

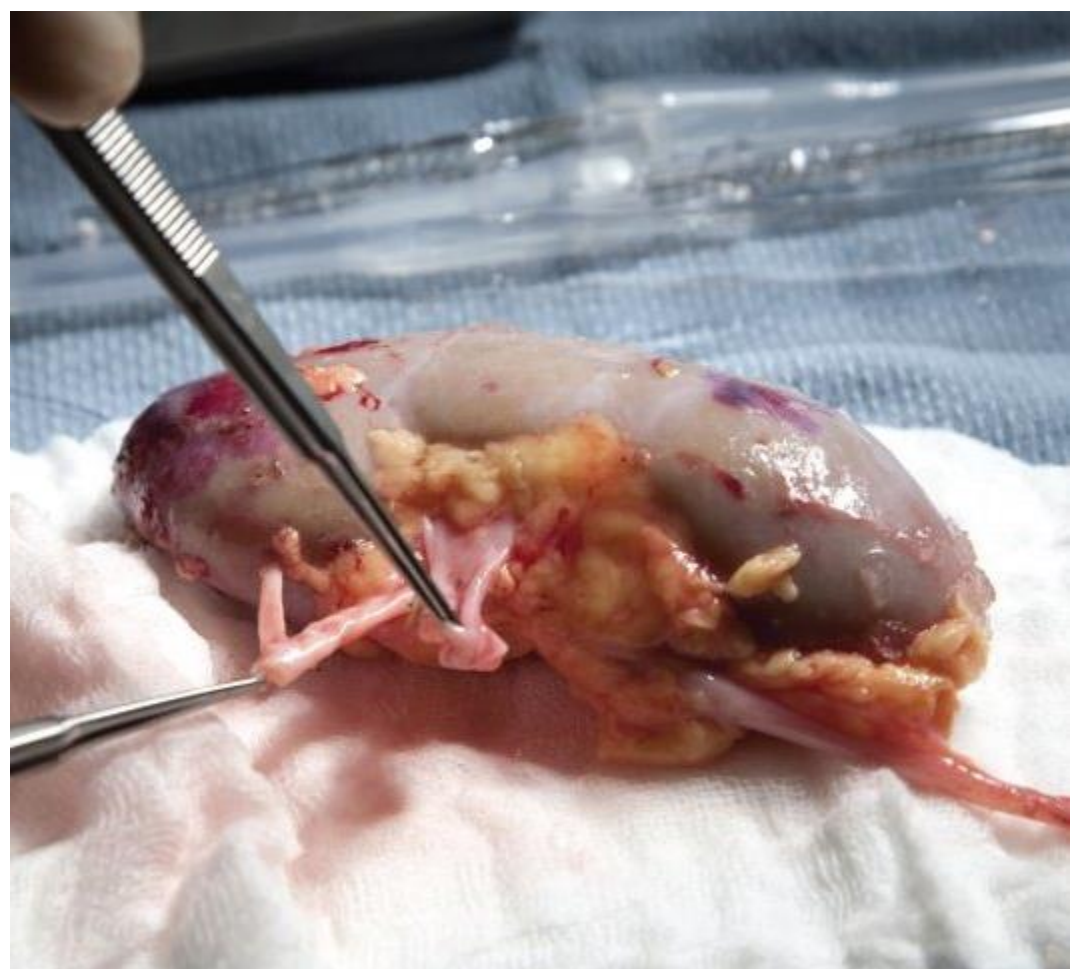
Aakankschit Nandkeolyar¹, Beverly Zhuge¹, Brandon Gordon¹, Anu Otgonbayar¹, Jamie Beiriger², Ravi Bethamcharla², Fred Allen¹, Kambiz Pourrezaei¹ and Meera Harhay²
¹School of Biomedical Engineering, Science & Health Systems, Drexel University, Philadelphia, PA
²Drexel University College of Medicine, Philadelphia, PA

Introduction

- Organ transplantation is a procedure where a failed or diseased organ is replaced with a donated working organ
- Approximately 3500 donated kidneys in the United States are discarded each year¹**
- Nearly 5000 people in the United States die while waiting for a kidney transplant¹**
- 156,089 kidneys have been recovered in the United States between 2004 and 2014, of which 27,987 (17.9%) have been discarded¹**
- Long term survival is greater in patients that receive kidney transplants as compared to patients on long term dialysis²

Limitations of Existing Solutions

Viability Biopsy

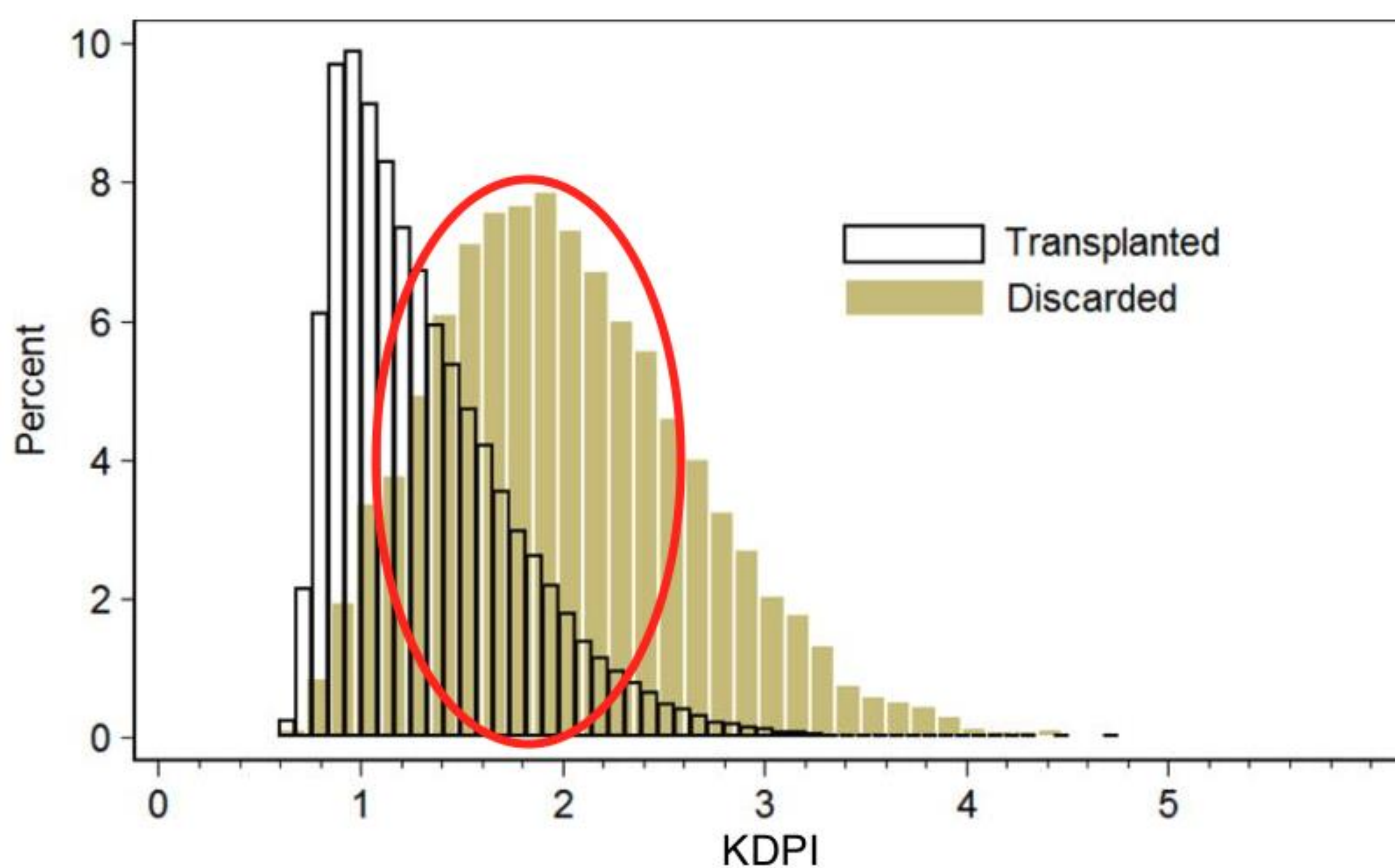


- Tissue sample may be unrepresentative
- Not conducted by renal pathologist
- Accounts for about 40-50% of all kidneys discarded in the United States³

Kidney Donor Profile Index (KDPI)

KDPI based on:	
Donor age	
Height	
Weight	
Ethnicity	
History of hypertension	
History of diabetes	
Cause of death	
Serum creatinine	
Hepatitis C virus status	
Donation after circulatory death	

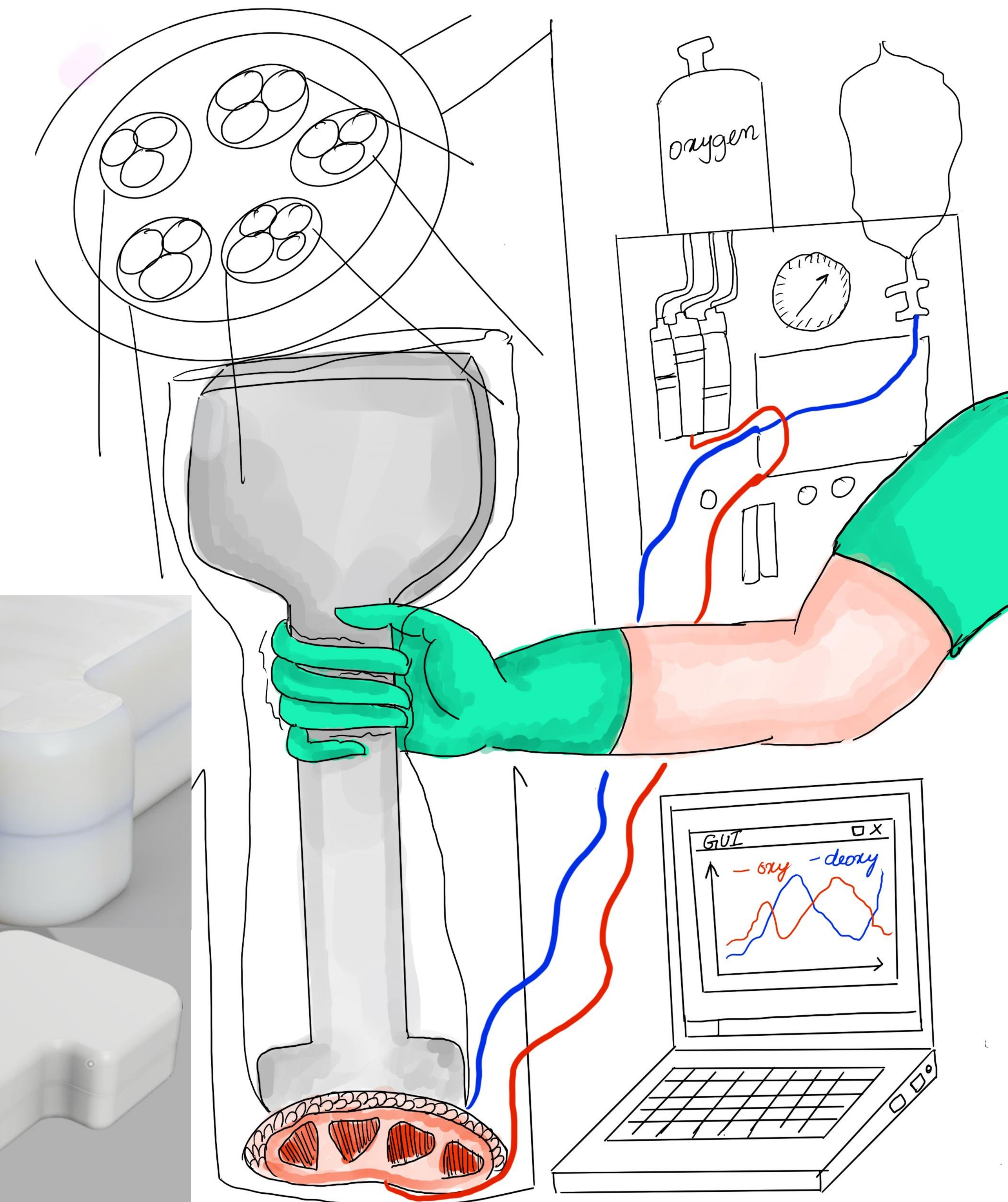
- Based only on preretrieval factors that may not be contemporaneous
- Narrow range of viability that leads to higher discard rates of kidneys
- Lack of consistency in predicting organ performance post transplant⁴



Device Specifications and Application

- Use of machine perfusion (MP) instead of static storage improves short term transplantation outcomes
- MP can be used as method to assess kidney viability
- Tissue oxygenation has been found to be a viable method of assessment of organ quality⁵
- Near Infrared Spectroscopy (NIRS) is a non-invasive method used to monitor oxygenation in tissues

The objective of this project is to develop a prototype NIRS probe suitable for blood oxygen monitoring of potential kidney transplants.



Requirements

Sensor Size:
The size of the probe sensor should have dimensions smaller than 11cm by 5cm (size of kidney).

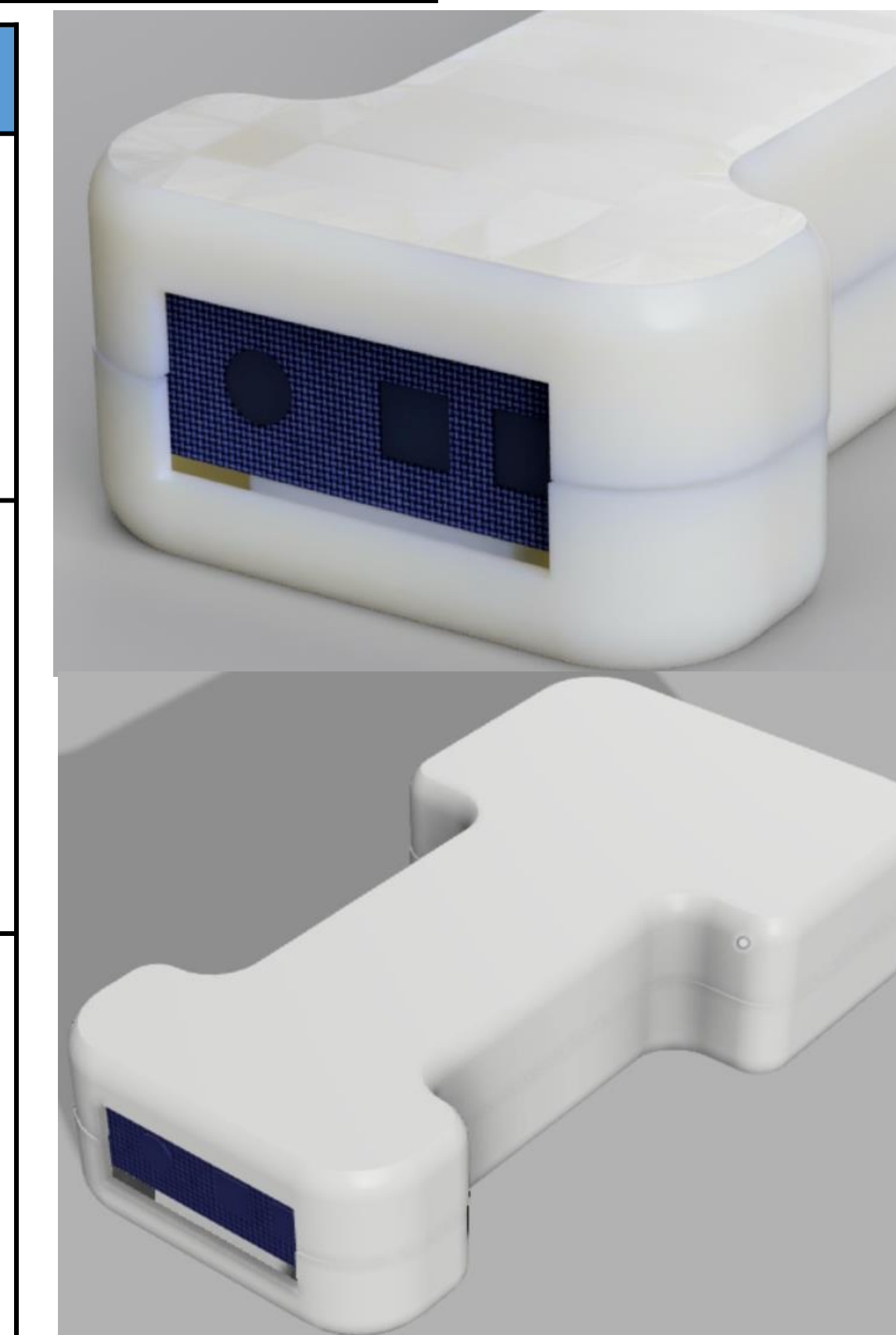
Easy Manipulation by Surgeon:
The handle should have a minimum length of 21.6cm.

Constrains

Size of the Container:
The sensor should reach the kidney at a depth of 30.5 cm

Compatibility with NIRS:
No restriction in the path of light, wireless communication, the sensor must lie perpendicular to the surface of the kidney and contain the sensor

Compatibility within Surgical Environment:
Compatible to use within a sterile bag in a surgical environment



Impact

- There are **no current technologies** that can be used to assess the quality of a donated kidney that are commercially available
- Establishes a new system of assessment and by reducing discard rates of kidneys especially by diseased donors-potentially adopted by entire transplant community-**U.S is the largest market for transplants in the world and the market size is expected to grow to \$895.2 million by 2024⁶**
- Helps **reduce mortality** in patients suffering from chronic kidney disease and failure
- The **average cost for a kidney transplant in the U.S is about \$414,800** due to a lack of supply, which could be reduced significantly using this system of assessment⁷
- Current prototype can be used by transplant surgeons** to assess differences between a variety of donated kidneys

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