INTRO End stage renal disease (ESRD) is the final stage of chronic kidney disease (CKD) in which the kidneys no longer function and a kidney transplant or dialysis is needed for survival. Professor Natasha Wright and Dr. Ibrahim Yekinni, MD and their research team are performing a one-year design ethnography study on the treatment of end-stage renal disease in developing countries. This will provide the data needed to inform the development of a more economically, culturally, and technically accessible dialysis system.

BACKGROUND. It is difficult to estimate the global burden of ESRD due to the lack of data from low and middle income countries, but a 2015 review to determine access to ESRD treatment suggested that around 2.3 million people have died prematurely from unavailable renal replacement therapies especially in Africa and Asia [2].

Eighty-eight percent of those who start dialysis in sub-Saharan Africa die within 3 months due to the lack of affordable therapy [3]. Only 3% of ESRD patients in Nigeria can afford all of their dialysis treatments. In a country where the average annual income is $2,100 [1,4] ESRD patients are expected to pay $23,000 - $30,000 out of pocket.

The prevalence of ESRD globally shows an 8% yearly growth, and the issue is far greater in Nigeria and other low-income countries, showing the need for solutions for affordable and available options for renal replacement.
OBJECTIVE The objective of this semester, as the start of this project, was to understand the biggest barriers to kidney dialysis in Nigeria and determine which direction the project should take to have the largest impact. There are two methods of kidney dialysis: hemodialysis (HD) and peritoneal dialysis (PD). Currently, the majority of patients use HD in Nigeria due to lack of access to PD equipment. We sought to determine whether it would have a greater impact to focus on making HD less expensive, or focus on increasing access to PD, which has the potential to be more cost-effective than HD.

The overall objective of this 3-5 year research project is to increase dialysis rates in Nigeria from the current 3% to 50%.

METHODS We conducted a one-week research trip in Nigeria to meet with stakeholders, including nephrologists, nurses, and medical directors from various hospitals, clinics, and dialysis centers.

We sought to learn if lowering the cost of manufacturing would directly lead to a decrease in the patient’s cost. We also wanted to determine what other barriers patients faced outside of financial cost, as well as if PD might lead to an increase in dialysis rates.

RESULTS We observed two different service models: that of public and smaller centers, which give space to distributors to set up a center. Patients pay the center directly, and the clinic does not purchase the machines. The nurses and staff are paid by the center.
In the second model, as observed in Clinix, the center purchases the machines and must supply their own technicians, but is then free to purchase fluids from any distributor.

In the first model, the price is set by the distributor, so there is no cost to the clinic. In the second model, the center controls the patient price. From speaking with Clinix, it seems likely that the price to patients would be lowered if the cost to centers was lowered.

From speaking with providers and doctors, it seems highly likely that lowering the cost to patients would increase dialysis rates. However, as we have yet to speak with patients, further research is needed.

The greatest factor in the product cost is the shipping of the acid concentrate. Potential ways to lower this cost are reducing the volume/weight of the shipping or by manufacturing the acid concentrate locally. However, reducing this cost does not make it likely that the cost to clinics will be reduced if the service model is not changed, as distributors set their prices and would likely not bring down the cost and instead just make a greater profit. From this we determined that solely reducing current manufacturing costs would not lead to a decrease in the patient cost.

We did not speak with patients, but the centers have limited numbers of machines, and since each treatment lasts for 4 hours, the combination of high treatment time and low amount of machines provides a barrier to patients as they cannot always access dialysis. Thus, an additional barrier is access to dialysis machines.
The greatest barrier to PD is the lack of equipment and fluids. Although PD could be cheaper than HD, it is currently more expensive because everything must be imported.

The greatest barriers to patients using HD appear to be the high cost and the lack of access (greater demand than centers can provide). With the potential to decrease the cost and increase access (PD can be done in the patient’s home and does not need to be done in the center setting), it seems likely that PD would lead to an increase in dialysis rates.

From this research, it was decided to focus on increasing access to PD equipment and fluids. A second research trip has been scheduled for January 2020, in which the team will speak with patients as well as doctors and manufacturers.

**NEXT STEPS & CONCLUSION** Three main objectives have been identified for the January 2020 trip.

The first is to better understand the patient experience and determine if PD would be a feasible and viable option. This involves understanding patients’ views and comfort levels of performing their own medical care in home as opposed to in the clinic as they are used to, determining if their homes are equipped to perform at-home care, and understanding how big of a price drop from the current price would be needed to make regular dialysis possible for these patients.
The second objective is to understand what barriers would be faced in switching to PD from the doctor’s perspective. This will be determined through observation of current surgery facilities and staff as well as learning about current physician training.

The third objective is to learn about local manufacturing. Although dialysis fluids are not locally manufactured at this time, other products such as IV fluids are. Visiting with these manufacturers will give perspective on the potential obstacles, the resources that are both available and lacking, as well as the regulations and protocols in local manufacturing.

The lack of access to dialysis is a major issue in many low income countries. With such a complex issue, it is important to start by gaining insight into the perspectives of various stakeholders, including the patients, physicians, and manufacturers. By taking into account these different views, the best path to increasing access can be determined, paving the way for a successful outcome. From the research conducted thus far, we concluded the objective with the highest potential for success is to pursue increasing access to peritoneal dialysis in Nigeria. We will now move forward from this exploratory research to achieve our goal of increasing dialysis rates in Nigeria from the current 3% to 50%.
References


