Anesthesia Data Conference – Agenda Version 1.1

Materials and Methods for Working with Large Anesthesia Data Sets

0800-1600; ASA HQ, Schaumburg IL

Session 1: Framing the opportunity: Why are we here? (15 min)
Dr. Dutton will provide a brief description of academic work with the NACOR dataset, and the challenges and opportunities identified to date. These include an understanding of the problem of missing data, and how to address it; the possibility of bias in the roster of participating practices; and the need to validate NACOR data against external sources.

Learning Objectives
- Describe challenges of validity and bias in the use of registry data
- Enumerate scholarly opportunities (gaps in knowledge) in anesthesia data
- Suggest methodologies for external validation of registry data

Presenter
Richard Dutton, M.D., M.B.A., Executive Director, Anesthesia Quality Institute

Session 2: What will the editors and reviewers be looking for? (60 min)
Dr. Dexter, the Statistical Editor for Anesthesia & Analgesia, will begin the conference with a description of the journal review process for papers based on analysis of registry data. He will emphasize creation of the research dataset from the registry, the impact of missing data – both systematically missing and missing at random – and appropriate statistical methodology for identifying and quantifying associations found in the data. This will include a brief discussion of logistic regression and propensity scoring.

Learning Objectives
- Describe the review process at Anesthesia & Analgesia
- Enumerate common pitfalls in academic work based on registry data
- Review the most appropriate statistical methodology for work with large datasets

Presenter
Franklin Dexter, M.D., Ph.D., Professor, Department of Anesthesia, University of Iowa

Session 3: What does NACOR data look like? (30 min)
The National Anesthesia Clinical Outcomes Registry is the largest available source of information on how anesthesia services are provided. NACOR’s primary purpose is promotion of quality improvement in participating anesthesia practices (currently more than 400), but the administrative, quality outcome and granular process data collected are of utility to researchers. Dr. Dutton will review the basics of how NACOR data are harvested, validated and included in the registry.

Learning Objectives
- Understand the purpose of NACOR and governance of the Anesthesia Quality Institute
- Describe the process of recruiting practice participation in NACOR, including the potential biases which might result
- Trace the collection process for NACOR data from the point of care, through electronic transmission, validation, analysis and inclusion in the Participant User File

Presenter
Richard Dutton, M.D., M.B.A., Executive Director, Anesthesia Quality Institute

**Session 4:** The Multicenter Perioperative Outcome Group (MPOG) Registry (30 min)
Dr. Shah will present a description of the MPOG anesthesia registry, including its purpose, its participants, and its data harvesting mechanisms. In particular he will focus on areas in which MPOG is an appropriate source for research data, either on its own or in combination with data from another source.

**Learning Objectives**
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**Presenter**
Dr. Nirav Shah

**Session 5:** External data sources: What is available, and how do we get it? (30 min)
Although NACOR provides data specific to the specialty of anesthesiology, there are numerous other large sources of data available on perioperative care. Dr. Miller will review the commonly used public and private datasets, including Medicare records and the National Inpatient Sample, and will provide practical recommendations on how to access these data, what specific elements are included or missing, and what methodologies have been used to analyze them.

**Learning Objectives**
- Describe the available datasets with representative national information on perioperative care
- Describe how to access the data in these collections, and what elements are available
- Briefly review recent major publications in this area, and their strengths and weaknesses

**Presenter**
Thomas Miller, Ph.D., M.B.A., Director of Health Policy Research, American Society of Anesthesiologists

**Session 6:** Load and Go – How to start a data-mining project (30 min)
This nuts-and-bolts lecture will walk the novice data miner through the basic steps of obtaining access to a large dataset, loading it into an appropriate statistical analysis software package, cleaning and organizing the information, and conducting basic descriptive tests. Dr. Shahul will illustrate this lecture from his own work with NACOR and other sources of ‘big data’ in perioperative care.

**Learning Objectives**
- Compare and contrast different statistical software available to anesthesiologist researchers
- Review procedures for loading and cleaning large datasets
- Illustrate how to characterize a large dataset through the first round of demographic analysis

**Presenter**
Sajid Shahul, M.D., M.P.H., Associate Professor, Department of Anesthesia and Critical Care, University of Chicago Medical Center

**Session 7:** Cleaning physiologic data (30 min)
The most complex large datasets in anesthesia include outputs from physiologic monitors in the operating room such as noninvasive blood pressure, arterial oxygen saturation and heart rate and rhythm, often gathered continually at microsecond intervals. Before analysis in a clinical research project these data require cleaning of
artifacts, aggregation over time and synchronization with other records. This area of study necessitates specific and evolving methodologies to maintain data integrity and maximize precision.

**Learning Objectives**
- Describe the challenges of work with physiologic data
- Review common algorithms for cleaning vital sign records of artifacts
- Present methodologic recommendations for data aggregation over time.

**Presenter**
Leif Saager, M.D., Cleveland Clinic Foundation Department of Outcomes Research

**Session 8:** Creative collection of institutional data – Can this be scaled up? (30 min)
Significant quantities of clinical information are available to researchers in large anesthesia practices, although often difficult to access and analyze. Dr. Tung will describe how to acquire research data from electronic healthcare records, how to connect disparate data elements from multiple sources, and how to detect rare outcomes and adverse events in such institutional records.

**Learning Objectives**
- Describe the common data available to researchers at their local level
- Illustrate connection of disparate data to link process and outcomes in clinical anesthesiology
- Explain how this kind of local detective work can be scaled for use in co-analysis projects pulling data from multiple national-level registries

**Presenter**
Avery Tung, M.D., Professor, Director of Critical Care Services Burn Unit, University of Chicago Medical Center

**Session 9:** What I did with NACOR data (15 min each; 3 hours total)
This moderated panel discussion will feature 9 researchers already using NACOR data for scholarly work. Each speaker will briefly describe their hypothesis, their basic methodology and their results. Dr. Dutton will then moderate a discussion among the investigators of the common pitfalls of work with NACOR data and how they were overcome. The session is intended to be a practical and inspiring illustration of what data are available in NACOR and how they can be used.

**Learning Objectives**
- Review projects already undertaken with NACOR data
- Illuminate useful methodologies for focusing research datasets and validating the results
- Discuss potential pitfalls and how they were avoided in these true examples.

**Presenters**
Joseph Hyder, M.D., Ph.D., Associate Professor, Department of Anesthesia, Mayo Clinic, Rochester
Franklin Dexter, M.D., Ph.D., Professor, Department of Anesthesia, University of Iowa
Peter Fleischut, M.D., Associate Professor, Department of Anesthesia, Weill Cornell Medical College
Richard Urman, M.D., M.B.A., C.P.E., Associate Professor, Department of Anesthesia, Harvard Medical School, Brigham and Womans Hospital
Michael Andreae, M.D., Assistant Professor, Department of Anesthesiology, Montefiore Medical Center, Albert Einstein College of Medicine
Elizabeth Whitlock, M.D., Department of Anesthesiology, University of California, San Francisco, School of Medicine
Jonathan Wanderer, M.D., Department of Anesthesiology, Vanderbilt University

*Moderator – Richard P. Dutton, M.D., M.B.A.*

**Session 10:** Future possibilities (30 min)
Information Age technology will bring academic anesthesiologists a wealth of opportunities to improve patient care through analysis of large datasets. The concluding panel of the conference will be an interactive session with all of the speakers and audience brainstorming about gaps in the anesthesiology knowledge base that can be addressed through registry-based research.

**Learning Objectives**
- Describe what can and cannot be done with large datasets at present
- Determine which data elements currently not available to anesthesia researchers would offer the most value in the future
- List the scientific topic areas most likely to benefit from research in registries in both the short-term and long-term

*Moderator*
Richard Dutton, M.D., M.B.A., Executive Director, Anesthesia Quality Institute

**Needed:**
- Reading list / syllabus for advance distribution
- Durable materials for the meeting