

coding RNAs (sncRNAs) of EVs derived from nasopharyngeal secretions (NPS) of children with episodes of viral infections and exposed to SHTS; ii) test the biological activity of EVs released from upper airway mucosa on target/recipient lung cells

**METHODS/STUDY POPULATION:** EVs were isolated from ten NPS samples of children with episodes of acute respiratory infections. EVs were characterized by particle sizing (size and concentration), EV markers, and protein arrays for interferons, cytokines, and other immune mediators content. RNA was extracted from ten samples of NPS-derived EVs by column for next generation high throughput sequencing (NGS) to identify sncRNAs in EVs. In studies currently in progress, EVs will be isolated from RSV-infected human nose organoids (HNOs) cells in air liquid interface (ALI) culture, with or without pre-exposure to tobacco smoke. EVs will be then tested for antiviral activity on recipient RSV-infected lower airway cells. Viral titers will be measured in recipient infected lung cells.

**RESULTS/ANTICIPATED RESULTS:** We isolated EVs from NPS samples and confirmed by immunoblot EV markers CD63 and Alix. The average size of NPS-derived EVs of virus positive and negative patients was 170 nm and 145 nm, respectively. We determined the particles number of EVs, concentrations of IFN- $\beta$  and IFN- $\gamma$  in NPS and NPS-derived EVs of these children. While IFN- $\beta$  levels were below the limit of detection in both NPS and NPS-derived EVs of all children, IFN- $\gamma$  was detected in NPS and NPS-derived EVs from infected patients, except for the two patients with no viral infections. We extracted RNA from control-, virus infected- and/or SHTS- EVs and found that piR-36511, piR-40926, piR-49645, piR-32679 and piR- 53263 were all significantly enriched in EVs derived from NPS of children exposed to TS compared to those not exposed.

**DISCUSSION/SIGNIFICANCE:** RSV leads to approximately 22,000 hospitalizations of children due to second-hand smoke. A vaccine is not currently available for RSV infection. EVs represent a novel translational approach to target undruggable. Airway mucosa EVs in viral respiratory infection function as antiviral messengers and tobacco smoke impairs the EV antiviral activity.

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### Nursing Professionals' Experiences during the COVID-19 Pandemic in Puerto Rico: A Phenomenological Study

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**OBJECTIVES/GOALS:** The COVID-19 pandemic has impacted nursing frontline professionals. The aims of this study were to explore experiences of nursing professionals in Puerto Rico during the pandemic, examine the impact on their health and provide research development opportunities enhance research capacity.

**METHODS/STUDY POPULATION:** This interpretative phenomenological study recruited graduate nurses who participated in one in-depth semi-structured virtual interviews. Interviews were audio recorded and transcribed. The data analysis process was guided using the following steps: 1. Reading and re-reading, 2. Initial noting, 3. Developing emergent themes, 4. Searching for connections across emergent themes, 5. Moving to the next case, 6. Looking for patterns across cases, and 7. Writing up. In addition, Van Manen's thematic structure of four foundations was used as a complement to guide reflection and interpretation. Faculty and students participated throughout the process.

**RESULTS/ANTICIPATED RESULTS:** Seven nursing professionals' lived experiences caring for Covid-19 patients were gathered. Their ages ranged from 31 to 45 and had

worked between 2 and 14 years providing direct care. Themes that emerged from narrations include compassion fatigue, teamwork, working beyond clinical role, and gratification. Nurses expressed dealing with a very difficult situation, fear of being infected, or infecting my family, and working together to get through it and better help patients. Nurses also expressed feelings of anxiety and lack of institutional support. Additionally, the impact of working with patients, feeling good for being there, good or bad and support from families.

**DISCUSSION/SIGNIFICANCE:** Nurses' narrations point to the complexities of their experiences working during the pandemic. They had to transcend usual demands even though they often lacked needed support. We must recognize the value of nursing and reflect upon changes in healthcare that are essential to move nursing forward.

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### Outcomes of an Integrated Research Ethics Consultation Service

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**OBJECTIVES/GOALS:** The need for mechanisms of ethical discourse and guidance has increased as translational research collaborations become more complex. The goal of this project is to analyze the stakeholder engagement and ethical issues our research ethics consultation service (RECS) conducted over a two year period.

**METHODS/STUDY POPULATION:** We conducted a retrospective review of our RECS database from 2020 to 2022. We examined the nature of the research and ethical issues of concern from consult requestors, including whether or not consults were preventative. In addition, we assessed the educational outreach conducted during that timeframe as a measure of service awareness.

**RESULTS/ANTICIPATED RESULTS:** There was a total of 42 consults conducted over the previous year. There were a wide variety of issues related to informed IRB-related processes (31%), consent (24%), QA/QI determination (12%), authorship (10%), confidentiality (7%), diversity/inclusion (7%), grant preparation (7%). Many of the consults (n=28, 67%) included secondary issues. A few consults (n=4, 10%) were preventative, meaning that the consult was requested in anticipation or consideration of a potential ethical issue. Outreach efforts extended to a diverse array of institutional stakeholders and trainees.

**DISCUSSION/SIGNIFICANCE:** The RECS serves numerous constituencies throughout our institution on ethical issues spanning nearly all aspects of research design, conduct, and analysis. These data highlight initiatives to increase study efficiency (in collaboration with institutional research oversight) and helps to direct educational efforts and outreach.

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### Phagocyte heterogeneity and T cell dependence of cellular host defense mechanisms in tuberculosis

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**OBJECTIVES/GOALS:** Phagocytes, diverse cells that ingest material, are the primary cell type infected by Mycobacterium tuberculosis (Mtb) and the executors of protective mechanisms. T cells play a critical role by helping phagocytes control the infection. Understanding the precise T cell-dependent mechanisms by which