

ATS Highlights 2023: Critical Care Assembly Early Career Professionals



C. Adrian Austin MD, MSCR

Clinical Instructor

Division of Pulmonary and Critical Care Medicine,

Division of Geriatric Medicine

University of North Carolina at Chapel Hill

Email: caaustin@unchealth.unc.edu

Twitter: [@AdrianAustinMD](https://twitter.com/AdrianAustinMD)

Tell us about your yourself.

I am an Intensivist, Pulmonologist, and Geriatrician with a strong interest in delirium research. My clinical interests are preserving older adults' functionality by focusing on their respiratory system, and managing the issues faced by survivors of severe critical illness. I have a geriatric pulmonology clinic at UNC that serves patients with these issue.

Describe your academic interests.

My research is clinical/ translational in nature and focuses on reducing the incidence and impact of delirium. Primarily, I am interested in using pharmacogenetics driven medication selection to reduce delirium in the inpatient setting. I also have an interest and expertise in using telemedicine for delirium assessment. I am investigating the impact of variations in pharmacogenetics on the metabolism of opiates used for analgosedation in the critically ill. The goal of this work would is to ultimately use pharmacogenetics to augment our medication selection decisions in the ICU, bringing a precision medicine approach to this environment.

Where do you see yourself in 5 years?

I see myself as an independent academic researcher designing and conducting clinical trials investigation the utilization of pharmacogenetics for the management of the critically ill and reduction of delirium in this population.

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Tell us about your research.

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I have recently been investigating the usage of pharmacogenetics in the management of critically ill adults with goals of reducing the impact of sedative related delirium in this population. Delirium, an acute change in cognition and attention is associated with a variety of undesirable outcomes including increased in-hospital mortality, long-term cognitive decline, and increased risk for institutionalization. Delirium is prevalent in the critically ill population. Most critically ill, mechanically ventilated adults receive drugs that can worsen delirium, such as opiates, as part of routine care. However, there is wide clinical variation in response to these medications. Genetic variation in drug metabolism (pharmacogenetics) may explain the clinically observed variations in delirium duration and severity. I have hypothesized that the pharmacogenetics of opiate metabolism is associated with differences in drug levels in different patients experiencing a critical illness (pharmacokinetics) and that pharmacogenetic variability leads to differences in observed clinical responses (pharmacodynamics) which, consequently, are associated with differences in delirium and duration of mechanical ventilation. There is growing evidence for the potential of using pharmacogenetics for medical decision making in the outpatient population. I believe that this approach can be used in the critically ill and that additional research in this population is necessary due to differences in drug metabolism (volume of distribution, clearance, etc) inherent to the critically ill that are different from outpatients.

I recently completed a pilot study investigating the feasibility of conducting this type of research in our ICU. I found that we can feasibly, safely, and quickly enroll patients and collect high quality genetic data. This project also provided data suggesting potential high impact single nucleotide polymorphisms (SNP's) involved in differences in drug metabolism and the downstream clinical effects (i.e. delirium). Our project was not powered for inferential statistics, but I plan to explore these SNP's in a future larger project. I am currently applying for funding for this larger project. The goal over the next few years would be to confirm that certain high impact SNP's are associated with either high or low opiate metabolism and resultant clinical effects in the critically ill. I would then like to conduct a clinical trial investigating the usage of this information versus usual care for sedative agent selection and dosing with the hypothesize the pharmacogenetics can improve drug selection and reduce negative outcomes such as over-sedation and delirium.