UVA NEONATOLOGY FELLOW SCHOLARSHIP OPPORTUNITIES
Potential Research, QI, and Education Projects
updated June 2020

IN GENERAL:

1) The SCHOLARSHIP requirement for UVA Neonatology Fellows typically includes a portfolio of several projects which may or may not be inter-related.
2) The Scholarship Oversight Committee consists of 3 members. The primary mentor is generally Associate Professor or Professor. One SOC member must be outside the Neonatology Division. The Program Director serves as ex officio member of each fellow's SOC (not one of the 3 official SOC members).
3) Full SOC meetings are held each November and May, generally 1 hour with powerpoint presentation of progress and plans (more details elsewhere).
4) Biannual brief presentation of each fellow's SOC progress to Neonatology Division generally occurs each November and May.

- Please see the UVA Children's Hospital Research Center (CHRC) website for a description of research within and outside the Neonatology Division: *https://research.med.virginia.edu/chrc*
- Please see the UVA Neonatology Fellowship website for an overview of division faculty scholarship interests: https://med.virginia.edu/pediatrics/divisions/neonatology/neonatology-research/
- Beyond the Department of Pediatrics, there are research and opportunities in other Departments including Global Health, School of Nursing, Biomedical Engineering, and others that can be explored in discussion with the Program Director.

Fellow SOC Responsibilities: The fellow is expected to work on their scholarly projects every weekday they are not either on service, post-call, or on vacation. Generally this means being in the lab or office from 9-5 if not involved in clinical conferences or in the unit collecting data or enrolling patients. If fellow is F2 they are expected to work on SOC in the afternoons.

Primary Mentor SOC Responsibilities: The primary SOC mentor is expected to meet weekly with the fellow in year 1 (when the fellow is not F1 in the NICU) and at least bimonthly in years 2-3. The primary mentor is expected to assist the fellow in all aspects of the research including (if applicable) IRB work, data analysis, and preparing abstracts and manuscripts.

EXAMPLE PROJECTS

Mentors may have several other possible projects, these are examples to give an idea of the type of work being done

BENCH RESEARCH

Within the Neonatology Division, bench research opportunities are available in the Neuroscience Laboratory of Dr. Jennifer Burnsed.

Title: Neuronal activity during learning and memory in young adult mice exposed to neonatal hypoxia ischemia
Question: Does neonatal hypoxia ischemia permanently alter neuronal circuitry involved in learning and memory?
Mentors: Burnsed, Kapur, Periasamy
Protocol or IRB approved? Yes
Work: 1) Perform learning and memory tasks in young adult mice that were exposed to neonatal hypoxia ischemia 2) Process and analyze neuronal tissue specimens (microscopy, 3D reconstruction and analysis)
Metrics: Learning and memory performance in mice. Neuronal activity mapping

Additional bench research opportunities for neonatology fellows outside the Neonatology Division include but are not limited to the areas of Infectious Diseases (particularly related to NEC and the intestinal microbiome, in the laboratories of Drs. Nataro, Zeichner, and Moore) and Nephrology (in the laboratories of Drs. Charlton, Lopez, and Gomez).

CLINICAL AND QUALITY IMPROVEMENT RESEARCH (by topic)

Neonatal Neurology

Title: Cerebral tissue oxygenation variability in neonates with HIE
Question: Does CtO2 variability correlate with HIE severity and short-term motor outcomes?
Mentor(s): Zanelli, ? Spaeder
Protocol or IRB approved? No
Work: Prospective - Obtain IRB approval - Write grant to purchase NIRS probes - Calculate NIRS variability
Metrics: - Short term NICU outcomes and motor outcomes as assessed by GMA and HINE

Title: Enlargement of sub-arachnoid (ESS) space in preterm neonates and short term motor outcomes.
Question: Does ESS size correlates with short term motor outcomes in VLBW infants?
Mentor(s): Zanelli, Burnsed, ?Daugherty
Protocol or IRB approved? No
Work: Retrospective/prospective - Obtain IRB approval - Perform ESS measurements
Metrics: - ESS measurement, HC at TEA - GMA and HINE

Title: Impact of music therapy on cerebral tissue oxygenation during a painful procedure.
Question: Can music therapy decrease the impact of painful procedures on CtO2?
Mentor(s): Zanelli, ? Spaeder
Protocol or IRB approved? No
Work: Prospective - Obtain IRB approval - Write grant to purchase NIRS probes - Develop the music therapy playlist - Calculate NIRS variability
Metrics: - CtO2 changes pre/during and post procedure; CtO2 variability

Title: Impact of language curriculum on pre-verbal language skills in preterm infants.
Question: Can a structured language curriculum improve pre-verbal language skills in infants born preterm?
Mentor(s): Zanelli, Letzkus
Protocol or IRB approved? No
Work: Prospective - Development of the language curriculum - Grant writing to purchase the LENA device

Metrics: Pre-verbal language skills (measured by LENA device) at term corrected age

Title: aEEG in the NICU **- QI PROJECT**
Question/Goal: Optimization of aEEG display on current full scale EEG screen
Mentor(s): Zanelli, Burnsed, Quigg
Protocol or IRB approved? No – QI project
Work: - Work Dr Quigg and E-phys lab to optimize aEEG display - Work on education plan for LIPs and nurses to: 1) look at the aEEG data and 2) know when to escalate to LIP on call and/or neurophysiologist on call
Metrics: - % compliance in target population, time to seizure treatment - Balancing measures: burden of call to neurology, false positive calls for seizure concern

Title: A standardized approach to the monitoring and treatment of PHVD and PHH **- QI PROJECT**
Question/Goal: Optimize the treatment of preterm neonates with PHVD and PHH
Mentor(s): Zanelli, O'Connell, Burnsed, ?Daugherty
Protocol or IRB approved? No – QI project
Work: - Review the literature and develop a standardized approach to PVHD and PHH monitoring and treatment - Work with radiology to incorporate standard lat vent measurements in report
Metrics: - Time to intervention compared to historical controls, short term outcomes (GMA, HINE) - Balancing measures: surgical complication

Title: NOWS/NAS management in the NICU **- QI PROJECT**
Question/Goal: Optimize the use of the ESC methodology for infants with NAS
Mentor(s): Zanelli, ?Swanson
Protocol or IRB approved? No – QI project
Work: - Develop reeducation plan on ESC methodology - Educate on team huddle prior to any opioid administration
Metrics: - LOS, number of morphine doses - Balancing measures: seizures, readmissions, poor weight gain

Microbiome, Inflammation and Neurologic Outcomes

Title: PRIIISM: Preterm Infant Inflammation and Intestinal Microbiome
Question: Are inflammation, microbiome, or metabolome associated with adverse neurodevelopmental outcomes in preterm infants?
Mentor(s): Fairchild, Kevin Pelphrey (Neurology Department)
Protocol or IRB approved? IRB submitted. Funded by TransUniversity Microbiome Initiative
Work: With parental consent, collect saliva, urine, stool, and leftover serum at three timepoints in <32 week infants
Metrics: Inflammation markers (cortisol, IL-6, 8, 10, 18) in saliva and serum. Microbiome in stool analyzed in TUMI core laboratory. Metabolome in urine analyzed in TUMI core laboratory.

Infection

Title: Antibiotic Stewardship: Do preterm infant need UTI prophylaxis?
Question: Compare infants with UTIs who were placed on prophylaxis vs. not and incidence of recurrent UTI. Our practice has changed so able to compare 2 years before 2015/6 and since.
Mentor(s): Kaufman, Charlton (Nephrology)
Protocol or IRB approved? No
Work: Examine infants with UTIs and if subsequent UTIs occurred?
Metrics: Recurrent UTIs on prophylaxis or not?

Title: Infection prevention by sanitation of mobile devices-QI
Question: 1. Compare using time-based analysis infections prior to and after the NICU implemented using an UV light machine (ReadyDock Duo) to disinfect Health care worker and family cell phones. 2. Compare hand hygiene times of visitors PRE/POST implementation of the ReadyDock Duo UV sanitizer.
Mentor(s): Kaufman, Rachel Nauman, Lisa Bryant, and HUCs(Health Unit Coordinators)
Protocol or IRB approved? No - QI
Work: Examine BSI, UTIs, and no. of sepsis evaluations prior to and after implementation of UV light sanitizer. Hand hygiene times of families.
Metrics: Late-onset infections.

Hematology

Title: Placental Blood Draws
Question: How often are we successful in obtaining admission labs at birth from the placenta, how often to we need to repeat any labs and does the placental blood culture have better yield than lower volume blood cultures drawn from the infant?
Mentor(s): Kaufman, Swanson?
Protocol or IRB approved? No - QI
Work: Review success in obtaining placental blood, technical aspects, as well as results from placental blood draws. Compare how often we are successful in obtaining placental labs, accuracy and implement QI measures
Metrics: Positive blood culture organisms, abnormal lab test results possibly artifact (low platelets), process and techniques in drawing from the placenta

Title: Keep the blood inside!
Question: Does placental lab draw work well to decrease need for sending baby blood for lab tests and blood culture at birth?
Mentor(s): Kaufman, ?Hematology , ?Swanson
Protocol or IRB approved? No - QI
Work: Review results from placental blood draws and implement QI measures
Metrics: Positive blood culture organisms, abnormal lab test results possibly artifact (low platelets)

MISCELLANEOUS

Title: NICU Bridge Program: Safely reducing NICU length of stay using iPad communication
Questions: 1) Can we safely get babies home from NICU sooner with NG feeds? 2) Can we safely get babies home from NICU sooner with apnea monitor or pulse oximeter?
Mentor(s): Vergales. Other?
Protocol or IRB approved?
Work: Work with Locus Health and Dr. Vergales on discharge with scale, iPad, and "virtual rounds" for babies that qualify for home ng feeds and/or monitor for mild cardiorespiratory events
Metrics: NICU length of stay, hospital readmissions, weight gain, number of events (brady-desat), parental satisfaction, healthcare team satisfaction

Title: Angel Eye Camera Program: Measurable improvements in outcomes
Questions: 1) Does Angel Eye Camera program lead to lower anxiety among mothers? Fathers? 2) Does AEC program lead to other improvements in measurable outcomes including discharge teaching?
Mentor(s): Epstein (Nursing School); Sinkin, Swanson
Protocol or IRB approved?
Work: Enroll families in ongoing AEC research study; participate in "virtual rounds" education. Collect survey data from parents. Develop videos of standardized discharge teaching, parent survey development
Metrics: parent surveys

Title: AWAKEN – Acute Kidney Injury in Neonates
Questions: Various
Mentor(s): Charlton (Nephrology), Swanson
Protocol or IRB approved? Yes
Work: AWAKEN database (housed at UAB) is a multi-national database on AKI in neonates. Projects require approval from Neonatal Kidney Collaborative
Metrics: Various

Title: Newborn stomach size – what is the real size?
Questions: Many people suggest the stomach of a newborn is about the size of a walnut – but there is no evidence for this. Can we determine with radiological or autopsy results the size of a newborn infant's stomach?
Mentor(s): Daughtry (Radiology), Swanson
Protocol or IRB approved? No
Work: Using fluoroscopy and other radiological techniques, determine the range of stomach sizes in neonates. Use autopsy studies to generate data.
Metrics: Stomach size

Title: Quality Improvement in the NICU
Questions: Various potential projects using data from VON, SPS, Be Safe, etc.
Mentor(s): Swanson, others
Protocol or IRB approved? No
Work: Develop projects and implement PDSA cycles; Create run and process control charts.
Metrics: outcome, process, balancing measures based on project; MOC credit

Title: Less Invasive Surfactant Administration
Questions: 1) Can LISA decrease surfactant administration complications. 2) Can LISA reduce ventilator days
Mentor(s): Swanson
Protocol or IRB approved?
Work: Create guideline on LISA for LIP use; create database and outcome metrics;
Metrics: Ventilator days; Laryngoscopy attempts; Surfactant administration complications

Title: POCUS for umbilical line placement – **QI project**
Question: Does the use of POCUS decrease the number of x-ray at time of umbilical venous line placement.
Mentor(s): Zanelli Rupin and Maryam are involved in this project. Plan to start the project this past May were cancelled because of COVID-19.
Protocol or IRB approved? No - QI project
Work: - Step 1 – education on how to detect the UVC tip with POCUS - Step 2- Use of POCUS in real time during UVC placement
Metrics: - Number of x-rays obtained at time of umbilical venous line placement - Balancing measures: line dislodgment, skin abrasion/irritation, infections, increase in procedure duration

Title: Bubble CPAP in the DR **- QI project**
Question/Goal: Optimize the respiratory support of VLBW infants in the DR to decrease the need for intubation and surfactant in VLBW infants
Mentor(s): Zanelli
Protocol or IRB approved? No – QI project
Work: - Work with RTs to build portable bubble CPAP system for the DR - Work on education plan to use bCPAP in the DR
Metrics: - % compliance in target population - Balancing measures: skin breakdown, need for intubation in the first week

Title: Vital sign analytics and autism and ADHD
Questions: Can Heart rate variability during the NICU be used to identify children at increased risk of autism?
Mentor(s): Miller, Fairchild
Protocol or IRB approved? Yes. Funded by Brain Institute
Work: Data collection and analysis Manuscript development
Metrics: Is there an association between heart rate variability and autism or ADHD.

Title: Database research focused on developmental outcomes
Questions: Various questions using a robust US national database. Academic success and executive functioning of late preterm infants compared to term infants?
Mentor(s): Miller, Scharf
Protocol or IRB approved? Exempt
Work: Develop a question, Learn data mining and analysis, Create figures, and manuscript development.
Metrics: Various