## RE: IRB Exemption Request

Saldana, Anthony <asaldana@research.ucla.edu>
Mon 4/27/2020 11:29 AM
**To:** Lin, James <JamesLin@mednet.ucla.edu>

Hi Dr. Lin,

After reviewing your research proposal I can confirm that IRB review and approval is not needed. Your project does not include interaction with human subjects or the collection of identifiable information. Therefore, your project does not meet the federal definition of "human subjects research" and does not fall under IRB purview. Feel free to contact me with any other questions or concerns.
Thank you,
Anthony

**Anthony Saldaña**, CIP
IRB Administrator, MIRB 1
UCLA OHRPP
310.825.5351 (p)
https://ucla.zoom.us/j/3924057943
asaldana@research.ucla.edu

---

**From:** Lin, James <JamesLin@mednet.ucla.edu>
**Sent:** Monday, April 27, 2020 10:56 AM
**To:** Saldana, Anthony <asaldana@research.ucla.edu>
**Subject:** IRB Exemption Request

Dear UCLA Medical IRB,

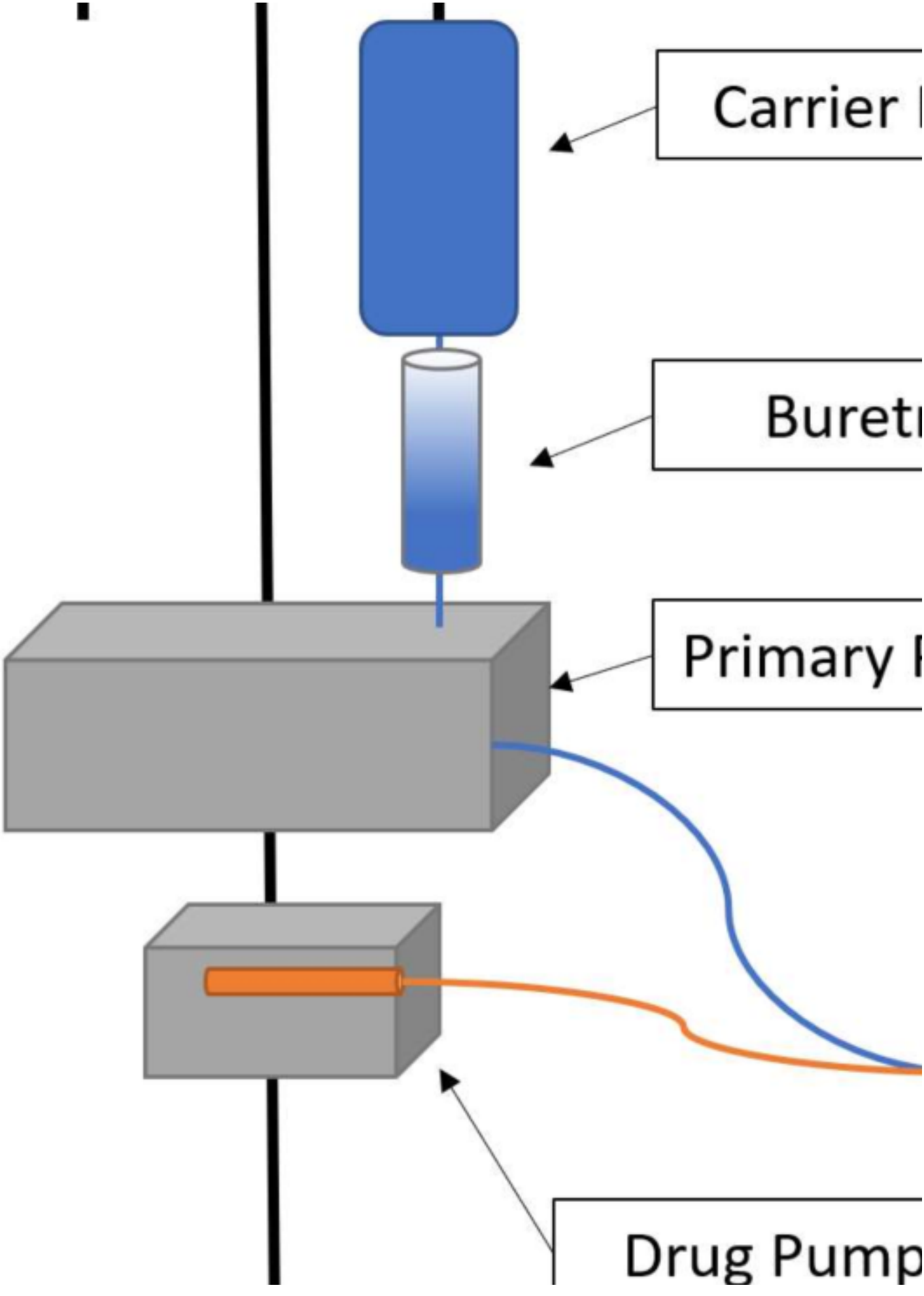
I'm writing to request evaluation of whether our study requires IRB evaluation. As described in our study design below, we are studying fluid transport properties of hospital pumps, syringes, and IV connector tubing without human contact, nor review of any human data.

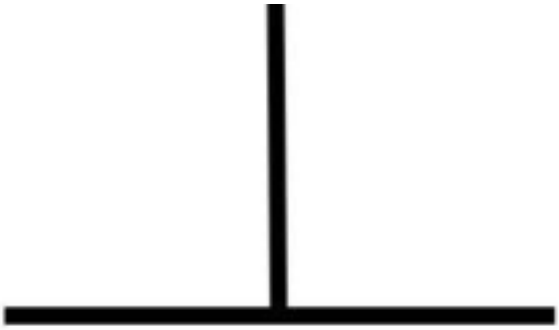
Introduction
We previously demonstrated that syringe size is directly proportional to variability of low flow infusions [Neal 2009]. However, as low flow drug infusions are generally found in clinical practice only with a primary infusion fluid, it is necessary to investigate the possible benefits or harms introduced by primary fluid combined with low flow infusions. To our knowledge, the influence of carrier fluid on low flow variability associated with syringe size has not been previously investigated. One might hypothesize that carrier fluid improves syringe-associated low flow drug variability by flushing drug from tubing dead space during start-up or drug interruptions and diluting concentrated drug in dead space. If verified, then use of carrier fluid would allow streamlining of options using larger common syringe sizes and simplified infusion pump libraries within institutions. In contrast, we hypothesize that carrier fluid might exacerbate low flow errors via perturbations attributable to the carrier fluid delivery system.

Methods
Equipment
All medical devices and equipment used in this study are standard equipment in our pediatrics care units. All infusions are performed with a Medfusion 4000 smart pump (Baxter; SIGMA, Medina, NY). Disposable sterile BD syringes (Becton-Dickinson, Franklin Lakes, NJ) sized 3-, 10-, and 60-mL are used. Blue (BL) food coloring (McCormick Culinary, Santa Rosa, CA) in 0.9% normal saline are used as carrier fluid and diluent for orange (OR) (Chefmaster Liqua-Gel, Fullerton, CA) low flow drug. For real time spectrophotometry, absorbances of colored fluids are measured directly through clear intravenous tubing (ICU Medical Extension Set 60 Inch Tubing 0.4 mL Priming Volume #B2020) using a Public Lab Desktop Spectrometry Kit 3.0 (Publiclab.org).

Infusion Simulation
Carrier fluid is infused from a smart infusion pump (Baxter Sigma Spectrum Infusion Pump 35700BAX) via a valveless burette (Baxter Buretrol Clearlink System #2H8865) connected to an infusion tubing set with 2 luer activated valves and a backcheck valve above the upper Y-site (Baxter Clearlink Continu-Flo #UC8519). Per FDA recommendations [USFDA 2016], the lowest Y-site closest to the "patient" (in this case, the spectrometer) is used to connect a smart syringe pump (Medfusion Syringe Infusion Pump Model 4000) for simultaneous infusion using extension tubing. The length of IV tubing from the drug infusion pump to the spectrometer (Public Lab Desktop Spectrometry Kit 3.0) is set at 18.5 cm to allow complete mixing of drug and carrier fluids. Spectrometry is measured inline through the tubing. To simulate patient-side intravenous catheter resistance and perform volume measurements, the end of the tubing after the spectrometer is connected via 5 cm of extension tubing (cut from a Smiths Medical #MX451FL extension set) to drain into the narrow end of a 1 mL glass pipette with 0.02 mL volumetric gradations.
Flow rate for the carrier fluid pump is set at 5 mL/hr. This rate is commonly used in the neonatal clinical setting [Sherwin] and was used in our previous study [Neal]. Flow rate for the low flow drug is set at 0.2 mL/hr for the same reasons. This rate is programmed into the smart pump as the drug model for all infusions: epinephrine with standard neonatal drug concentration of 40 mcg/mL (our institutional practice) at a dose of 0.027 mcg/kg/min in a 5 kg infant, which yields a flow rate of 0.2 mL/hr. For purposes of our experiments, we use orange food dye (OR) for "drug" diluted in blue dyed carrier fluid (BL) as our drug model.
Changes in 433 nm wavelength blue peak transmittance are used to determine drug concentrations. Concentration curves are established in calibration studies by assessing 433 nm transmittance for 10 replicates at each concentration, averaging the results, and fitting to a power-law function. For each trial of 3-, 10-, and 60-mL syringe sizes (Becton-Dickinson Luer Lok), 5 spectrometry measurements per time point are recorded and the replicate determinations averaged. Spectrometer readings are recorded in 5-minute intervals until either target concentration (determined by concentration curve studies of OR drug in BL carrier fluid) is reached and maintained or more than 90 minutes have elapsed. Total volume infused is measured using a 1-mL volumetric pipette with 0.02 mL gradations, which is connected directly to the end of the IV tubing for all experiments. A schematic of the experimental apparatus is diagrammed in the Figure below.
The same normal saline calibration is used for all calibrations and spectral analyses. Multiple factors that could affect spectral analysis, such as light source, ambient lighting, distance from the spectrometer, and alignment, are kept constant. Heights of the infusion pumps, spectrometer, infusion tubing, and volumetric collection pipette are kept constant.

Figure


Carrier
Buret
Primary
Drug Pump



Request
We appreciate your advice regarding the necessity of IRB review for our study that has no human contact and no identifiable nor deidentified human data.

Thank you,
James Lin, MD
Assistant Clinical Professor
David Geffen School of Medicine at UCLA

---