

MRI Infant Warmer

Team “No Ice Ice Baby”

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Presentation Overview

Problem Statement

Background

Product Design Specifications

Designs:

- The Tent
- The Sleeping Bag
- The Glamper

Design Matrix

Future Work

Potential Pitfalls

Acknowledgements

References



Problem Statement

- Pediatric Anesthesiologist, AFCH
- MRI Compatible Warming System
- Unable to Thermoregulate
- Current Devices and Economic Barriers



Background

- Heat loss
- Cardinal Health
warming pad: *loses heat too fast*
- Plastic Bag: *not actively heated*
- Bair Hugger



[2]



[3]



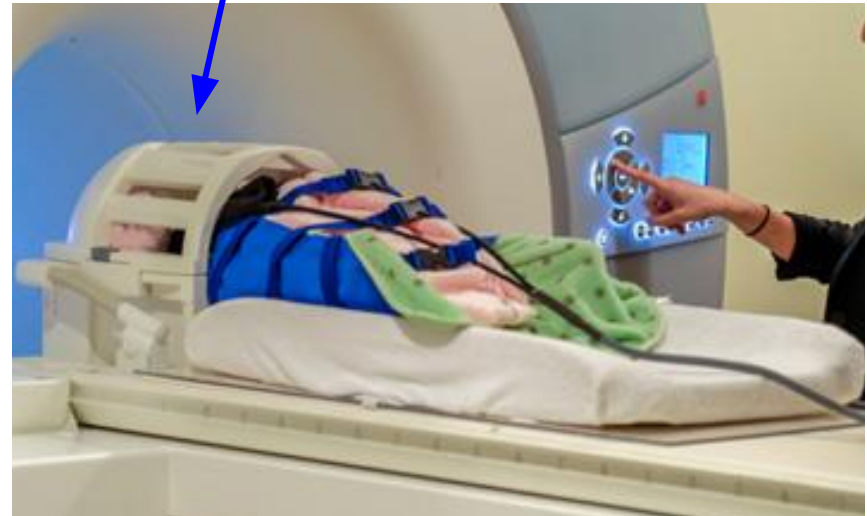
[8]



Product Design Specifications Summary

- MRI compatibility
- Maintain temp of 36.5°C
 $\pm 0.5^{\circ}\text{C}$
- Cannot increase surrounding
temp over 22.0°C
- Allow insertion for
accessory tubing
- Sterile/disposable

8" Head Shield



[6]



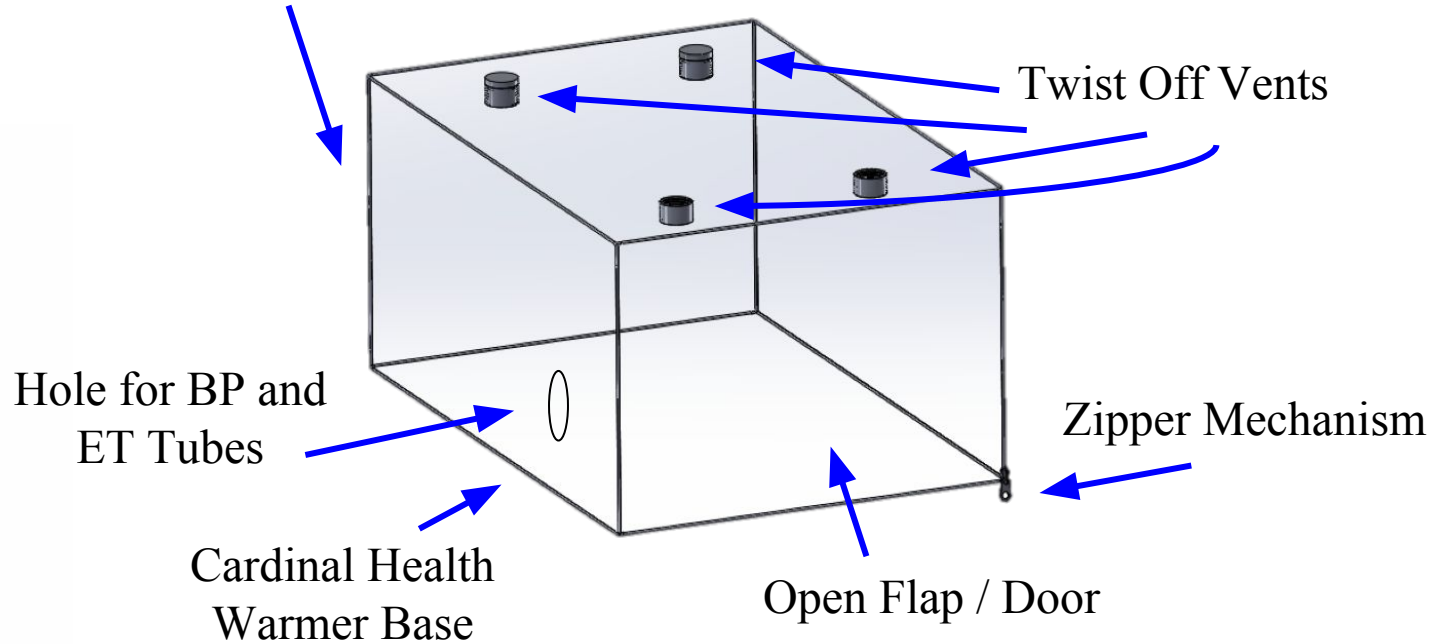
“The Tent”

Cardinal Health
Warming Pad



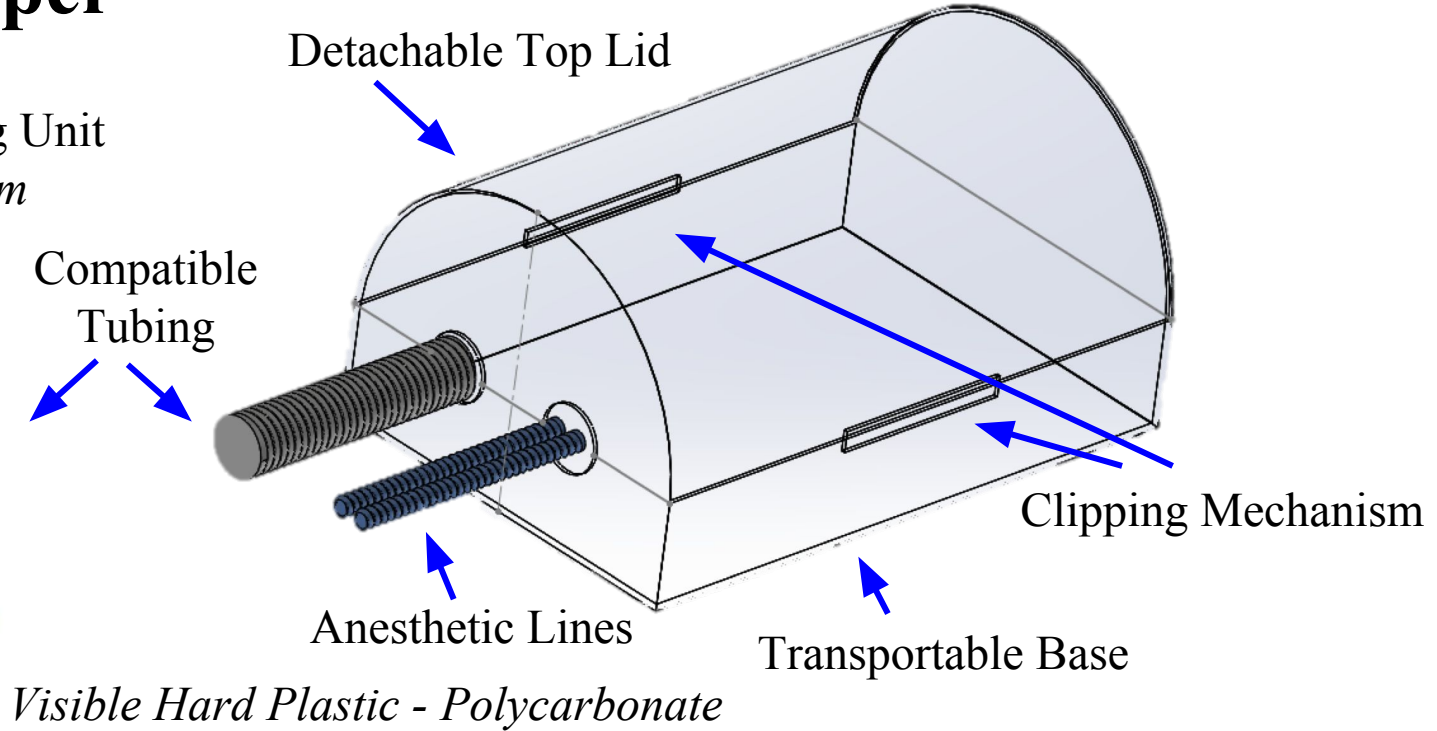
PVC Pipe Skeleton

*Visible Plastic Sheet -
Low Density Polyethylene*



“The Glamper”

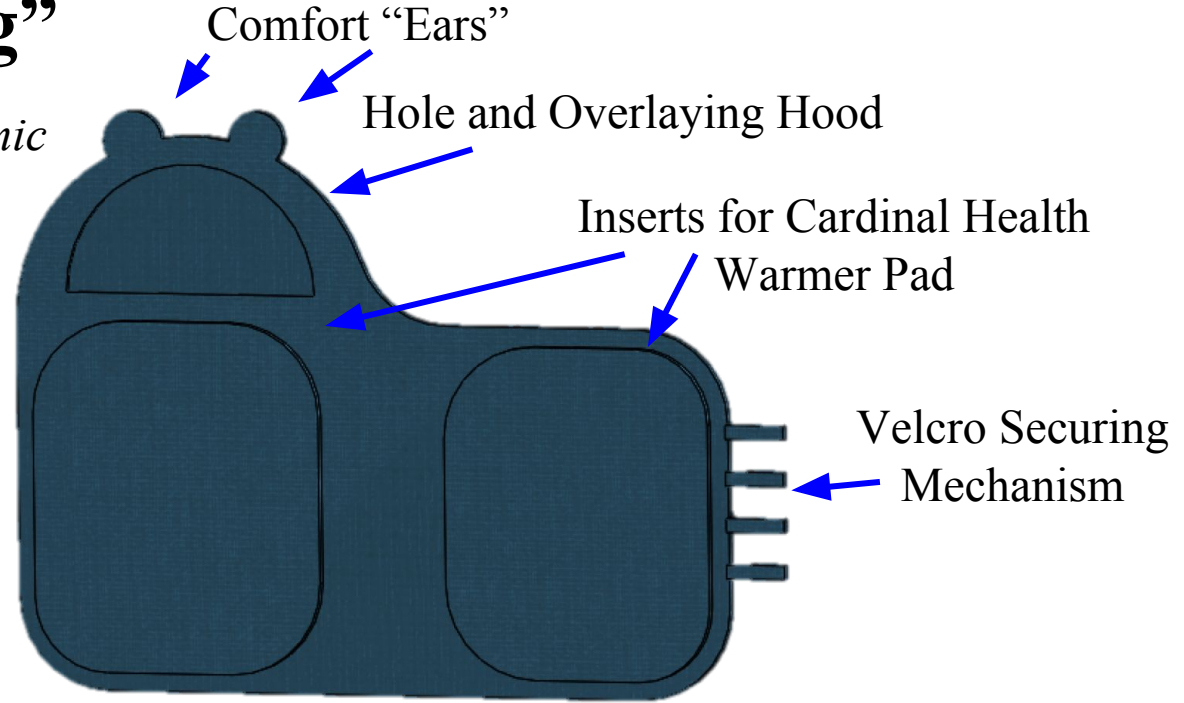
Bair Hugger Heating Unit
**not in MRI room*



“The Sleeping Bag”

Cardinal Health
Warmering Pad

*Thermochromic
Fabric*



Open View



Design Matrix

| | The Tent | | The Glamper | | The Sleeping Bag | |
|----------------------------------|----------|----|-------------|----|------------------|----|
| Safety (20) | 3/5 | 12 | 5/5 | 20 | 4/5 | 16 |
| Effectiveness (20) | 2/5 | 8 | 5/5 | 20 | 4/5 | 16 |
| Precision (15) | 1/5 | 3 | 5/5 | 15 | 4/5 | 12 |
| Sterility (15) | 4/5 | 12 | 3/5 | 9 | 5/5 | 15 |
| Assembly Time (10) | 2/5 | 4 | 2/5 | 4 | 3/5 | 6 |
| Aesthetics (10) | 3/5 | 6 | 3/5 | 6 | 5/5 | 10 |
| Ease of Manufacturing (5) | 5/5 | 5 | 1/5 | 1 | 3/5 | 3 |
| Cost (5) | 5/5 | 5 | 2/5 | 2 | 3/5 | 3 |
| Total (100) | 55 | | 77 | | 81 | |



Future Work

- Research materials
- Finalize design
- Prototyping and testing
 - Fabrication and testing protocol
 - Evaluation of cardinal health warming pad
- Fabricate and present final prototype



Potential Pitfalls

- Temperature specifications ($36.5^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$)
- Fabrication
- Testing
 - MRI expenses
 - Having accurate results without a test subject



Acknowledgements



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Dr. Peter M Popic, *Client*



References

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Questions?

