Jen Crebs: Hello and welcome to a new year of Trauma Loupes, the *Journal of Trauma and Acute Care Surgery*’s monthly podcast. This is Jen Crebs, managing editor.

Right as we entered 2013, the January issue went to press, so hopefully you’ve received your copy by now. Today we’ll hear from editor-in-chief Dr. Gene Moore, and Dr. Angela Sauaia, the Journal’s biostatistician, who are here to comment on a few selected articles. We’ll start with Dr. Moore and his must-reads for the month....

Dr. Gene Moore:

Welcome to the January 2013 issue of the *Journal of Trauma*. This issue is indeed a treasure as it highlights major contributions from the recent AAST meeting.

The lead article is by President Wayne Meredith who employed the metaphor “how to boil a frog” to review the past, present, and future of Acute Care Surgery. His central theme was that this politically charged process must proceed methodically with due consideration of the potential ramifications. While comprehensive Acute Care Surgery has been practiced in some urban safety-net trauma centers for decades, the concept is largely foreign to many academic centers. However, we are making substantial progress. I had the privilege of serving as the Florida COT visitor in late October, and was pleased to see that in virtually every academic institution in Florida, there is a division of acute care surgery and, gratifyingly, that in many this service has the first right-of-refusal for operative care of any patient entering through the Emergency Department.

The next contribution is the Fitts Oration delivered by Dr. David Hoyt, who told the story of the NIH- and DOD-sponsored Resuscitation Outcomes Consortium, using this as a paradigm for conducting large scale randomized clinical trials. Dr. Hoyt modestly described his pivotal role in accomplishing this landmark collaboration. The accompanying special reports by Dr. John Morris and colleagues outline the AAST research agenda for emergency general surgery, emphasizing the enormous research opportunities we have if we can develop collaborations similar to ROC.

The next AAST highlight is the Master Surgeon lecture by a true master surgeon, Dr. Charles Lucas, who authoritatively describes technical
solutions for large torso wounds, specifically chest wall defects and those following the open abdomen.

The CME articles this month focus on emergency general surgical issues. The first is by Dr. de Mestral and colleagues from St. Michael’s Hospital and Institute for Clinical Evaluative Science in Toronto who evaluated more than 10,000 patients who were admitted with acute cholecystitis and subsequently discharged without cholecystectomy. The occurrence of gallstone-related events within six weeks was 14% and, alarmingly, 29% at 1 year. Interestingly, the risk was highest for those patients between 18 to 34 years old. This study reaffirms the general policy in the US to remove the gallbladder during the initial admission for acute cholecystitis, but this large experience in Canada provides a unique opportunity to validate this policy.

In a related study, and perhaps more appropriate for the US, Dr. Kelli Brooks and colleagues from Duke University examine the optimal timing of cholecystectomy during initial hospitalization for patients admitted with acute cholecystitis. In sum, they demonstrate the sooner the better. Multivariate logistic regression analyses indicated that delayed cholecystectomy was associated with a higher conversion rate to an open procedure and increased the length of hospitalization.

The other CME article is by Dr. Geoff Garst et al from the University of Colorado who developed a disease severity score for acute appendicitis. The concept parallels that of organ injury scaling that also originated in Denver. Analyzing 1,000 consecutive patients undergoing appendectomy, the proposed five-grade system performed well, correlating strongly with adverse outcomes. The authors submit that disease severity scores for emergency procedures done by acute care surgeons would be useful to compare therapeutic modalities, plan resource utilization, improve performance, and adjust reimbursement for patient care.

Again, the AAST research agenda for EGS [here and here] is also available in this issue of the Journal and covers this topic as well. Finally, as this issue contains a record 32 AAST plenary and poster presentation manuscripts, it is indeed a treasure of new and exciting information. Happy reading!

Jen Crebs: Thank you, Dr. Moore. Now we’ll turn to Dr. Angela Sauaia to hear more about the statistical side of the January issue. Welcome, Dr. Sauaia.
Dr. Angela Sauaia:

Thank you, Jen. Both AAST 2012 Special reports in this issue emphasize the need for risk adjustment models and high-quality, well-designed, well-analyzed clinical trials. An important part of this goal relates to the good use of multivariate analysis. In last July’s podcast, I briefly spoke about multivariate analysis. It seems about time to go back to this increasingly used statistical tool. In this January issue, out of roughly 35 clinical research articles, 23 required some form of multivariate analysis. Of these, six, or about a quarter, used multivariate analysis for prediction; in the remaining three-quarters, multivariate analysis would be used for control of multiple confounders.

Multivariate analysis indeed can be used for two main purposes: to find predictors, or more often, to control or adjust for multiple confounders. These two purposes require diametrically different methods; therefore it is key that investigators define this at the very beginning. As an example of the use of predictors, we can look at the excellent report on triggers of massive transfusion in the PROMMTT study. Callcut and her colleagues used multiple logistic regression to define variables available right at the ED to assist providers in defining who is likely to need a massive transfusion. To find these predictors, one can use statistical software to make the “statistical decision” and “choose” variables. No causal mechanism can be implied, and the final product of this type of multivariate analysis is, quite simply, a tool. For example, “matches in your pocket” is an excellent predictor of lung cancer, which does not imply a causal effect. Predictors can also be used to produce risk adjustment models, when we want to compare quality of care at different institutions or for many other purposes.

On the other side of the multivariate analysis spectrum, it is the much more common goal of adjusting or controlling for multiple confounders. An example in this issue is the also excellent study by Brooks and colleagues, who used the American College of Surgeons National Surgical Quality Improvement Program database to evaluate timing of cholecystectomy for patients admitted with acute cholecystitis.

If we look at the fine print of Tables 3 and 4 of this article, we will see that mortality, morbidity and other outcomes were adjusted for patient age, sex, BMI, and a number of other patient characteristics. That means that regardless of how old, how obese, etc., late cholecystectomy patients were more likely to require open procedures and longer hospitalization. Thus, the authors concluded that immediate cholecystectomy was better. I will tell you, this is a relief for those of us who had immediate cholecystectomies for acute cholecystitis. But I digress. Going back to the statistical analysis, when adjustment for multiple confounders is the purpose, then the clinician is the one who
decides which variables to include in the model. And these variables are not selected to stay or not to stay in the model, they remain there so we can evaluate the independent effect of this variable of interest, in this case timing of cholecystectomy. We do not use statistical software to determine which variables remain or not in the model. We can use some guidance from the univariate association, but only as guidance. If the variable is clinically important, regardless of the univariate analysis, we must include it in the model. In the end, this is fundamentally a clinical decision. There, enough of statistics for one day.

See you soon, and happy New Year!

Jen Crebs: Thank you, Dr. Sauaia.

The two cholecystitis studies were clearly compelling this month, so we have opened access on one of these—the CME article by Dr. de Mestral and colleagues in Toronto. Please stop by our website to read the entirety of this article, along with two centerpieces of last September’s AAST meeting—that is, Dr. Hoyt’s Fitts Oration and Dr. Meredith’s presidential address.

We’ll be back in about a month with highlights from the February 2013 issue. In the meantime, please send any questions or requests to info@jtrauma.org. Thanks for listening and best wishes for 2013.