

THE LIAM CHALLENGE

July 17, 2018

Designing an Innovative Solution to a Problem
facing Academic Medicine

OUR TEAM

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DEFINING THE PROBLEM

The inspiration, the background, and why we (and you) should care

The Heroin Epidemic

- ▣ Since 2011 prescription pain killers became harder to get and more expensive
 - One 80mg Oxycontin pill can run \$60-100 dollars
 - One dose of heroin is about \$9
- ▣ Overdose Deaths have risen every year since 2011
- ▣ Opioid related hospitalizations were 2.5% higher in 2016 than 2012

Infectious Sequelae of IV drug use

- ▣ ULH has increasing numbers of hospitalized patients for treatment of infections related to IV drug use
- ▣ Multiple Infectious Sites affected
- ▣ Many require long-term IV antibiotic regimens
- ▣ Identifying a discharge plan can be challenging for these patients
 - Safety concerns related to placement of PICC line
 - Not candidates for typical rehab facilities, home health services
 - Patient compliance with daily infusion centers

Financial Impact

- ▣ U of L data
 - Med/Surg \$7,571
 - PCU \$7,062
- ▣ 2013 Virginia Commonwealth study
 - Partnered with Residential Addiction Treatment Facility to administer the prolonged IV antibiotic therapy were able to save 2.43 million in a 6 year period by reducing length of hospital stay
- ▣ U of L has one such recent partnership with Centerstone
 - Not enough places at Centerstone

A Unifying Problem

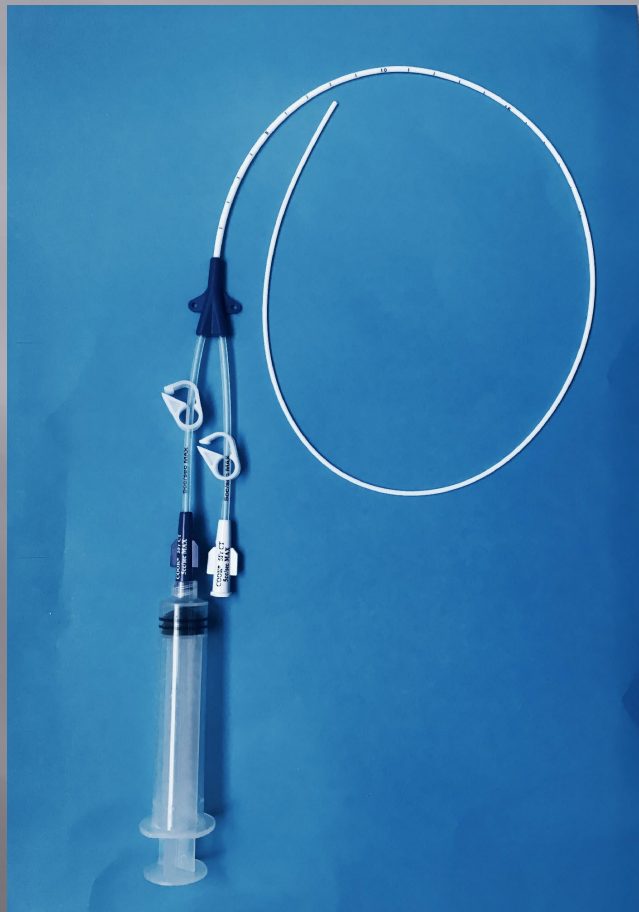
- ▣ Affects Patients
- ▣ Affects Our Community
- ▣ Affects our Learning Environment
- ▣ Affects our Hospital

CONCEPT AND INITIAL SOLUTIONS

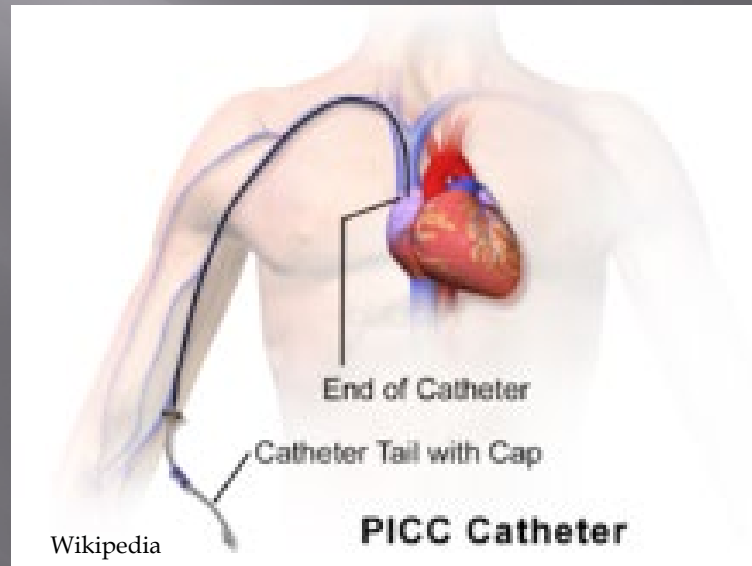
How do we fix the problem?

What are we trying to prevent?

- ▣ Patients using their PICC lines for IV abuse outside the hospital

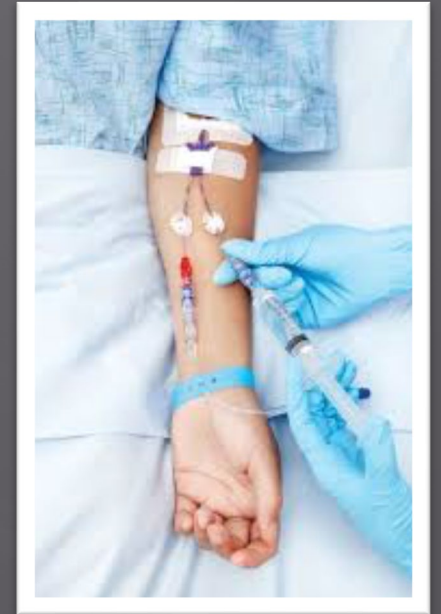


Sydney Interventional Radiology



How do we prevent access outside the hospital?

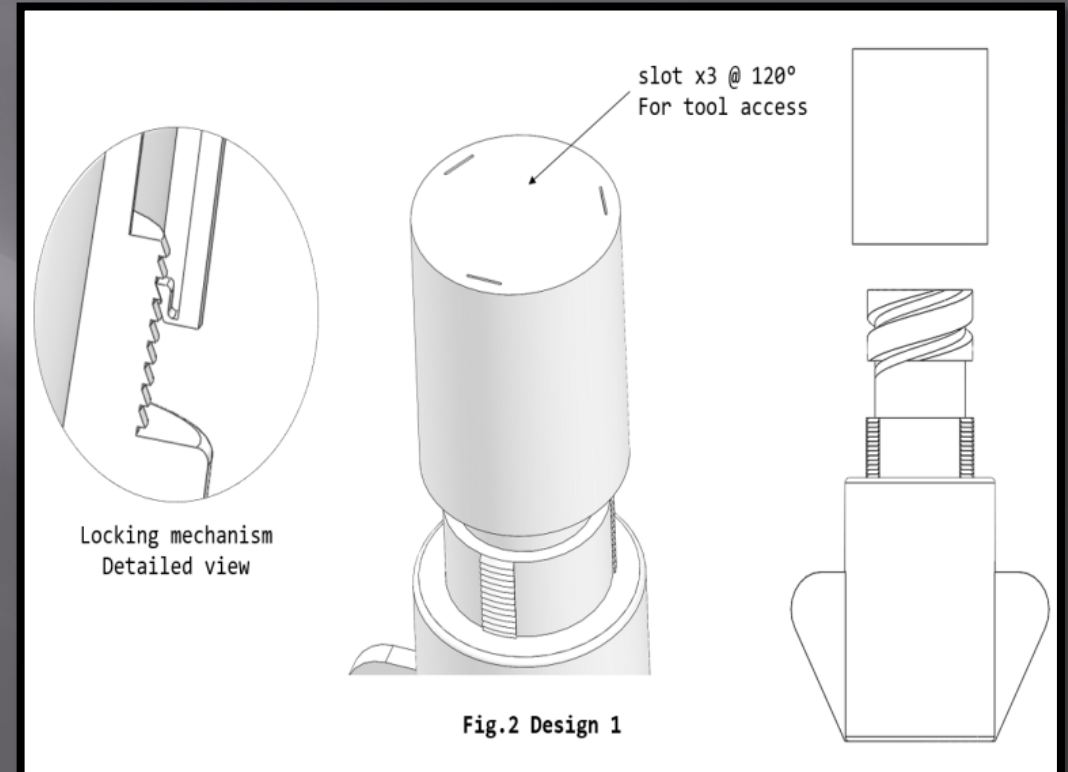
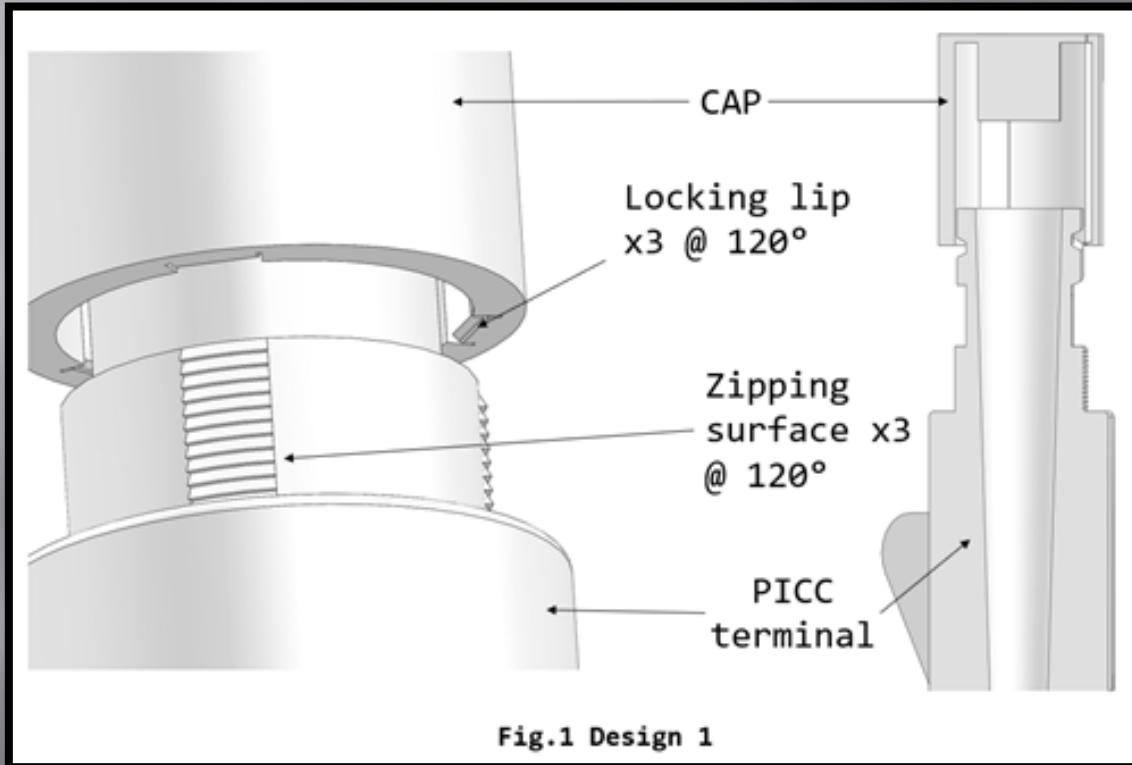
- ▣ New Access For Each Infusion?
 - Difficult Sticks
 - Procedures
 - Infection
- ▣ Lock and Key Mechanism?
- ▣ Disposable PICC Caps?
- ▣ IV Tubing Compatible Only With Patient PICC



Collaboration: Department of Biomedical Engineering

- ▣ Dr Guru Giridharan, Professor
- ▣ Multiple meetings/ ideas discussed
- ▣ CAD drawing generated
- ▣ Prototypes generated using the 3-D printer
- ▣ Office of technology transfer (OTT)
- ▣ Provisional patent file #

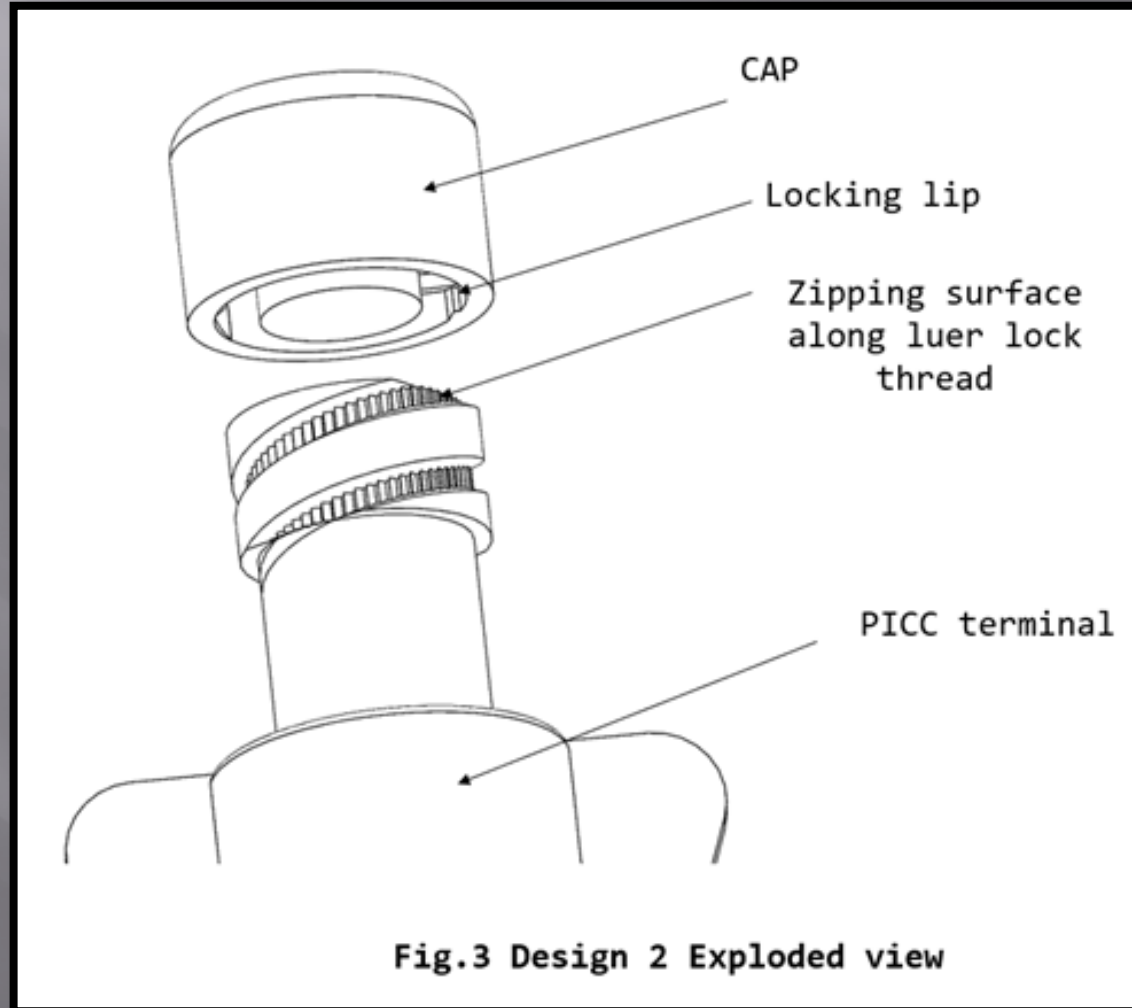
Three Concepts



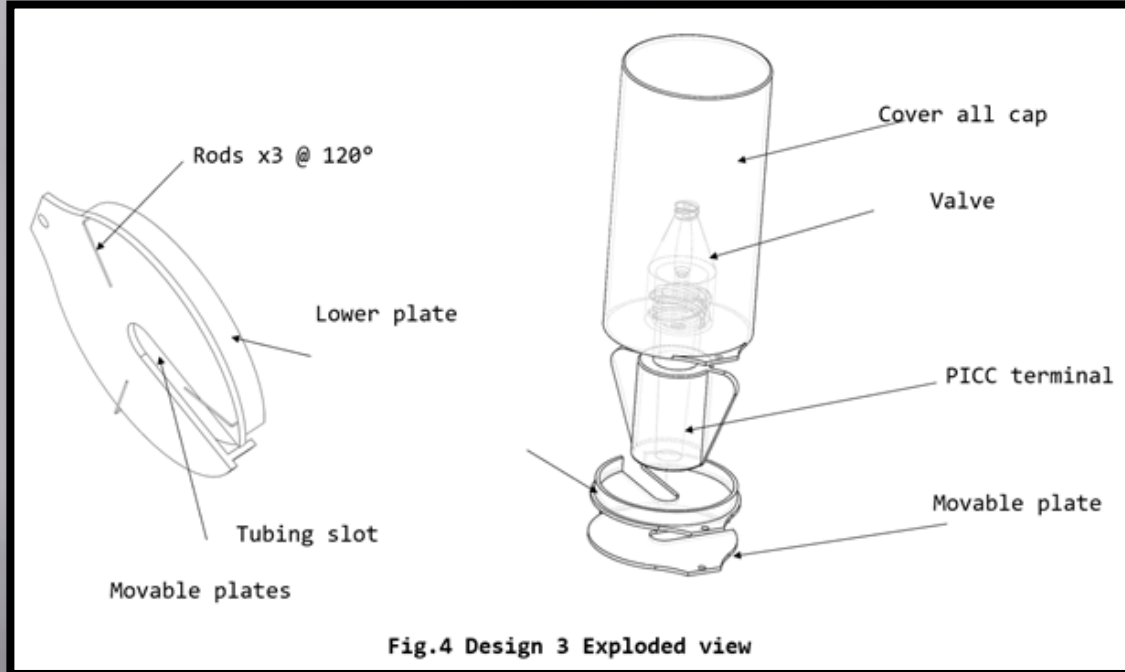
Concept Number 1

Three Concepts

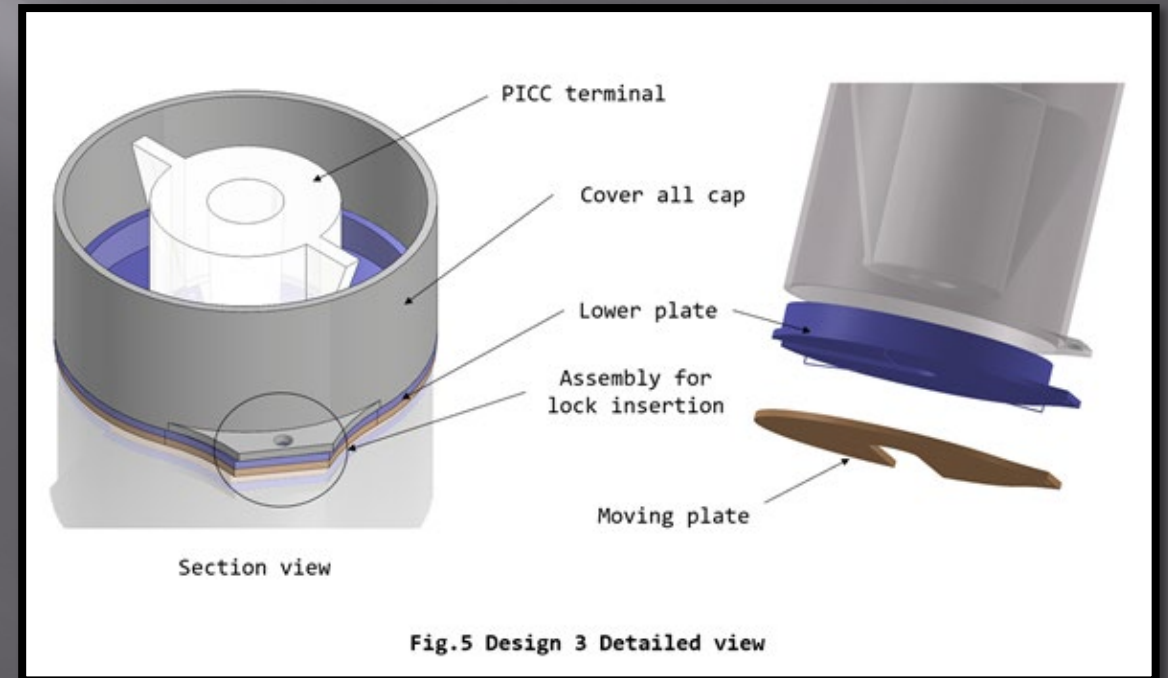
Concept Number 2



Three Concepts



Concept Number 3



What makes this solution innovative

- There are no products on the market which are tamper resistant, only tamper evident



Tamper-Resistant IV Port Caps

★★★★★

[Be the first to review this product](#)

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Deter IV Bag Tampering

- Deter IV bag tampering by restricting the port access
- Use to indicate if medication has been added
- Difficult and time consuming to remove
- Thick, durable polypropylene plastic can't be penetrated with a needle

Steri-Tamp® IV Seals

Steri-Tamp® IV Seals



The Only Tamper-Evident Seal that Provides a 100% Sterile Barrier!

TampAlerT IV Syringe Cap (100 Caps)



Sterile closures for IV syringes!

- Tamper-Evident Luer Lock Closures
- Sterile / Non-Toxic / Non-Pyrogenic

375 x 375 - marketlab.com

TampAlerT Individual IV Syringe Cap

TampAlerT Syringe Cap

TampAlerT Individual IV Syringe Cap

INSPECT
The clear outer shell allows visual inspection to verify medication integrity. If the shell is detached, the pharmacist, nurse, and/or patient will know that the integrity of the syringe contents may have been compromised.

UNLOCK
The cap easily unlocks at drop-off time by pulling the silver outer shell straight off and removing the red spring cap by twisting counter-clockwise.

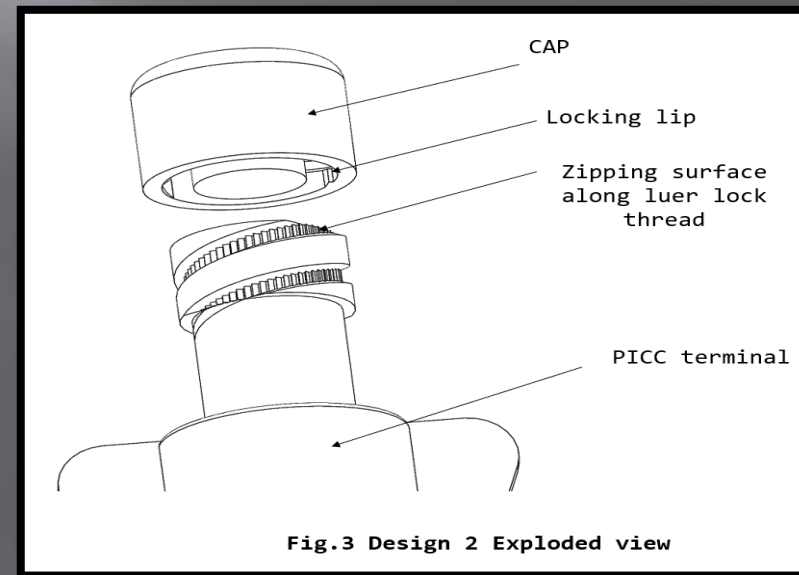
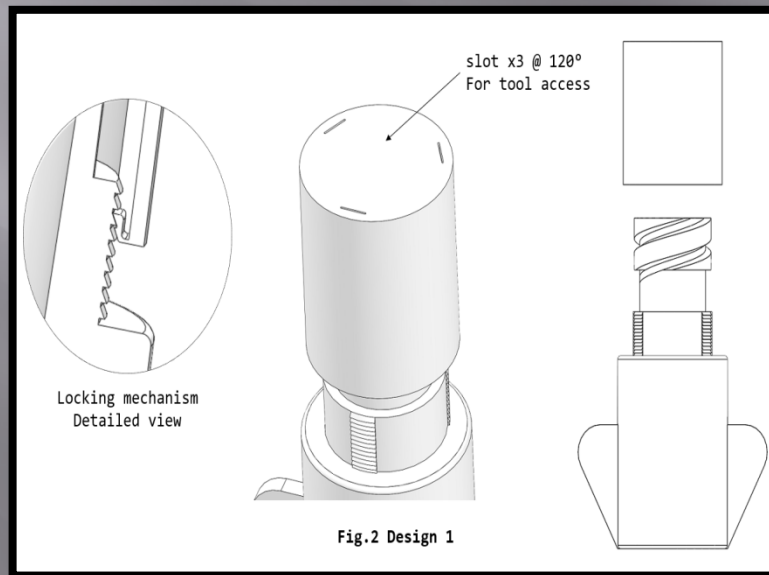
Tamper-Evident Syringe Bags

STERI-TAMP® IV Bag Port Seals

Combi-Cap Device

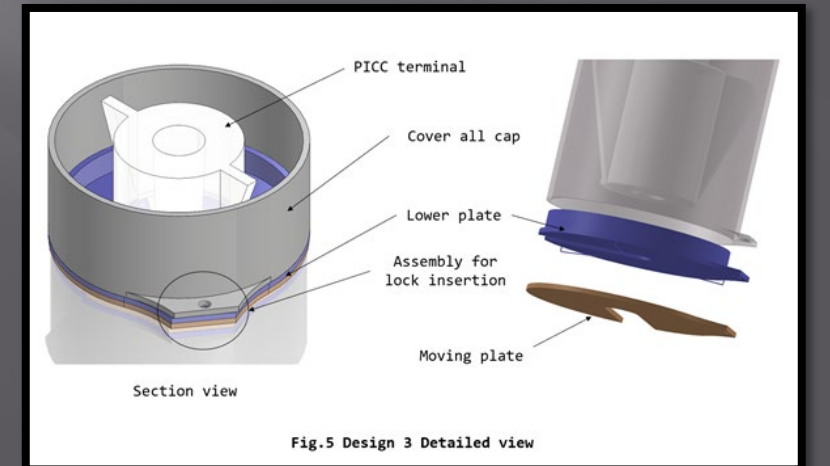
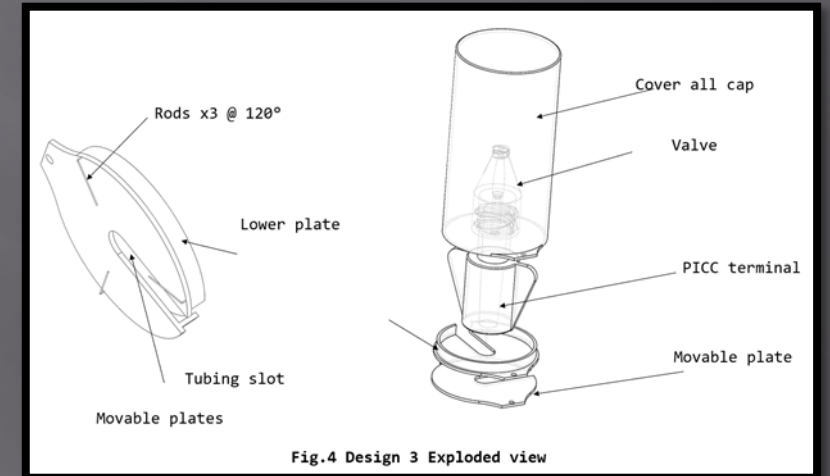
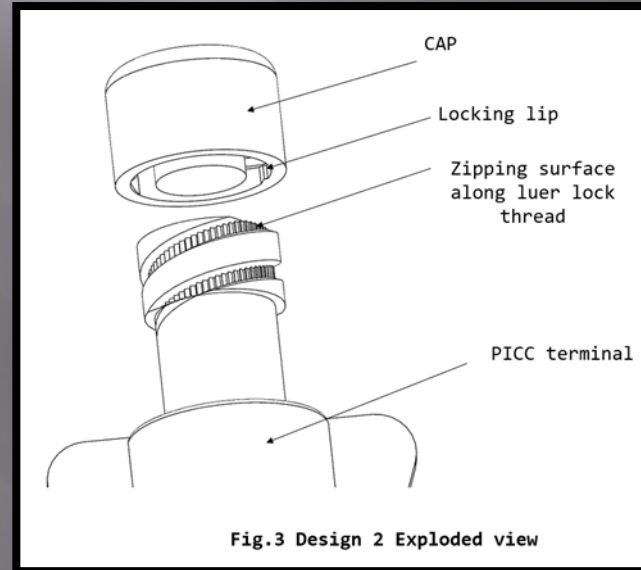
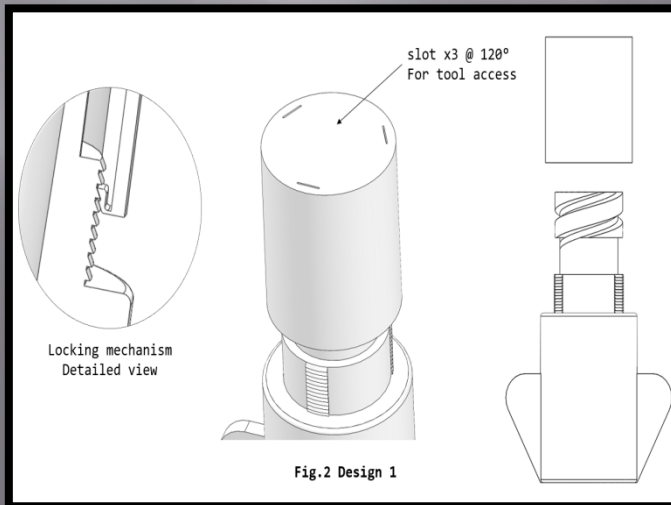
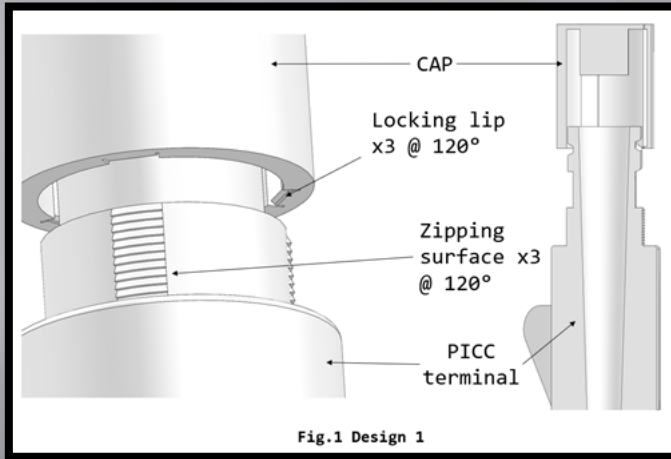
Utilizes

- Innovative Zip-tie technology in luer lock design
- Reusable, ununlockable design



What makes this solution innovative

- Multiple iterations put forward, multiple design options



- ▣ Future designs can be built off of this design
 - Peripherally inserted central venous catheter (PICC), or central venous catheters (CVLs) with tamper resistant tubing
 - Tamper resistant IV bags, catheters etc.

Feasibility

- ▣ Cheap
- ▣ Reproducible
- ▣ Built on current available platforms

Next Steps

- ▣ Create company: start up costs vary
 - Would work with University Marketing and Legal Departments
 - Determine market interest
 - Explore funding sources: Grants, Medical Equipment companies
- ▣ Goal: Sell patent to established industry and gain from royalties

Barriers

- ▣ Financial:
 - Feasibility study
 - Proof of concept
 - Manufacturing
- ▣ Limited interest in this product
 - Other tamper evident products already exist
 - Development of appropriate IM antibiotic formulations that may negate need for this product
 - Unattractive concept?
- ▣ Litigation Fears:
 - Broken caps leading to ED visits
 - Patient may still bypass the cap and inject in other sites (other veins, IV bag)

Summary

- ▣ Tamper resistant cap to prevent access to PICC line for inappropriate IV drug administration
- ▣ Patent pending on prototype
- ▣ Market testing
- ▣ Decreased length of stays for target patient population, saving healthcare dollars
- ▣ Prestige for the University