that forbids eating, drinking, and storing food in areas that could be exposed to blood or potentially infectious materials. OSHA regulations also require hospitals to evaluate work areas to determine which could potentially be contaminated and to ban staff from eating and drinking in those specific areas. On the flip side, OSHA does not require hospitals to create safe eating and drinking zones for staff; that decision is left to each individual hospital.

OSHA sets minimum health and safety regulations, which are then enforced by TJC. However, because they are only considered minimum requirements, hospitals are free to adopt more stringent policies if they choose. If you're an emergency physician who is restricted from eating and drinking in your emergency department, even in areas separate from potential contamination, those policies are likely directed by your hospital, not TJC, Centers for Medicare and Medicaid Services, or OSHA.

"As we start thinking about ways to improve health systems, wellness is so critical, and eating and drinking directly pertain to that," said Erik Blutinger, MD, an emergency medicine resident in Philadelphia and Emergency Medicine Residents' Association representative to the ACEP Board of Directors. "I certainly know that without food and drink, I can't function. I can't think straight, and my thoughts are no longer rational and logical. It's especially important in emergency medicine to be able to eat and drink, given the fact that we can't even step away for a few minutes from the department."

How Can You Work with Your Employer to Change Its Food and Drink Policy?

Start advocating for change by making your hospital's policymakers understand the forces at play regarding this issue. ACEP created a fact sheet that emergency physicians can share with administrators to jump-start this conversation. It explains current OSHA regulations, the role of TJC, and how these factors affect the emergency department. It's possible that your hospital's policies were put into place years ago by previous administrators without full understanding of the regulations. Providing the facts, combined with your firsthand testimony reflecting how hard it is to navigate a stressful shift in the emergency department without once pausing for food or drink, creates a compelling case for change. Visit acep.org/letseat to read more.

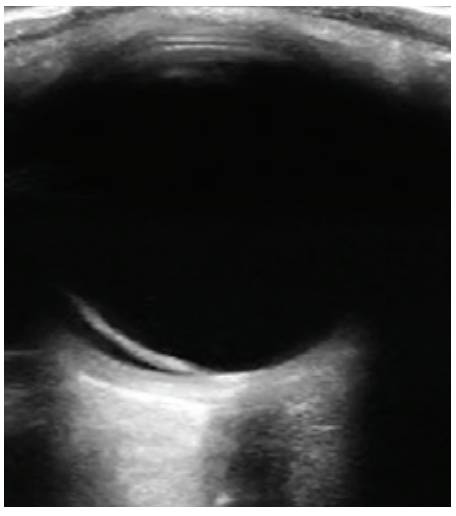
MS. GRANTHAM is a communications manager at ACEP.

GLOBAL POCUS | CONTINUED FROM PAGE 13

the other posterior layers, appearing as one homogenous structure.[2] The retina is anchored at the ora serrata laterally and the optic nerve posteriorly. This will be important later on when distinguishing retinal versus vitreous detachments.

A normal retina should be closely attached to the posterior wall of the globe such that on ultrasound there will be no distinction between the two. In the case of retinal detachment, the retinal membrane will be lifted off the posterior or lateral globe and appear as a hyperechoic (bright white) and sometimes serpiginous membrane (see Figure 6). Because of its firm attachment to the optic disc, a detached retina may take on a funnel-shaped appearance, and you will see it tethered to the optic nerve (see Figure 7). The retina's attachment to the optic nerve posteriorly will be preserved even in the case of a retinal detachment, which is an important detail when distinguishing it from other detachments. With patient eye movements, the membrane may undulate or wave.

Involvement of the macula, in the case of retinal detachment, is a critical piece of information to obtain. The macula contains structures specialized for high-acuity vision and is located perpendicular to the lens. Once you have obtained a clear image of the retinal detachment with the lens included in the image, draw a straight line connecting the middle of the lens to the posterior wall of the globe. The area you encounter is the macula, and if it is still attached, your consult to ophthalmology becomes emergent rather than urgent. Preventing further detachment of the macula is paramount and could be a vision-saving act.



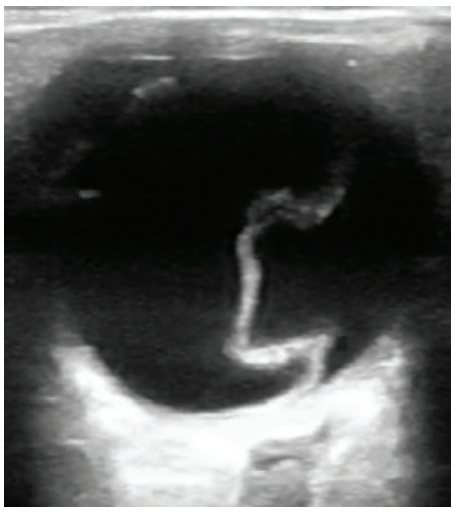


FIGURE 6 (LEFT): In retinal detachment, the retinal membrane will be lifted off of the posterior or lateral globe and appear as a hyperechoic (bright white) and sometimes serpiginous membrane.

FIGURE 7 (RIGHT): A detached retina may take on a funnel-shaped appearance.

POCUS for retinal detachment has been shown to not only be possible but also accurate and precise among emergency physicians. According to a systematic review of the literature, sensitivities range from 97 to 100 percent, and specificities range from 83 to 100 percent. In a study by Blaivas et al, all retinal detachments diagnosed by ocular ultrasound performed by emergency physicians were later confirmed by a formal, masked ophthalmology evaluation, demonstrating its high specificity.[3,4,5]

Tips and Tricks: Be sure to scan through the entire retina and encourage eye movement while scanning as there may be small detachments of the peripheral retina that are easily overlooked.

Case Resolution

So what about the 65-year-old man with acute vision loss? After performing your funduscopic exam, you bring the ultrasound bedside and scan your patient's eye. You immediately notice a retinal detachment and call the ophthalmologist, who is able to see the patient immediately in her office. On the way out, your patient thanks you for your quick diagnostic skills.

Ocular ultrasound is easy to learn and can rapidly assess ocular emergencies. With practice, you can easily incorporate POCUS into your diagnostic algorithm and rule in or out important ocular pathology.

Part 2 will appear in the April issue.

References

1. Lizzi F, Coleman DJ. History of ophthalmic ultrasound. *J Ultrasound Med.* 2004;23(10):1255-1266.
2. Lyon M, Blaivas M. Ocular ultrasound. In: *Emergency Ultrasound.* 2nd ed. New York: McGraw Hill; 2008: 449-462.
3. Jacobsen B, Lahham S, Lahham S, et al. Retrospective review of ocular point-of-care ultrasound for detection of retinal detachment. *West J Emerg Med.* 2016;17(2):196-200.
4. Blaisvas M, Theodoro D, Sierzenski PR. A study of bedside ocular ultrasonography in the emergency department. *Acad Emerg Med.* 2002;9(8):791-799.
5. Vrablik ME, Snead GR, Minnigan HJ, et al. The diagnostic accuracy of bedside ocular ultrasonography for the diagnosis of retinal detachment: a systemic review and meta-analysis. *Ann Emerg Med.* 2015;65(2):199–203.e1.

SCRIBE'S JOURNEY | CONTINUED FROM PAGE 1

lessons. Scribing reaches beyond thorough documentation and increased efficiency. It has become a necessity to both emergency departments and aspiring premed students. As time goes on, their mutual reliance and integration will only increase.

My favorite emergency cases occurred outside of the emergency department. When a good friend crashed his vehicle and laid unconscious, not breathing, it was an emergency physician who met him on the side of the road and provided lifesaving interventions. When a local house collapsed down a mountain and rescue technicians rappelled into the rubble to ensure that children had not been present, it was an ED doc they had waiting on standby. An emergency physician provides their community with the best when they are experiencing their worst. Through these circumstances, I saw that emergency medicine reaches outside of the walls of a hospital and, perhaps, could be the practical field I had dreamed of.

As a scribe, I learned many lessons that prepared me well for medical school. I saw firsthand how to approach a patient with objectivity and deductive reasoning to narrow the differential diagnosis, and I learned how to develop a plan of care based on those considerations. I know the value of thorough documentation, and I am familiar with many of the charting regulations (ICD-10). When I'm faced with a "challenge question" (eg, "Will I need surgery?" "Do I have cancer?" "Am I going to die?"), my professors are always impressed with my emergency medicine approach, encouraging the patient that they are in the right place and we will work together through the history and physical exam to get them to the next correct place.

At times, scribing went beyond documentation. I often assisted in log rolls and other activities that helped the transitional processes for an emergency department to run more smoothly. I am convinced that manipulating a wheelchair and driving a hospital bed should require a license. Other times, I found ways to implement my skills as a scribe outside of a chart. During codes, I often grabbed a marker and recorded times of medications and procedures on the room's whiteboard. I learned to spike fluids and fetch a crash cart. I became part of a team and tried to use my time to fill in the gaps.

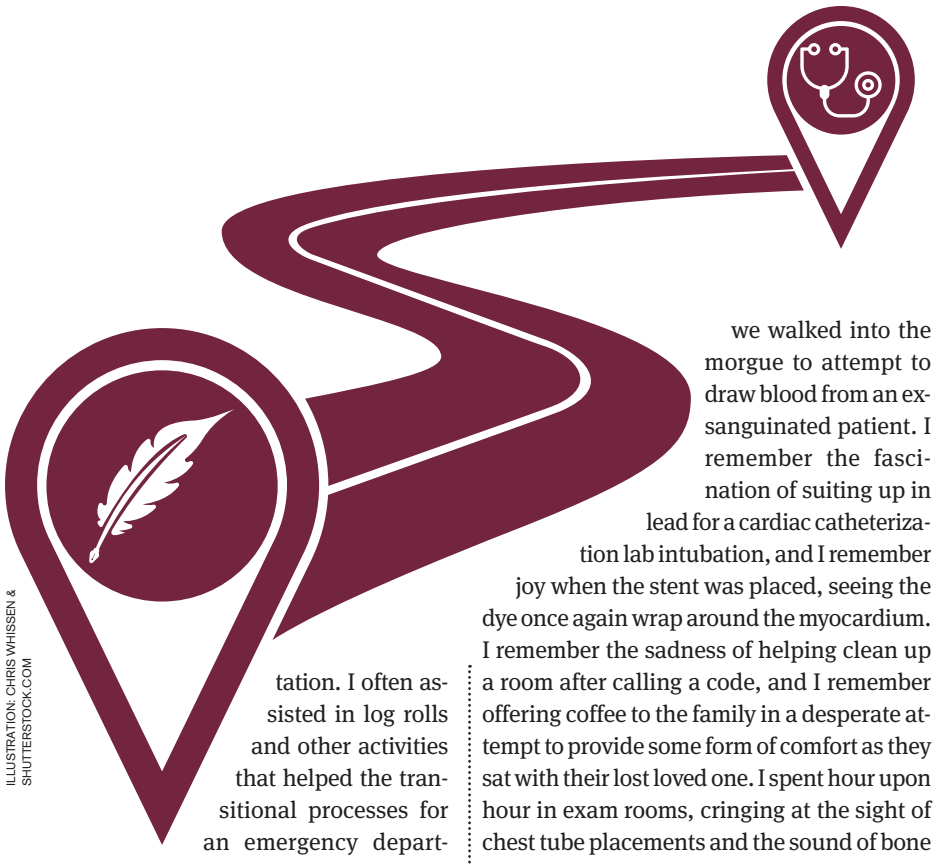


ILLUSTRATION: CHRIS WHISSEN & SHUTTERSTOCK.COM

Truthfully, I trailed my physician and tried to provide any assistance required. This path took me all over the hospital. I remember the feeling in the pit of my stomach when we walked into the morgue to attempt to draw blood from an exsanguinated patient. I remember the fascination of suiting up in lead for a cardiac catheterization lab intubation, and I remember joy when the stent was placed, seeing the dye once again wrap around the myocardium. I remember the sadness of helping clean up a room after calling a code, and I remember offering coffee to the family in a desperate attempt to provide some form of comfort as they sat with their lost loved one. I spent hour upon hour in exam rooms, cringing at the sight of chest tube placements and the sound of bone drills. I learned to identify *Clostridium perfringens* from *Clostridium difficile* simply by smell, and I learned that, sometimes, opening a bag of coffee can help with those smells!

To the physician, I was an extra set of eyes that noted a bruise here, swelling there, or clear fluid draining from an ear in a trauma patient. I was the one who wrote down "left" versus "right." Often, there were things that the physician picked up on that they did not state aloud. These things appeared as gaps in the history, but through inquiring about those details, I learned that you can glean a lot of information without speaking.

While I have gained invaluable clinical experience, the most valuable lessons came from the doctors themselves. Through simple observation, I learned how to break bad news with honesty and tact. I learned to remain calm and collected in the face of urgency. I sat with souls as they slipped from this earth, and I watched soon-to-be parents receive the news of their pregnancy. I saw that a kind word and small act of service can mean the world to someone.

I gravitated most to the physicians whom I found to be willing instructors. Though I came out of my first ECG introduction remembering only the letters "PQRST," I had identified a teacher, and I followed his lead (and his shifts). Often, those willing to take the time to pass along wisdom were also willing to spend time with their patients and the staff. They got water glasses and pillows rather than recommending an aide for the job. Difficult diseases were explained in colloquial terms, and families were allowed to ask questions. They fought for a patient's best interest while still retaining respectful professionalism with peers.

The most valuable thing you can do as a physician is to demonstrate the role of a physician. Be a healer, teacher, and leader. Be astute and analytical and show a propensity for lifelong learning. Be correctable, willing to admit mistakes, and take time to teach those following you all the lessons you've learned. You never know—you just might influence a young kid like me to follow in your footsteps.

MS. SMITH is a second-year medical student at Edward Via College of Osteopathic Medicine in Spartanburg, South Carolina.

Trapped in Paradise

ON THE GROUND DURING THE CAMP FIRE OF 2018

by JUDITH PECK, MD, FACEP

ABOVE LEFT: At 8:41 a.m., the sun was still visible.

ABOVE RIGHT: By 9:07 a.m., the sun was no longer visible

LEFT: Setting up the outdoor emergency department in front of the hospital.

PHOTOS: JUDITH PECK

The town of Paradise, California, burned to the ground on Nov. 8, 2018, in the Camp Fire. It was the most destructive and deadly wildfire ever recorded in the history of California. The risk of fire has always been there. The state is always heading into, living through, or recovering from a drought. Brush fires occur at the end of every summer. Fire has always been a part of life in California. However, large destructive fires are no longer an anomaly. The fire season has evolved into something to be feared, as each new season is worse than the last.

The Camp Fire was well underway as I walked across the parking lot of Feather River Hospital to start my ED shift. Strong winds brought in the scent of smoke and fire. Reports said the gusts were up to 60 mph. That sounds about right. Retrospectively, I can say those were the signs of a destructive wildfire closing in on our hospital, but at the time, I was completely oblivious—and so was everyone else. It was business as usual. Patients were checking into the emergency department. The operating room was running cases. Hospitalists were making rounds. The cafeteria was still serving breakfast.

Evacuation

The fire started about five miles east of the hospital. It spread very fast. Within 90 minutes, embers were falling in the ambulance bay, and the order came through to evacuate. The day had barely started. There was only one intubated patient, and the rest were well enough for discharge.

The ambulance bay was an egress point for the hospital. As staff emptied the hospital, a long line of gurneys snaked its way through the emergency department. There was no time to print off electronic health records. There were no paper charts like in days of old. All the patients had were their ID bracelets and personal effects. It would have been nice if their medical information was encoded into their ID bracelets, but we're a long way off from that kind of technology.

There were about 60 patients and a limited number of ambulances. Critical care patients were evacuated first. When the last ambulance was gone, hospital personnel volunteered to transfer the remaining patients. They drove into the bay, and we loaded up their cars as fast as we could.

Smoke began to extinguish the sun's light (see photos). It was obvious that the fire was getting close because the horizon was glowing. Surprisingly, there was no panic. There were no egos. People worked very well together. The hospital was empty in 45 minutes.

The only escape route was down a narrow two-lane road that was surrounded by fire. It led through miles of dried-up pines. Law enforcement directed us onto the road even though traffic was gridlocked. I learned after the fact that cars had collided with one another in the dense smoke. Burning trees had fallen across the road. Car engines had stalled from the lack of oxygen. Burning vehicles sat abandoned on the road.

The middle of a raging fire is not bright like a campfire. It's black and red. Thick black smoke fills the air. The sun is gone. Visibility is no more than a few feet. The only source of light is a red glow from the surrounding fire. It's a little piece of hell on Earth.

Reality sank in. Escape was impossible. Burning to death seemed to be an absolute certainty. The only unknowns were how bad it would hurt and how long it would take. They say there are no atheists in foxholes. I'd say that holds true in a raging fire.

I learned that there's a certain peace that comes with accepting death as your fate. Ironically, in that moment, my thinking cleared and I remembered my daughter. I couldn't leave her without a mother, so I returned to the hospital. The parking lot was made of asphalt and wouldn't burn. For now, it was safe. My plan was to shelter in place and try to evacuate later.

Back at the Hospital

It wasn't long before elderly couples arrived in their cars. None of them were acutely sick. They were simply there to wait out the fire. At that time, I had absolutely no idea that Cal Fire was out back trying to save the hospital; I didn't know for hours.

Looking back, I wonder if the couples knew something I didn't. Apparent wisdom aside, they were frail. They would need masks, food, and water. The emergency department had all three. So I loaded up a wheelchair and brought it from car to car.

Over time, people trickled in. I made periodic rounds of the parking lot to pass out supplies. On my third or fourth round, I was surprised to find a group of ED nurses sitting in an SUV. I thought they'd escaped. Their cars had caught fire as they made their way through a ravine a few miles down the road. They were forced to turn back on foot.

We set up a makeshift shelter in front of the hospital. Evacuation routes must have intermittently opened up. People stopped by for masks and water before moving on. Their cars showed signs of fire damage: ash, melted brake lights, and blistered paint.

Ambulances returned with critical care patients, and medical personnel returned with medical-surgical patients. Paramedics informed us about a woman in labor headed our way, followed by a patient with 40 percent burns. We expanded the shelter into an outdoor emergency department.

By this time, the back of the hospital was on fire, and the halls were filled with a pungent smoke. Even still, people raided the hospital to get supplies. They returned with gurneys, IV fluids, and crash carts. If it looked useful, people grabbed it. We were very well set up except for a lack of electricity. It looked a lot like a field hospital.

All the while, propane tanks exploded in the distance as the fire got closer. The wind constantly threatened to send the hospital up in flames. And there was the smoke. Always the smoke.

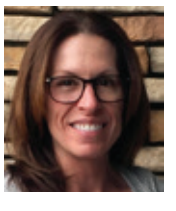
The fire threatened our position, so we moved to the helipad, another large piece of asphalt. Most of the surrounding fuel had burned earlier in the day, so it was relatively safe. We'd be OK if we had to spend the night.

By mid-afternoon, an evacuation route was open. It was surrounded by fire on both sides, but everyone got out.

Reflections

The city of Paradise set up a plan to evacuate its population in the event of a wildfire, but what it got was a hydrogen bomb. The evacuation plan was woefully inadequate. Roads were gridlocked. People were trapped, and some died. Catastrophes of this nature require reflection and an honest evaluation of what went wrong. No doubt, city officials have thought of this every single day since the fire.

Hospitals will continue to get caught in California's large-scale fires. We learned the hard way that evacuation is not always possible. Plans to shelter in place need to be developed. It may not always be possible for hospital personnel to run into a burning building to gather supplies. Thus, emergency kits that are accessible and portable need to be created. The best-laid plans of mice and men often go awry, but we should prepare ourselves as best as possible.



DR. PECK is an emergency physician at Sutter Auburn Faith Hospital in North Auburn, California. During her military career, she practiced combat and disaster medicine in multiple austere environments.

Get Ready for ACEP Wellness Week

From group challenges and organizational cooperation, wellness is a team effort

by DANIEL LAKOFF, MD, FACEP

This year's ACEP Wellness Week is April 7–13, 2019, and our theme is Wellness 2.0—Intelligently Designing Emergency Medicine. The concept of physician well-being has evolved over time, and a tidal wave of support has carried it to the forefront of our priorities in the past few years. We have turned the corner with "physician wellness" from a concept predominantly individual-based (focusing on personal resilience, self-care, and mental health) to a concept that is heavily weighted toward the systemic and operational issues leading to burnout. Appreciating this viewpoint, ACEP has dedicated Wellness Week 2019 to continue to highlight the ways we can drive systemic change and improve the quality of our work-life experience.

This year's initiatives will have a new twist to the format and include group challenges that require preparation time (see below for details). We're also proud to be making this a more coordinated event with increased internal collaboration by having other ACEP committees highlight what they are doing to support physician well-being. Other national emergency medicine organizations will be also be celebrating the week with us, including the Council of Emergency Medicine Residency Directors, Society for Academic Emergency Medicine (SAEM), American College of Osteopathic Emergency Physicians, Emergency Medicine Residents' Association, and SAEM Residents and Medical Students. We're also pleased to have support from the international community, with groups from Australia, Canada, and Turkey that are tackling the same issues. To join what will be vibrant conversations all week, check out the hashtags **#ACEPWW19** and **#iEMWell** and follow the EMDocs and ACEP Facebook groups. All sign-up forms are at **www.acep.org/emwellnessweek.**

DR. LAKOFF is assistant professor of emergency medicine and a healthcare leadership and management fellow at Weill Cornell Medicine in New York City and a member of ACEP's Well-Being Committee.

Challenge Yourself During Wellness Week 2019

Here's what you have to look forward to this year.

1. GROUP CHALLENGES

Start preparing now! For this challenge, we'll be asking wellness champions to lead their department (faculty or staff) or residency program (residents plus faculty) and complete the following items for prizes and recognition:

A) Create and submit your departmental wellness vision and mission statement.

B) Complete a group wellness activity of your choosing from one of the following options, and submit vivid supportive documentation or media demonstrating completion along with a registration form and signed mission statement.

Option 1: Week-Long Step Challenge	Option 2: Demonstration of Wellness Activity Participation	Option 3: Week-Long Gratitude Challenge	Option 4: Week-Long Random Acts of Kindness Challenge
» Select a seven-day period to record steps achieved by your group. » Submit proof of the number of steps achieved by each team member (eg, pictures from a tracking device or app with weekly step count). » Steps will be totaled and then divided by the number of people you designate in your group on your registration form.	» Submit documentation of your group participating in a department-sponsored group wellness activity. » Examples of supportive documentation include a video documentary, photographs (five to 10), a PowerPoint presentation with voiceover, or a written summary. » This activity will be judged on the percentage of members participating and how the activity demonstrates commitment to physician wellness and utilization of resources by group members.	» Select a seven-day period to record things you are grateful for. » Examples include creating a gratitude jar that participants fill with written comments or creating a group message board where members can post what they are grateful for during the week-long challenge. » This activity will be judged on percentage of group participation.	» Select a seven-day period to "pay it forward" to other members of your group. » Examples include buying coffee, coming into shift early to relieve a co-worker, or collecting clothes or food for a local shelter. » Take photos of each act as supportive documentation. » This activity will be judged on percentage of group participation.

2. DAILY CHALLENGES

Be on the lookout during Wellness Week for the daily challenge to be posted on Twitter (@ACEPNow) and on Facebook at the EMDocs and ACEP accounts at 10 a.m. and 1 p.m. EST each day. Expect this year's daily challenges to be a little different and stimulate some conversation as we tackle operational issues as well as individual ones.

Several daily prizes will be given to contributors.

3. DAILY NEWSLETTERS

With this year's focus a blend of individual and operational items, we'll be providing reliable material for self-care using the spokes of the Wellness Wheel and also sharing articles along with our insights so you can bring them to the table during your faculty meetings or group discussions.

Building a Community ED Practice

THE CHALLENGES AND SUCCESSES OF A DEMOCRATIC, INDEPENDENT GROUP

Because all the physicians took ownership of the process and the hospital was enormously stable and successful, this concept worked quite well.

by THOMAS FITZGERALD, MD, FACEP

Emergency medicine is a constantly changing and evolving medical practice. The business side of emergency medicine is no different. I want to share some insights that have been beneficial to Carrollton Emergency Physicians (CEP), an independent, physician-owned EM practice, hoping that they might prove useful to emergency physicians starting their own practice or to those who would like to learn more about small group practice management.

A little historical perspective is warranted. My journey with emergency medicine started in Atlanta. Having graduated from Emory School of Medicine in 1977, I did a surgical internship at Grady Memorial Hospital, followed by working at the old Crawford Long Hospital (an Emory affiliate) in the emergency department to see if this new specialty of emergency medicine was a fit for me. I liked what I did but realized that being fully trained in emergency medicine was essential. I completed the EM residency at Grady and was chief resident the final year. My wife, whom I met in medical school, had just finished her obstetrics and gynecology residency and had a four-year commitment to the Air Force, which had paid for her medical school expenses. I worked in local emergency departments near her base assignments. During that time, I learned a lot about the medical and business sides of emergency medicine. As my wife's commitment was ending and we were looking for places to practice, the hospital administrator at my hometown hospital asked if I would consider starting an EM group in Carrollton, Georgia. At the time, all of their emergency coverage was by locums, and none were trained in emergency medicine. When we started looking for a place to live and practice, we created a list of priorities for where we wanted to live. Next on the list was the type of practice we might have and the lifestyle available with two small children. Carrollton was not initially on my list, but the offer of starting a completely new group was intriguing.

Building the Group as Part of the Community

I wanted to start a group that I personally would want to join well after it was started. I was committed to the concept that all the doctors would be EM residency–trained and board-certified. While there are plenty of physicians who are not trained in emergency medicine who practice great emergency medicine, having this consistency and certification was important to the members of the group and also to the medical staff, who had never been exposed to trained emergency physicians. This was also important to the community, which had seen moonlighting doctors from 50 miles away taking care of their loved ones during their most vulnerable times. That factor also convinced me that I wanted all of our physicians to live in the community. They had some flexibility, but I wanted them to be "local" and be seen at the grocery store, schools, and churches. I also asked that they become active in the community in addition to their medical practice. It didn't matter in what form they were involved, but I thought it was an important factor to increase our credibility in the community. I thought that the more our patients knew us, the less likely they would be to sue us if there was an unexpected outcome. Finally, I wanted to make sure that the spouses were actively involved in the entire process and were thoroughly made aware of the community. The family had to buy into the deal.

The hospital played an enormously important role in this process. The medical staff was very supportive of me setting up whatever type of practice I thought was best; there were no turf wars. Also, the hospital was a community hospital, run by a board of local community leaders with a stable administration and a solid financial footprint. I purposefully told all candidates about the importance of the hospital's stability in their practice, as well as having a stable contract. Your ED contract is only as good as the working relationship between the ED group, administration, and board. This concept was frequently new to many interviewees.

I told our administration that I hoped to have all residency-trained physicians in five years; this was actually accomplished in three. Everyone in this new group had to buy into the general concepts of the group structure and dynamics for the plan to work. This was Carrollton Emergency Physicians' practice, not mine.

The next question was, can this type of democratic, independent EM group serve one hospital system, prosper, have contract stability, and provide long-term careers for our physicians?

Dedication Leads to Success

Because all the physicians took ownership of the process and the hospital was enormously stable and successful, this concept worked quite well. We currently have 24 physicians, all residency-trained and board-certified/eligible, who are all partners and equal shareholders. The group is completely democratic, with the most junior partner making the same salary and working the same shifts as the most senior partners. Administrative costs for the partners managing the group are capped at 4 percent of gross revenues. This year, the group will see about 100,000 patients with the aid of 15 advanced practice providers.

Since the group was started in 1985, we have had only one partner leave the group, and that was because his wife's family, who lived nearby, moved. We only used locums once, 15 years ago, when the hospital asked that we immediately take over ED coverage for a smaller hospital it acquired. Within a year, they had all been replaced with residency-trained emergency physicians. Additionally, we have enjoyed a limited malpractice history. We have had very few claims because the physicians are good and known by our community. This has resulted in lower premiums.

Transitions are important. I recently retired from my clinical practice and administrative duties. The current leadership actively practices emergency medicine, and the group supports them. They are being creative and thoughtful as they handle the ever-increasing challenges of medicine. They implement important changes after the group votes while maintaining the core principles of the group.

The process can work. It works because the physicians come to work every day, making the process happen. They all believe that it is an honor and privilege to provide care for their community. I think that all the components (hospital, administration, community, and how the EM group is established) are important.

DR. FITZGERALD is former CFO, past president, and founder of Carrollton Emergency Physicians in Carrollton, Georgia.

How Much Is Too Much?

Reducing the duration and quantity of opioids are tactics for limiting use and avoiding addiction

by EVAN SCHWARZ, MD, FACEP, FACMT; AND R. COREY WALLER, MD, MS, FACEP, DFASAM

Editor's Note: This is the seventh part of an ongoing series on what emergency physicians can do to combat the opioid epidemic. Read the rest of the series at ACEPNow.com.

The opioid epidemic initially revolved around abuse of prescription opioids. Since then, the epidemic has evolved, with the majority of deaths now associated with fentanyl and other synthetic opioids. Still, the majority of people initiate opioid use with prescription opioids before switching to illicit, and potentially more dangerous, drugs.[1] As such, physician prescribing habits continue to be scrutinized. Not only is this evident from articles in the lay press but also with guidelines such as those from the Centers for Disease Control and Prevention (CDC) or hospital organizations.[2,3] In some situations, laws were even passed governing prescribing practices. For instance, in Missouri, a seven-day prescribing limit for acute pain was passed during the latest legislative session.[4]

This scrutiny has led to considerable debate regarding emergency physicians' prescribing practices and their association with long-term opioid use—and potentially abuse. The easy answer is to keep patients opioid naive when possible. After all, you can't get addicted if you're never exposed. Resources are available to help emergency physicians appropriately manage pain in situations where they should avoid opioids. The ACEP Pain Management and Addiction Medicine Section has developed the Managing Acute Pain (MAP) bedside tool (acep.org/map) that can be used in real time.

Of course, there are still times when an emergency physician will need to prescribe an opioid. While scoring systems such as the Opioid Risk Tool (ORT) are readily available on your smartphone and easy to use, they are limited. Sure, a high score should probably make you think twice, but a low score doesn't eliminate the chance of developing a substance use disorder; this is the crux of the problem. Even though the rate of developing an opioid use disorder is low, we simply don't know who is going to be fine and who will start down the deadly and destructive path toward addiction.

This is exemplified by the current U.S. Surgeon General, Jerome Adams, MD, MPH. Dr. Adams is an incredibly accomplished physician and public health official. Yet his brother, with similar genetics and raised in similar circumstances, is serving time in federal prison for drug-related crimes due to his substance use disorder.[5]

How Dangerous Are Prescriptions?

What evidence is there that a prescription from the emergency department is going to lead patients down this path? It's an important question. The emergency department certainly can't be the source for the majority of prescriptions when compared to internists, family medicine physicians, and pain physicians. However, this doesn't mean we don't need to prescribe responsibly. A study published in the *New England Journal of Medicine* in 2017 investigated this by reviewing claims data from a national sample of Medicare patients.[6] The authors explored individual prescribing practices among emergency physicians in the same practice to determine if their prescribing was associated with long-term opioid use over the next year. Emergency physicians were separated into "high-intensity" and "low-intensity" prescribers based on the total number of prescriptions and total number of pills prescribed.

The authors found the high-intensity group was 3.3 times more likely to prescribe opioids than the low-intensity group (7.3 percent versus 24.1 percent, $P<0.001$). Shockingly, this corresponded to a number needed to harm of 49. Or, to put another way, for every 49 prescriptions written, one resulted in long-term use.

There were multiple and significant limitations that have been discussed elsewhere—most important, long-term use does not equal addiction and the prescriptions themselves were not necessarily inappropriate.[7] Still, this study is not unique in associating new prescriptions in opioid-naive patients with long-term use and is not the only ED-based study to do so.[8-10] A similar study from the CDC also concluded that the probability of long-term use increased starting on day three of the prescription.[11] This was also a review of opioid-naive patients in a large claims database and has many of the same limitations as the *New England Journal of Medicine* study. Other non-ED-based studies also demonstrate long term persistence of between 5 and 10 percent following an initial prescription.[12,13] Once again, long term use does not equal addiction. However, even factoring in their limitations, these findings are important.

Possible Solutions

What is the emergency physician who is concerned about contributing to long-term use—and potentially addiction—but still believes that an opioid is indicated to do? The good news is that evidence shows patients may only need a very short course of opioids for many conditions.

A recent study offered another solution. It looked at the use of digital pills to evaluate ingestion patterns of ED patients.[14] Digital pills are gel caps containing a medication (in this case, oxycodone) and a biosensor. In the stomach, the gel cap is dissolved, releasing the pill and activating the biosensor. A reader is attached by a sticker to the abdominal wall and transmits ingestion data to a cloud-based server. A convenience sample of opioid-naive patients diagnosed with an acute fracture was included.

Only 15 patients completed the study, but what it found was still very interesting. Patients only required a mean of six pills (range of three to nine pills), with nearly 82 percent of the dose taken in the first 72 hours. Nearly half of patients stopped taking opioids by day three. Patients who required operative repair did use more medication (median of eight pills with a range of six to 11) but required small dosages by 24 hours. Importantly, 12 of the 15 patients reported that their pain was well controlled.

A study evaluating opioid requirements following surgery also suggests that patients' pain can be controlled with smaller amounts of opioids.[15] While there were multiple limitations, the authors determined that the median number of opioids consumed following laparoscopic cholecystectomy, appendectomy, colectomy, hernia repairs, small bowel resections, and vaginal hysterectomies was fewer than 10 tablets. To be balanced, some procedures such as an abdominal hysterectomy required more. Perhaps as interesting, the authors discovered that the quantity of pills prescribed had the strongest association with opioid consumption (0.53 pills consumed for every one prescribed [95% CI, 0.40–0.65]), which was stronger than the association with patient-reported pain in the week following the procedure. Availability of follow-up appointments and other patient-centered factors still need to be considered when determining the prescription duration.

While emergency physicians aren't responsible for the current epidemic or the majority of opioid prescriptions, our actions may still have long-term repercussions. The good news is that it appears we can still achieve appropriate analgesia while limiting patients' opioid exposure. For most patients, prescribing between three and four days of opioids, or approximately 10 to 15 pills in addition to non-opioid analgesics for acute pain, should be enough. Of course, patient-specific circumstances and follow-up availability should be factored into prescribing practices.

References

1. Heroin overdose data. Centers for Disease Control and Prevention website. Available at: https://www.cdc.gov/drugoverdose/data/heroin.html. Accessed Feb. 22, 2019.
2. Dowell D, Haegerich TM, Chou R. CDC guideline for prescribing opioids for chronic pain--United States, 2016. *JAMA*. 2016;315(15):1624-1645.
3. Opioid use in Missouri: opioid prescribing guidelines. Missouri Hospital Association website. Available at: https://web.mhanet.com/SQI/opioid/MHAPolicy_OpioidPrescribingGuidelines.pdf. Accessed Feb. 22, 2019.
4. S 826, 99th Leg, 2nd Sess (Mo 2018). Available at: https://www.senate.mo.gov/18info/pdf-bill/tat/SB826.pdf. Accessed Feb. 22, 2019.
5. Joseph A. The surgeon general and his brother: a family's painful reckoning with addiction. STAT website. Available at: https://www.statnews.com/2017/12/07/surgeon-general-and-his-brother. Accessed Feb. 22, 2019.
6. Barnett ML, Olenski AR, Jena AB. Opioid-prescribing patterns of emergency physicians and risk of long-term use. *N Engl J Med*. 2017;376(7):663-673.
7. Schwarz E. Unpacking the opioid blame game. *Emergency Physicians Monthly* website. Available at: http://epmonthly.com/article/unpacking-opioid-blame-game. Accessed Feb. 22, 2019.
8. Alam A, Gomes T, Zheng H, et al. Long-term analgesic use after low-risk surgery: a retrospective cohort study. *Arch Intern Med*. 2012;172(5):425-430.
9. Clarke H, Soneji N, Ko DT, et al. Rates and risk factors for prolonged opioid use after major surgery: population based cohort study. *BMJ*. 2014;348:g1251.
10. Butler MM, Ancona RM, Beauchamp GA, et al. Emergency department prescription opioids as an initial expsoure preceding addiction. *Ann Emerg Med*. 2016;68(2):202-208.
11. Shah A, Hayes CJ, Martin BC. Characteristics of initial prescription episodes and likelihood of long-term opioid use - United States, 2006-2015. *MMWR Morb Mortal Wkly Rep*. 2017;66(10):265-269.
12. Marcusa DP, Mann RA, Cron DC, et al. Prescription opioid use among opioid-naive women undergoing immediate breast reconstruction. *Plast Reconstr Surg*. 2017;140(6):1081-1090.
13. Brummett CM, Waljee JF, Goesling J, et al. New persistent opioid use after minor and major surgical procedures in US adults. *JAMA Surg*. 2017;152(6):e170504.
14. Chai PR, Carreiro S, Innes BJ, et al. Oxycodone ingestion patterns in acute fracture pain with digital pills. *Anesth Analg*. 2017;125(6):2105-2112.
15. Howard R, Fry B, Gunaseelan V, et al. Association of opioid prescribing with opioid consumption after surgery in Michigan. *JAMA Surg*. 2018:e184234.

DR. SCHWARZ is associate professor of emergency medicine and medical toxicology section chief at Washington University School of Medicine in St. Louis.

DR. WALLER is a fellow at The National Center for Complex Health and Social Needs and managing partner at Complex Care Consulting LLC.

Telemedicine Initiative
BY THE NUMBERS

DATES
Sept. 13-22, 2018

TOTAL TELEMEDICINE CONSULTS
95

AVERAGE TIMES

TO GET INTO THE QUEUE
(NURSE & PATIENT LOGIN PROCESS)
10.2 seconds

WAIT FOR A PROVIDER
(TIME NURSE & PATIENT WAITED FOR RELYMD PROVIDER TO RESPOND)
5.7 minutes

CONSULTATION
7.1 minutes

RESPONSES

"WHAT WOULD YOU HAVE DONE IF YOU HADN'T DONE THIS TELEMEDICINE VISIT?"

EMERGENCY DEPARTMENT
41*

WAIT FOR PRIMARY CARE PHYSICIAN APPOINTMENT
19

WOULD NOT HAVE SOUGHT CARE
7

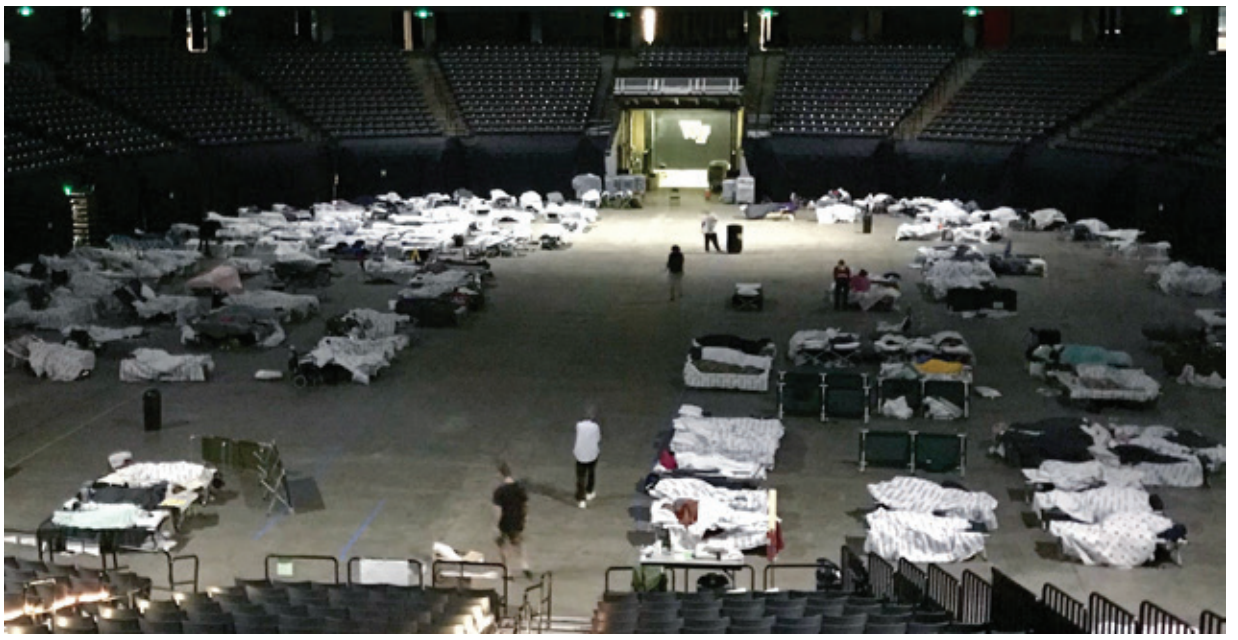
URGENT CARE
4

NONE OF THE ABOVE
9

DID NOT ANSWER
15

*Of the 41 patients who stated they would have gone to the emergency department, 33 were evaluated and deemed safe to be managed at the shelter.

SURVEY RESPONSE RATE: 80 out of 95 visits (84 percent)



BOBBY PARK

One of the shelters set up for those affected by Hurricane Florence.

DISASTER TELEMEDICINE | CONTINUED FROM PAGE 1

conditions, and kidney failure. In their flight to safety, many forgot their medications. Additionally, due to the stress of the circumstances, many of the shelter residents developed acute medical conditions, and their only access to physician care was through EMS and local emergency departments. The added call volume from the shelters strained the Wake County EMS system and taxed the already crowded emergency departments in Wake County.

Wake Emergency Physicians and RelyMD

Staffing six different shelters simultaneously with individual qualified providers was beyond the human resources capabilities of the stressed Wake County infrastructure. Wake County EMS and North Carolina Department of Health and Human Services contacted a local telemedicine company, RelyMD, and asked it to deploy its services to the shelters. RelyMD is a telemedicine service that is 100 percent owned and staffed by Wake Emergency Physicians, PA (WEPPA). With more than 160 emergency medicine and telemedicine specialists, WEPPA is a private, independent emergency medicine practice based in Raleigh, North Carolina, that staffs nine different emergency departments across three health care systems. RelyMD provides thousands of annual online medical evaluations via mobile app and internet-enabled computers. Its providers are available 24-7-365 in an on-demand model.

Telemedicine Workflow

Just before the storm hit, the RelyMD team provided a one-hour in-service covering the basics of the platform, which operates on an iPad. During a 10-day hurricane-related period, RelyMD cared for 95 shelter patients, with 67 percent of the care delivered during the first three days of Florence making landfall. The medical issues included respiratory conditions, chest pain, wound care, minor injuries, mental health issues, dialysis coordination, and medication refills. Nurses would evaluate the patient's needs, take vital signs, review medication lists, and transmit 12-lead ECGs, after which they contacted the RelyMD provider, who would get the "quick story" from the nurse. Then using synchronous real-time audio and video, a physical exam would be performed through the camera of the iPad, with the nurse acting as the provider's hands. Of the 95 telemedicine consults, nine patients were evaluated and advised to go to the emergency department for further care (see Table 1). The diversion rate of patients who said they would have gone to the emergency department if the telemedicine consult hadn't been available was 33 out of 41 cases, or 80 percent. (See "Telemedicine Response, By the Numbers" for a summary of this telemedicine initiative.)

The Advantages of Telemedicine

The Hurricane Florence telemedicine shelter project is an illustration of how necessity is the mother of invention. Hurricane Florence strained the medical system in Wake County, and the RelyMD telemedicine initiative provided a needed solution. Traditionally, having multiple shelters means requiring multiple medical providers, one for each facility. Through telemedicine, one provider was able to be efficiently deployed to all of the shelters simultaneously.

From a logistical standpoint, the service was deployed quickly, despite the need to go on-site to deliver the iPads, introduce the concept, and show the nurses how to perform the telemedicine visits. The program was up and running in the busiest shelter in less than eight hours.

In a resource-constrained environment, the right care was delivered. Of those patients who said they would have gone to the emergency department for their medical care, the data show that there was an 80 percent emergency department diversion rate. This resulted in significant savings with respect to overall cost and EMS worker hours (see Figure 1). Of the nine patients who were sent to the emergency department

TABLE 1: Patients Evaluated by Telemedicine and Directed to Go to the Emergency Department

PATIENT	TELEMEDICINE ASSESSMENT	EMERGENCY DEPARTMENT FOLLOW-UP
1	Possible infected dialysis graft	Admitted for infected dialysis graft
2	Lateralizing neurologic symptoms	Unknown follow-up
3	Shortness of breath	Unknown follow-up
4	Chest pain and shortness of breath	Admitted for elevated troponin
5	Abscess needing incision and drainage	Abscess incision and drainage performed, then discharged
6	Chest pain and allergic reaction	Chest pain evaluation negative and discharged
7	Hyperglycemia, rule out diabetic ketoacidosis	Transport refusal
8	Lateralizing neurologic symptoms	Unknown follow-up
9	Hemoptysis	Admitted for rule out tuberculosis

after initially being evaluated by RelyMD, three required admission to the hospital.

Beyond the Shelters

RelyMD recognized that there were people affected by Florence all across North Carolina, not only in the shelters. To help those populations, RelyMD offered a coupon code for a free patient-initiated telemedicine evaluation. Patients were able to obtain treatment using the RelyMD app or an internet-enabled computer. RelyMD was able to evaluate and manage more than 100 patients across North Carolina.

Future Disasters

Unfortunately, devastating natural disasters will continue to affect the nation. In this case, telemedicine was a useful tool that helped manage patients quickly and in a high-quality manner. One provider was able to take care of patients across eight different shelters. At one point, there were more than 100 shelters set up for Hurricane Florence victims across North Carolina. Telemedicine has the capacity to take care of all of these patients with a fraction of the usual medical resources.

References

1. Scism L, Ailworth E. Moody's pegs Florence's economic cost at $38 billion to $50 billion. *The Wall Street Journal*. Sept. 21, 2018.
2. Borter G. Hurricane Florence death toll rises to 51. Reuters. Oct 2, 2018.

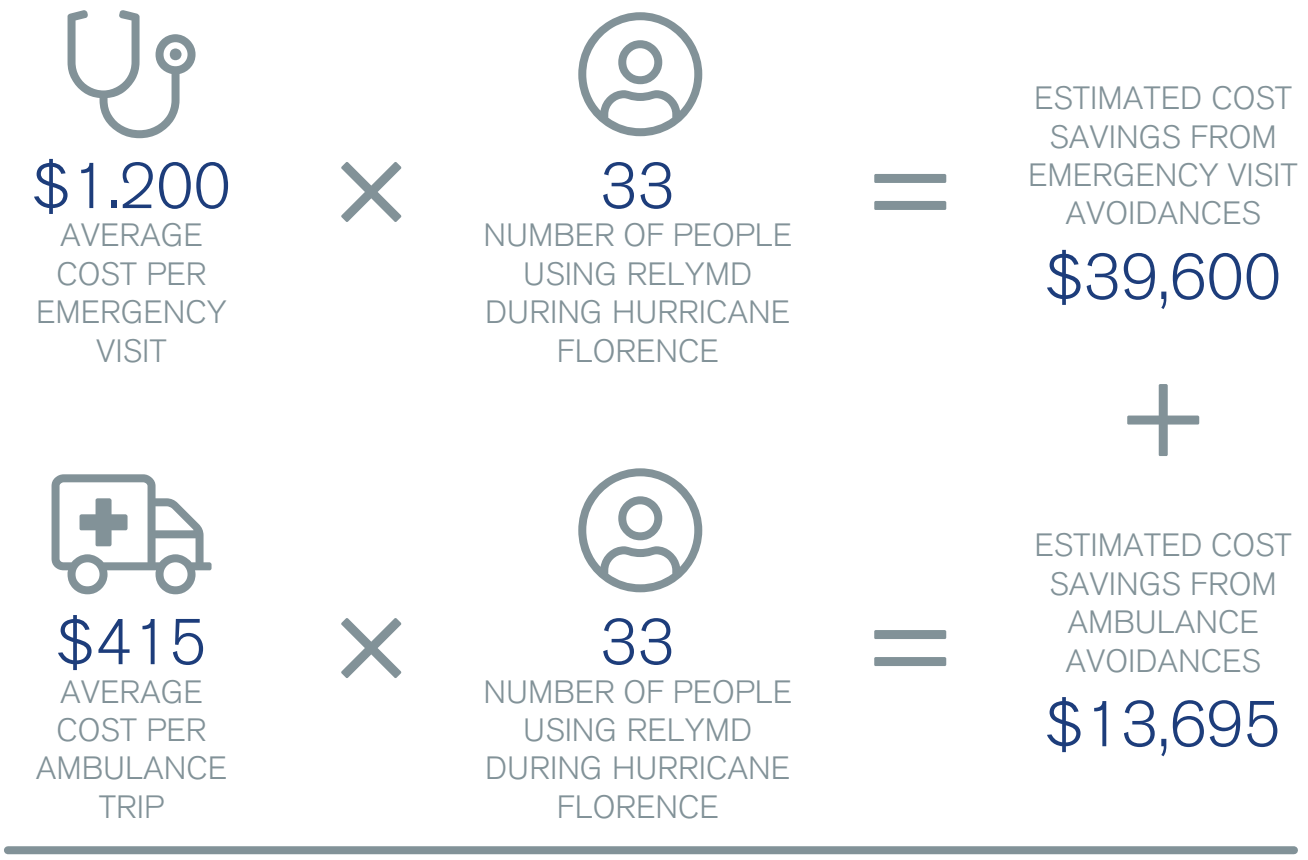
DR. PARK is the director of RelyMD, a North Carolina–based telemedicine company, and a partner at Wake Emergency Physicians. **MS. RAEGEN** and **MR. CAFLISCH** are executives at RelyMD. **DR. GRANOVSKY** is president of LogixHealth, a national coding and billing company.

GET INVOLVED

ACEP has an active telemedicine section. Visit www.acep.org/how-we-serve/sections/telehealth/ to learn more.

FIGURE 1

Cost Savings from Telemedicine Program



DOGMA FEELS RIGHT UNTIL YOU STEP IN IT

SKEPTICS' GUIDE TO EMERGENCY MEDICINE

DR. MILNE is chief of emergency medicine and chief of staff at South Huron Hospital, Ontario, Canada. He is on the Best Evidence in Emergency Medicine faculty and is creator of the knowledge translation project the Skeptics' Guide to Emergency Medicine (www.TheSGEM.com).

Up Your Nose with Pain Control?

Fentanyl versus ketamine for intranasal analgesia

by KEN MILNE, MD, MSC, CCFP-EM, FCFP, FRRMS

The Case

An 8-year-old boy presents to the emergency department with a painful wrist injury after falling at the playground. His parents gave him an appropriate dose of ibuprofen before arriving at the emergency department. His pain is a 7/10, and the triage nurse asks you for some additional medication for his pain while he is waiting for his X-ray.

Background

Children represent a group of patients who aren't likely to receive adequate analgesia.[1,2] This phenomenon is known as oligoanalgesia, or poor pain management through the underuse of analgesics. Despite three decades of research in this area, recent evidence confirms that ED pain management in children is still suboptimal.

A retrospective cohort study of children presenting to the emergency department with an isolated long-bone fracture showed almost one-third received inadequate medication, and 59 percent received no pain medications during the critical first hour of assessment.[3] Other studies have demonstrated that only 35 percent of children presenting to a pediatric emergency department with fractures or severe sprains receive any analgesics.[4,5] Two potential options for providing faster-acting, effective, and easy-to-administer pain medications to children are intranasal (IN) fentanyl and ketamine.

IN fentanyl is an excellent alternative to oral or IV opioids when rapid pain management is desired or IV placement is not otherwise necessary. Fentanyl at doses of 1.5–2 mcg/kg (maximum 100 mcg) provides effective and rapid analgesia comparable to that of IV morphine.

Ketamine is a noncompetitive N-methyl-D-aspartate (NMDA) and glutamate receptor antagonist that provides analgesia by virtue of decreasing central sensitization "wind-up" phenomenon ("a progressive increase in the number of action potentials elicited per stimulus that occurs in dorsal horn neurons"[6]) and pain memory. Sub-dissociative ketamine has been used in the adult population as an effective opioid-sparing alternative that is associated with higher rates of minor but generally well-tolerated adverse effects.

The sub-dissociative ketamine dose for children is 0.5–1 mg/kg. It can provide rapid pain management for children who lack vascular access with the added benefit of lasting longer (60 minutes) compared to IN fentanyl (30 minutes).

Clinical Question

In children with acute extremity injuries, is IN ketamine noninferior to IN fentanyl for pain management?

Reference

1. Frey TM, Florin TA, Caruso M, et al. Effect of intranasal ketamine vs fentanyl on pain reduction for extremity injuries in children: the PRIME randomized clinical trial. *JAMA Pediatr*. 2019;173(2):140-146.

- **Population:** Children ages 8 to 17 years presenting to the emergency department with moderate to severe pain due to traumatic limb injuries (visual analogue scale >35 mm).
  - » **Exclusions:** Significant head, chest, abdomen, or spine injury; Glasgow Coma Scale <15 or inability to report a visual analogue scale score; nasal trauma or aberrant nasal anatomy; active epistaxis; ketamine or fentanyl allergy; history of psychosis; opioid administration prior to arrival; non-English speaking; in police custody; and postmenarchal girls without a negative pregnancy test.
- **Intervention:** IN ketamine 1.5 mg/kg (max 100 mg)
- **Comparison:** IN fentanyl 2 mcg/kg (max 100 mcg)
- **Outcomes:**
  - » **Primary Outcome:** Pain reduction after 30 minutes.
  - » **Secondary Outcomes:** Sedation level, capnometry values, adverse events, the need for rescue analgesia, and change in vital signs.

Authors' Conclusions

"Ketamine provides effective analgesia that is noninferior to fentanyl, although participants who received ketamine had an increase in adverse events that were minor and transient. Intranasal ketamine may be an appropriate alternative to intranasal fentanyl for pain associated with acute extremity injuries. Ketamine should be considered for pediatric pain management in the emergency setting, especially when opioids are associated with increased risk."

Key Results

The trial enrolled 90 children, with 50 percent allocated to each group. The mean age was 12 years. Ketamine was shown to be noninferior to fentanyl for pain reduction at 30 minutes after administration of the study medication.

- **Primary Outcome:**
  - » Ketamine: 30.6 (95% CI, −35.8 to −25.4)
  - » Fentanyl: 31.9 (95% CI, −37.2 to −26.6)
  - » The 95% confidence intervals did not cross the prespecified noninferiority margin of 10 mm.
- **Secondary Outcomes:**
  - » No significant differences were observed in the highest achieved sedation scores, mean capnometry values, vital signs, or need for rescue analgesia.
  - » Overall, more adverse events were observed in the ketamine group (49) versus the fentanyl group (14). All adverse events were minor and transient. Except for the 15-minute assessment, where the ketamine group had much more drowsiness (17 versus 4), there was no significant difference in the number of adverse events between groups at each assessment point.
  - » No difference occurred in the need for additional analgesia (11 in the ketamine group and nine in the fentanyl group).

Evidence-Based Medicine Commentary

1. **Blinding:** They used sealed envelopes, but they did not specifically state that they were opaque envelopes. Computer randomization is considered a more secure system and less likely to be broken. To confirm blinding, they asked the staff to guess group allocation at the 30-minute assessment. Sixty-three percent of staff guessed correctly, suggesting blinding was not maintained. These two factors could have introduced bias into the study.
2. **Selection Bias:** The patients were not recruited consecutively but rather represented a convenient sample of patients. More than one-fifth (22 percent) of eligible patients were excluded for a variety of reasons. One reason was clinician preference. This could introduce selection bias and impact the conclusion of noninferiority.
3. **Co-administration:** The study design did not allow for co-administration of ibuprofen with the IN medication. Ibuprofen is an effective analgesic and is opioid-sparing. While this design allowed the researchers to answer the question about the effectiveness of the two medications in question, this is not how we would manage these patients

CONTINUED *on page 27*

ENVISION PHYSICIAN SERVICES OFFERS ...

THE OPPORTUNITY TO GRAVITATE TO ANY SETTING I WANT

MATT KAUFMAN, MD, FACEP
EMERGENCY MEDICINE

MEDICAL DIRECTOR POSITIONS

- **Northeast Methodist Hospital**
  San Antonio, Texas
- **Northwest Medical Center**
  Fort Lauderdale, Florida
- **OSF Sacred Heart Medical Center**
  Danville, Illinois
- **TriStar Mt. Juliet ER**
  Nashville, Tennessee

ASSOCIATE DIRECTOR POSITIONS

- **Newton Medical Center**
  Newton, New Jersey
- **Community Medical Center**
  Toms River, New Jersey

COAST-TO-COAST POSITIONS

- Academic • Community • Pediatric
  Rural • Urban • Travel Team

888.823.9284
EVPS.com/ACEPNow2019

Envision
PHYSICIAN SERVICES

DR. FAUST is an instructor at Harvard Medical School and an attending physician in the department of emergency medicine at Brigham & Women's Hospital, Boston. Follow him on Twitter @jeremyfaust.

Interdisciplinary FOAMed One Tweet at a Time

#FOAMed encourages different medical specialties to come together, learn from one another, and even share a laugh now and then

by JEREMY SAMUEL FAUST, MD, MS

We are approaching the end of the decade in which online medical education exploded in popularity. In the 2010s, free open-access medical education (#FOAMed) grew out of a small but vocal group of primarily American and Australian emergency and critical care physicians and other health care providers. Today, #FOAMed and #MedTwitter comprise a global movement that looks to be permanent. While other medical specialties have certainly gotten in on the act, emergency medicine continues to be at the forefront. The reasons for this are twofold: We were early on this wave so our participation levels are superb, and with our vast clinical practice, there is always something to be learned or improved upon. Twitter has proven to be an invaluable tool in disseminating new research knowledge as well as slick packaging of older information that has not yet been fully translated into practice.

As both a participant and an observer, I have been gratified to see other fields of medicine flock toward emergency medicine education and research leaders online, interacting with us in ways that, in the past, perhaps, would not have happened in the traditional hallways of medicine. In essence, our field's leadership in social media has helped put emergency medicine at the center of progressive medicine and, specifically, medical education. The more we welcome non–emergency physicians into our online conversations, the better this dialogue will become. Here are a few nonemergency Twitter accounts to watch.

Jen Gunter, MD (@DrJenGunter), is an obstetrician-gynecologist who has been blogging her expertise for years. Her blog and her hold-no-punches Twitter feed are inspirational to me. A classic "happy warrior," Dr. Gunter vocally and proudly takes on the cynical pseudoscience of Gwyneth Paltrow's Goop products, calls out antivaccine supporters, and does not hesitate to put uneducated (and frequently sexist) opiners in their places when they try to "mansplain" the female body to her. Her takedown of Goop's annual conference in New York with emergency physician Dara Kass, MD (@DaraKass), was one for the ages.

Representing trauma surgeons, **Joseph Sakran, MD, MPA, MPH** (@JosephSakran)—along with emergency medicine's own **Megan Ranney, MD, MPH, FACEP** (@DrMeganRanney), and others—has served as a point person for the #ThisIsOurLane movement, an online spat that the National Rifle Association picked with physicians that escalated into a mission-defining moment for many doctors. Dr. Sakran, himself a survivor of gun violence, has the credibility, expertise, and media know-how to represent those of us who believe that medicine has a role to play in decreasing senseless gun violence in our nation. Among several key voices that emerged on this topic is radiologist **Heather Sher, MD** (@HSherMD), whose article in *The Atlantic* after the shooting in Parkland, Florida, helped raise the profile of this problem as well.

On the lighter side is the anonymous account known as **Dr. Glaucomflecken** (@DGlaucomflecken). A writer for the GomerBlog (medicine's answer to *The Onion*), Dr. Glaucomflecken alternates between posts that genuinely educate us (eg, for the love of pseudomonas, don't sleep in your contact lenses!) and ones that have us bent over laughing. Here's a recent favorite: "After every surgery day I walk over to the nearest ICU and loudly announce that I have zero post op cataract surgeries that require ICU admission. They're always so nice about it, they make sure a police officer is available to accompany me off the premises." He also co-authored an instant classic *BMJ* Christmas article with emergency physician **Esther Choo, MD, MPH** (@choo_ek), "A Lexicon for Gender Bias in Academia and Medicine," in which a few important terms were defined, including "Misteria: Irrational fear that advancing women means catastrophic lack of opportunity for men" and "Feternity leave: When becoming a mother is conflated with choosing to forsake the practice of medicine (also known as What They Suspect When You're Expecting)."[1]

Finally, one of my local colleagues here in Boston, emergency radiologist **Bharti Khurana, MD** (@KhuranaBharti), is educating the masses by posting excellent images of emergency department radiographs (MRIs, CTs, plain radiographs). She's always sure to include a good case vignette and help us out with an arrow pointing to the pathologic finding, which emergency physicians always appreciate.

These are just a few of the great non–emergency medicine Twitter accounts to watch. Feel free to tweet me others, and I'll share those as well.

As the first decade of #FOAMed secured emergency medicine at the forefront of online medical education and knowledge dissemination, the next will likely be defined by our reaching across the divide to our non–emergency medicine colleagues. The results will raise emergency medicine's profile as a specialty that is leading medicine forward.

Reference

1. Choo EK, DeMayo RF, Glaucomflecken. A lexicon for gender bias in academia and medicine. *BMJ*. 2018;363:k5218.

DO YOU HAVE ANY FAVORITE FOAMED RESOURCES THAT *ACEP NOW* READERS SHOULD KNOW ABOUT VIA THE FEED?

TWEET AT ME @JEREMYFAUST OR EMAIL TO JSFAUST@GMAIL.COM

TIPS FOR BETTER PERFORMANCE

SPECIAL OPs

DR. WELCH is a practicing emergency physician with Utah Emergency Physicians and a research fellow at the Intermountain Institute for Health Care Delivery Research. She has written numerous articles and three books on ED quality, safety, and efficiency. She is a consultant with Quality Matters Consulting, and her expertise is in ED operations.

Moving Day at Washington Hospital

Careful planning and innovation can take the anxiety out of a big ED move

by SHARI WELCH, MD

PHOTO: WASHINGTON HOSPITAL HEALTHCARE SYSTEM

Washington Hospital Healthcare System (WHHS) in Fremont, California, had a very efficient emergency department that had long ago outgrown its physical plant. Seeing more than 150 patients per day in its 28-bed department, it was a model of efficiency. Though adjacent spaces had been repurposed—including using a modular building for triage to free up the previous triage and registration area for a fast track to help manage patient flow—it still boasted very strong patient flow metrics:

Initial Metrics

- **Door to Provider:** 27 minutes
- **Length of Stay (LOS) Overall:** 198 minutes
- **LOS Admitted:** 262 minutes
- **LOS Discharged:** 143 minutes
- **Left Without Being Seen:** 1.45 percent

The old emergency department had a very small footprint (7,600 square feet), so the ED leaders and staff were forced to be efficient in storing the supplies and equipment necessary to run a busy emergency department. The tight layout made communication very easy, as everyone was within voice distance. After years of planning, the board came up with funding to build a new acute care tower, which would house the emergency department, the intensive care units (ICUs), and inpatient rooms. The acute care tower included a 22,000-square-foot emergency department (three times the original emergency department size), allowing for a number of different patient flow models. The WHHS leaders left nothing to chance. They began planning for the move to the new tower more than a year in advance.

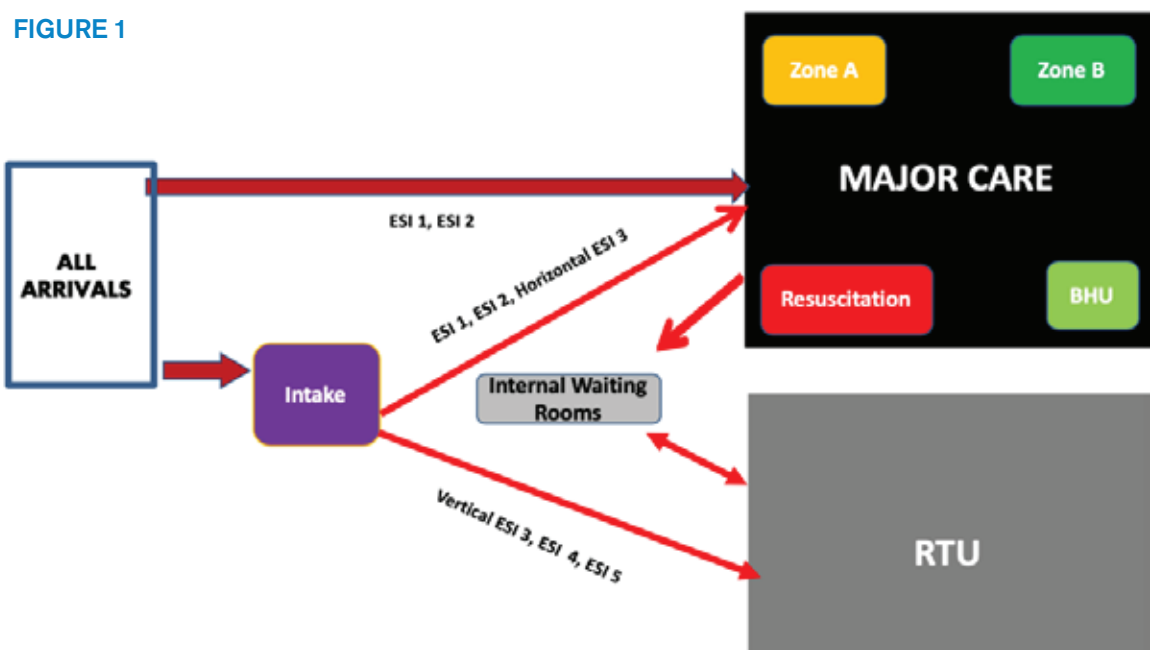
Careful Planning

Working with an independent consultant, the leaders assembled a multidisciplinary transition team that was very engaged in the process. Many of the participants in the transition work had survived another move into a new emergency department in northern California and were eager to avoid the mistakes that frequently plague moves of this kind. For example, one team member moved into a new department where the phone system did not work! They were determined to plan carefully.

The team began with a data analysis that helped inform the patient flow model that could be fitted into the new space. With a high volume of low-acuity patients in their mix, the team decided on this elegant flow model for their emergency department (see Figure 1).

In the new model, ambulances, 21 percent of arrivals, would typically be screened by the charge nurse and quickly assigned to either major care (bedded patients) or the rapid treatment unit (RTU) for low-acuity patients. Emergency Severity Index 3 patients who needed a bed could have their medical screening exam and testing started in the RTU and then be sent to one of the zones. The new emergency department had a designated behavioral health care area and two large trauma/resuscitation bays for a total of 40 treatment spaces. The RTU had six rooms plus its own internal waiting room.

FIGURE 1



ABOVE: Members of the Washington Hospital Healthcare System (from left): Jerico Padallan, Will Cristobal, Michael Platzbecker, Dr. Kadeer Halimi, Brenda Brennan, and Noemi Gonzalves.

LEFT: Figure 1: Patient flow model for Washington Hospital Healthcare System's new emergency department.

The transition team developed a robust work plan with all that needed to be done prior to the move into the department. The transition team had exceptional leadership that included the physician medical director, Kadeer Halimi, DO, and nursing leaders Michael Platzbecker, MSN, RN, CEN, assistant chief nursing officer, and Brenda Brennan, MS, RN, CNS, CEN, emergency services administrator. They had high-level executive support from their CEO, Nancy Farber, and their chief nursing officer, Stephanie Williams. Many of the staff who worked in the emergency department participated in this transition work so a critical mass of people was invested. Checklists for supplies for each area were developed. Because communication would now be a challenge in the bigger emergency department, a workgroup was formed to look at the specifications and features of various communication devices, and the group partnered with the ICU in selecting a device.

One of the challenges for the transition team was the development of zones using the existing geography. Unfortunately, the model that had been developed by physicians more than a decade prior was not created with geographic work zones in mind, a newer design concept for emergency medicine. Creating work zones for medical teams proved difficult, as the layout could not be easily divided into zones. The transition team, along with physician and nurse leaders, worked steadfastly in cooperation to develop these zones. Realizing that some patients are more complex and some providers are faster than others, the physicians and nurses opted for a flex zone in the department. They adhere to a strict patient-centric culture in the WHHS emergency department, and the physicians are highly productive. They believe that if a provider is available and a patient needs to be seen, there should be flexibility in the system. Their model allows for flexing of zones based on patient need. This was a big change for all stakeholders. In the smaller department, the physicians used free-range staffing to self-assign patients, and there were no zones. In the new department, the zones are fed by the charge nurse, who functions as a flow nurse. Rules of the road were crafted to help standardize patient streaming and flow into the zones. Additionally, the physician group has kept some of its older physicians on staff to work four-hour "swing shifts" when the department is on surge.

The WHHS transition team met monthly to work on all the elements of their transition work plan. Tabletop exercises were conducted to validate that their flow model would work. Using real patient data from the year before, they tested the flow model using these exer-

CONTINUED *on page 28*

DR. HELMAN is an emergency physician at North York General Hospital in Toronto. He is an assistant professor at the University of Toronto, Division of Emergency Medicine, and the education innovation lead at the Schwartz/Reisman Emergency Medicine Institute. He is the founder and host of Emergency Medicine Cases podcast and website (www.emergencymedicinecases.com).

A Rational Approach to the PE Evaluation

How to address the problem of over-investigation for suspected pulmonary embolism

by ANTON HELMAN, MD, CCFP(EM), FCFP

Emergency department over-investigation is, perhaps, nowhere more pervasive than in the workup of suspected pulmonary embolism (PE). Data from the EMPEROR Registry in 2011 found that the mortality rate directly attributable to PE was only 1 percent, while the all-cause 30-day mortality rate was 5.4 percent, and mortality from hemorrhage was 0.2 percent.[1] Interestingly, 85 percent of deaths occurred in untreated patients while waiting for diagnostic confirmation. It appears from this data that most patients with PE die of comorbidities, such as malignancy, which might have placed the patient at risk for PE, or die from delay in treatment while waiting for imaging confirmation. Much of this decreased mortality may be related to the increase in diagnosis of clinically insignificant subsegmental PEs in the past two decades. Comparison of pooled data from uncontrolled outcome studies shows no increase in PE recurrence or death rates for patients diagnosed with isolated subsegmental PEs who were not anticoagulated compared to those who were.[2] In the last 10 years, the incidence of diagnosed PE has doubled, despite no change in mortality, partly due to advances in CT technology and partly due to radiologists overcalling subsegmental PEs due to medico-legal concerns.

The unnecessary testing for PE, and subsequent treatments following diagnosis, may cause harm to patients, result in more follow-up testing from false-positive results, contribute to more anxiety for patients and their families, skyrocket costs, and consume valuable resources. PE costs the United States about $1.5 billion annually, with estimates of more than $30,000 per PE diagnosed.[3]

To avoid unnecessary radiation and major bleeding complications as a result of anticoagulating patients with false-positive CT pulmonary angiogram (CTPA) results, it's important to have a rational approach to imaging for PEs, as well as a good approach to shared decision making with our colleagues, radiologists, and patients.

A landmark article published more than 30 years ago in the *Canadian Medical Association Journal* outlines four principles of diagnostic decision analysis:[4]

1. In the diagnostic context, patients do not have disease, only a probability of disease.
2. Diagnostic tests are merely revisions of probabilities.
3. Test interpretation should precede test ordering.
4. If the revisions in probabilities caused by a diagnostic test do not entail a change in subsequent management, use of the test should be reconsidered.

We tend to overestimate the risk of PE, which leads to overtesting.[5] The vast majority of patients who are considered for PE are low-risk according to Wells' criteria. We order many needless CTs for fear of a PE in low- and no-risk patients. Remember that placing PE in the top three considerations in your differential diagnosis of a patient who presents with chest pain or shortness of breath does not necessarily mean they are at high risk for PE. The PROPER trial out of France, where the prevalence of PE is low, showed that gestalt performed similarly to pulmonary embolism rule-out criteria (PERC) in terms of three-month PE rate, but PERC resulted in an 8 percent decrease in unnecessary CT scanning and a 40-minute decrease in ED stay.[6] Other studies have shown that even seasoned physicians have a tendency to overestimate pretest probability in low-risk patients.[7] We should all take the time to calculate these validated scores.

Imaging Options

Although CTPA is generally considered the gold standard for diagnosing PE, it is far from perfect, and ventilation/perfusion single-photon emission CT (V/Q SPECT) may have better test characteristics. CTPA is prone to over-diagnosing clinically irrelevant emboli in low-risk patients.[8] Furthermore, although its sensitivity approaches 100 percent for clinically relevant PEs, those patients at high risk for PE, based on a Wells' score >6, who have a negative CTPA should be counseled that up to 5 percent of high-risk patients may develop a PE within a few months of a negative CTPA.[9,10]

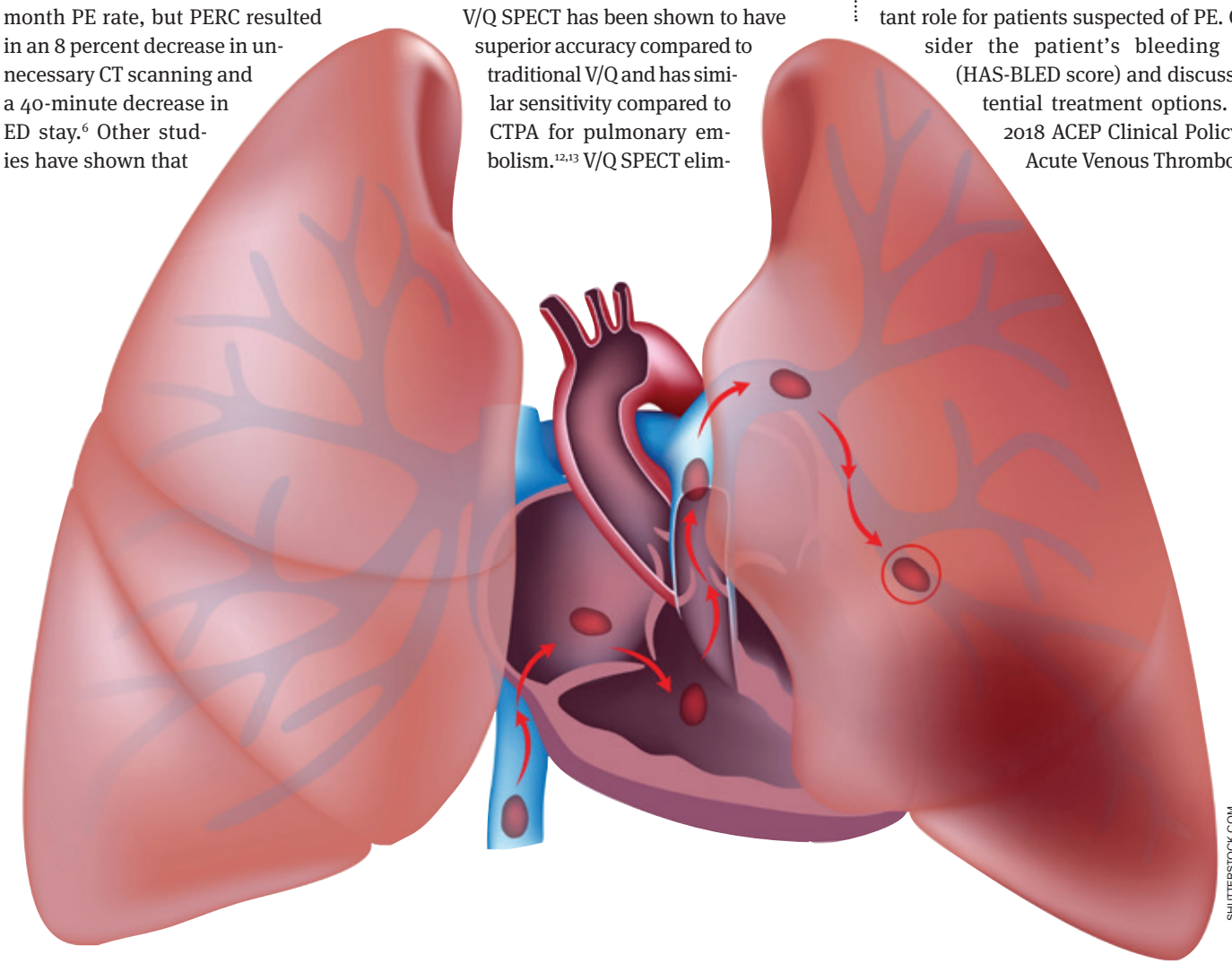
Clot burden and clot location on CTPA have not been shown to accurately predict outcome or even symptoms. The clinical context is much more important, and markers such as hypotension and hypoxia are far better outcome predictors.[11]

V/Q SPECT has been shown to have superior accuracy compared to traditional V/Q and has similar sensitivity compared to CTPA for pulmonary embolism.[12,13] V/Q SPECT eliminates intermediate probability scans and is reported dichotomously as positive or negative for PE. This avoids the ambiguity of results seen with traditional V/Q scan interpretation. Robust data are pending regarding its diagnostic utility compared to CTPA. However, the current evidence suggests that it may be superior with a lower dose of radiation to breast tissue.[13] Consider V/Q SPECT not only in otherwise healthy young patients with a normal chest X-ray and those with CT contrast allergy but also in patients with existing lung disease.

Treatment Decisions

Is there any evidence for clinical benefit in treating subsegmental PE found on CTPA? An observational study by Goy et al in 2015 reviewed 2,213 patients with a diagnosis of subsegmental PE and showed that whether or not anticoagulation was given, there were no recurrent PEs. However, 5 percent of anticoagulated patients developed life-threatening bleeding.[14] Other studies have yielded similar results.[15]

Shared decision making plays an important role for patients suspected of PE. Consider the patient's bleeding risk (HAS-BLED score) and discuss potential treatment options. The 2018 ACEP Clinical Policy on Acute Venous Thromboem-



SHUTTERSTOCK.COM

bolic Disease gives withholding anticoagulation in patients with subsegmental PE a Level C recommendation and states: "Given the lack of evidence, anticoagulation treatment decisions for patients with subsegmental PE without associated [deep vein thrombosis] should be guided by individual patient risk profiles and preferences [Consensus recommendation]."[16]

Nonetheless, I recommend starting anticoagulants for subsegmental PE in the emergency department with a clear explanation that anticoagulants may (and probably should) be stopped in follow-up. While the risk of major bleeding with a full course of anticoagulation is significant, the risk of bleeding from a few doses of anticoagulant is very low. Thus, starting treatment for subsegmental PE in the emergency department and referring the patient for timely (within a few days) follow-up in a thrombosis or internal medicine clinic is a reasonable option. Consultants may risk-stratify low-risk patients with serial lower-extremity Doppler ultrasound to direct ongoing therapy.

Big-Picture Solutions to Over-Investigating

Some potential solutions to over-investigating include malpractice reform, more time spent talking to patients, and a change in the system of financial rewards for ordering tests. For PE workup in particular, departmental decision support systems have been shown to reduce imaging rates and increase diagnostic yield.[17]

So next time you're about to pull the trigger on ordering a CTPA for suspected PE based on gestalt, instead take the time to use your evidence-based departmental decision support system that utilizes diagnostic decision tools such as Geneva score, Wells' score, D-dimer and PERC rule. If your patient is young or has a contrast allergy, consider a V/Q SPECT as a potentially more accurate test for PE that may result in fewer false positives with less radiation than CTPA.

Special thanks to Dr. Eddy Lang and Dr. Kerstin de Wit for their expert contributions to the EM Cases podcast on which this article was based.

References

1. Pollack CV, Schreiber D, Goldhaber SZ, et al. Clinical characteristics, management, and outcomes of patients diagnosed with acute pulmonary embolism in the emergency department: initial report of EMPEROR (Multicenter Emergency Medicine Pulmonary Embolism in the Real World Registry). *J Am Coll Cardiol.* 2011;57(6):700-706.
2. Bariteau A, Stewart LK, Emmett TW, et al. Systematic review and meta-analysis of outcomes of patients with subsegmental pulmonary embolism with and without anticoagulation treatment. *Acad Emerg Med.* 2018;25(7):828-835.
3. MacDougall DA, Feliu AL, Boccuzzi SJ, et al. Economic burden of deep-vein thrombosis, pulmonary embolism, and post-thrombotic syndrome. *Am J Health Syst Pharm.* 2006;63(20 suppl 6):S5-S15.
4. Schechter MT, Sheps SB. Diagnostic testing revisited: pathways through uncertainty. *Can Med Assoc J.* 1985;132(7):755-760.
5. Penaloza A, Verschuren F, Meyer G, et al. Comparison of the unstructured clinician gestalt, the wells score, and the revised Geneva score to estimate pretest probability for suspected pulmonary embolism. *Ann Emerg Med.* 2013;62(2):117-124.e2.
6. Freund Y, Cachanado M, Aubry A, et al. Effect of the pulmonary embolism rule-out criteria on subsequent thromboembolic events among low-risk emergency department patients: the PROPER randomized clinical trial. *JAMA.* 2018;319(6):559-566.
7. Kline JA, Stubblefield WB. Clinician gestalt estimate of pretest probability for acute coronary syndrome and pulmonary embolism in patients with chest pain and dyspnea. *Ann Emerg Med.* 2014;63(3):275-280.
8. van Belle A, Büller HR, Huisman MV, et al. Effectiveness of managing suspected pulmonary embolism using an algorithm combining clinical probability, D-dimer testing, and computed tomography. *JAMA.* 2006;295(2):172-179.
9. van der Hulle T, van Es N, den Exter PL, et al. Is a normal computed tomography pulmonary angiography safe to rule out acute pulmonary embolism in patients with a likely clinical probability? A patient-level meta-analysis. *Thromb Haemost.* 2017;117(8):1622-1629.
10. Belzile D, Jacquet S, Bertoletti L, et al. Outcomes following a negative computed tomography pulmonary angiography according to pulmonary embolism prevalence: a meta-analysis of the management outcome studies. *J Thromb Haemost.* 2018;16(6):1107-1120.
11. den Exter PL, van Es J, Klok FA, et al. Risk profile and clinical outcome of symptomatic subsegmental acute pulmonary embolism. *Blood.* 2013;122(7):1144-1149.
12. Gutte H, Mortensen J, Jensen CV, et al. Comparison of V/Q SPECT and planar V/Q lung scintigraphy in diagnosing acute pulmonary embolism. *Nucl Med Commun.* 2010;31(1):82-86.
13. Bhatia KD, Ambati C, Dhaliwal R, et al. SPECT-CT/VQ versus CTPA for diagnosing pulmonary embolus and other lung pathology: pre-existing lung disease should not be a contraindication. *J Med Imaging Radiat Oncol.* 2016;60(4):492-497.
14. Goy J, Lee J, Levine O, et al. Sub-segmental pulmonary embolism in three academic teaching hospitals: a review of management and outcomes. *J Thromb Haemost.* 2015;13(2):214-218.
15. Yoo HH, Queluz TH, El Dib R. Anticoagulant treatment for subsegmental pulmonary embolism. *Cochrane Database Syst Rev.* 2014;(4):CD010222.
16. ACEP Clinical Policies Subcommittee (Writing Committee) on Thromboembolic Disease. Clinical policy: critical issues in the evaluation and management of adult patients presenting to the emergency department with suspected acute venous thromboembolic disease. *Ann Emerg Med.* 2018;71(5):e59-109.
17. Deblois S, Chartrand-Lefebvre C, Toporowicz K, et al. Interventions to reduce the overuse of imaging for pulmonary embolism: a systematic review. *J Hosp Med.* 2018;13(1):52-61.

SKEPTICS' | CONTINUED FROM PAGE 22

in the real world. Often, parents have provided some analgesia (ibuprofen or acetaminophen) before arrival, or children will be given a dose in the emergency department.

Bottom Line

IN ketamine is a noninferior analgesic compared to IN fentanyl for children with acute extremity injuries but does cause more minor adverse events.

Case Resolution

You instruct the nurse to administer 1.5 mg/kg of IN ketamine to the boy while he waits for his X-ray. His pain decreases to 5/10, and the X-ray confirms a buckle fracture. You splint him, which provides even more pain relief.

Thank you to Dr. Samina Ali, a pediatric emergency physician, clinician-scientist, and professor of pediatrics and emergency medicine at the University of Alberta in Edmonton.

Remember to be skeptical of anything you learn, even if you heard it on the Skeptics' Guide to Emergency Medicine.

References

1. Brown JC, Klein EJ, Lewis CW, et al. Emergency department analgesia for fracture pain. *Ann Emerg Med.* 2003;42(2):197-205.
2. Selbst SM, Clark M. Analgesic use in the emergency department. *Ann Emerg Med.* 1990;19(9):1010-1013.
3. Dong L, Donaldson A, Metzger R, et al. Analgesic administration in the emergency department for children requiring hospitalization for long-bone fracture. *Pediatr Emerg Care.* 2012;28(2):109-114.
4. LeMay S, Johnston C, Choinière M, et al. Pain management interventions with parents in the emergency department: a randomized trial. *J Adv Nurs.* 2010;66(11):2442-2449.
5. Kircher J, Drendel AL, Newton AS, et al. Pediatric musculoskeletal pain in the emergency department: a medical record review of practice variation. *CJEM.* 2014;16(6):449-457.
6. Wind-up. AnaesthesiaUK website. Available at: http://www.frca.co.uk/article.aspx?articleid=100514. Accessed Feb. 21, 2019.

cises, informed by actual patient demographic and chief complaint data to validate their model. During construction, the transition team made regular visits to the new space to give input on nonstructural decisions like computer and phone placement. Toward the end of the build, the transition team began intense training for the staff on patient flow and new processes. There were tutorials regarding supply locations, travel throughout the department, patient streaming, and all operational details. Exact patient flow through the department was mapped, and the staff received this training as well.

Finally, the transition team conducted several days of mock patient encounters, with registration and ancillary services present. Interesting small changes were identified. Patient intake was challenging due to a bulletproof window that did not allow for communication with arriving patients and families. This was addressed by adding an intercom. The imaging department developed the details for patients being transported to imaging. Ultrasound opted to bring the ultrasound machine to the emergency department for formal ultrasounds rather than transporting patients out of the department.

Celebrating Success

All of this preparation led to a seamless opening day, and within a week, the WHHS emergency department was performing better than it did prior to the change. Door-to-physician times were seven minutes, and patient walkaways all but disappeared.

Current State Metrics

- **Door to Provider:** 9 minutes
- **LOS Overall:** 164 minutes
- **LOS Admitted:** 286 minutes
- **LOS Discharged:** 133 minutes
- **Left Without Being Seen:** 0.5 percent

For anyone looking forward to a moving day, it is never too early to start the transition work. The WHHS transition team led one of the most successful emergency department relocations I have heard of. The time spent helped the team to maintain a high-functioning and cohesive unit that was able to problem-solve as new situations arose. They are now such a high-performing team that they are ready for their next challenges: The WHHS ED leaders are maintaining their magnet status while planning to become a designated trauma center for their region! Hats off to the WHHS transition team.

CODING WIZARD

NAVIGATE THE CPT MAZE, OPTIMIZING YOUR REIMBURSEMENT

Editor's Note: *Cutting through the red tape to make certain that you get paid for every dollar you earn has become more difficult than ever, particularly in our current climate of health care reform and ICD-10 transition. The ACEP Coding and Nomenclature Committee has partnered with ACEP Now to provide you with practical, impactful tips to help you navigate through this coding and reimbursement maze.*

SCRIBES AND DOCUMENTATION

by **WALTER L. GREEN, MD**

Question: What do I need to document to bill for burns and their treatment?

Answer: In addition to documenting an appropriate E/M encounter (eg, Current Procedural Terminology [CPT] 99283), four things should also be documented for patients with burns: location, size relative to total body surface area (TBSA), depth of the burn, and whether dressings or debridement were performed and by whom. Anatomical location should include laterality, left or right, and the specific part of the body involved (eg, palm and/or back hand surface, each finger).

TBSA can be estimated using the rule of nines or a burn diagram. A diagram is especially useful in children since the rule of nines may be inaccurate. The depth of burns should be documented as first degree, partial thickness, or full thickness. CPT 16000 (1.32 relative value units [RVUs], $48.04 Medicare) is for first-degree local treatment, 16020 (1.55 RVUs, $55.87 Medicare) applies to dressings/debridement of <5 percent TBSA partial thickness burns, 16025 (3.16 RVUs, $113.88 Medicare) is for dressings/debridement of TBSA 5 to 10 percent partial thickness burns, and 16030 (3.82 RVUs, $137.67 Medicare) is for dressings/debridement of TBSA >10 percent partial thickness burns.

Brought to you by the ACEP Coding and Nomenclature Committee.

DR. GREEN is associate professor of emergency medicine at University of Texas Southwestern Medical School, Dallas.

CLASSIFIEDS

{ Job Opportunities }

Division Chief, Pediatric Emergency Medicine
EMS Fellowship Director/EMS Medical Director
Assistant Medical Director
PEM/EM Core Faculty
Vice Chair Research Emergency Medicine

What We're Offering:

- We'll foster your passion for patient care and cultivate a collaborative environment rich with diversity
- Salaries commensurate with qualifications
- Sign-on bonus
- Relocation assistance
- Retirement options
- Penn State University Tuition Discount
- On-campus fitness center, daycare, credit union, and so much more!

What We're Seeking:

- Experienced leaders with a passion to inspire a team
- Ability to work collaboratively within diverse academic and clinical environments
- Demonstrate a spark for innovation and research opportunities for Department
- Completion of an accredited Emergency Medicine Residency Program
- BE/BC by ABEM or ABOEM
- Observation experience is a plus

What the Area Offers:

We welcome you to a community that emulates the values Milton Hershey instilled in a town that holds his name. Located in a safe family-friendly setting, Hershey, PA, our local neighborhoods boast a reasonable cost of living whether you prefer a more suburban setting or thriving city rich in theater, arts, and culture. Known as the home of the Hershey chocolate bar, Hershey's community is rich in history and offers an abundant range of outdoor activities, arts, and diverse experiences. We're conveniently located within a short distance to major cities such as Philadelphia, Pittsburgh, NYC, Baltimore, and Washington DC.

FOR ADDITIONAL INFORMATION PLEASE CONTACT:

PennState Health

Susan B. Promes, Professor and Chair, Department of Emergency Medicine c/o Heather Peffley,
Physician Recruiter, Penn State Health Milton S. Hershey Medical Center
500 University Drive, MC A595, P O Box 855, Hershey PA 17033
Email**: hpeffley@pennstatehealth.psu.edu**
or apply online at: **hmc.pennstatehealth.org/careers/physicians**

Penn State Health is committed to affirmative action, equal opportunity and the diversity of its workforce. Equal Opportunity Employer – Minorities/Women/Protected Veterans/Disabled.

We fight the good fight.

At USACS we have one mission: to care for patients. Every full-time physician in our group becomes an owner in our group, creating a legendary culture and camaraderie you can feel. That's true whether you're working in the ED, or getting clobbered by a snowball on a ski trip with your fellow comrades.

Discover why USACS is the fastest growing physician-owned group in the country. Check out career opportunities at USACS.com.

US Acute Care Solutions

Own your future now. Visit USACS.com
or call Darrin Grella at 800-828-0898. dgrella@usacs.com