

MOTIVATION

- Surgical site infections (SSIs) cause over 100,000 deaths annually in low income countries

Table 1: High vs. Low Income Countries

	Low Income	High Income
Income per capita[1]	<\$1,035	>\$12,216
Prevalence of SSI[2]	15.5%	5.5%

- SSIs result from non-sterile technique in surgery
- More than 50% of rural clinics lack electricity and therefore cannot sterilize surgical tools with traditional autoclaves
- Current solar autoclaves are too expensive or complex for common use
- Our user-friendly device uses inexpensive solar cooker technology to sterilize surgical equipment in areas without grid electricity

STAKEHOLDER ANALYSIS

Table 2: Primary Benefits, Costs, and Net Impact of Helios

Stakeholders	Primary Benefits	Primary Costs	Net Impact
Patients	Reduced risk of SSI	None	Positive
Physicians	Safer surgical procedures	Learning period; increased time per surgery	Positive
Clinics	Sterilization system for surgical tools and water	Installation cost ~ \$210	Positive
Families	Improved patient health; increased productivity	None	Positive
Community	Decreased prevalence of waterborne illness	Learning period	Positive

DESCRIPTION OF DESIGN

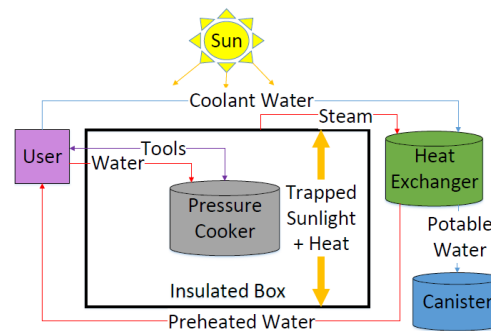


Figure 1: Flowsheet

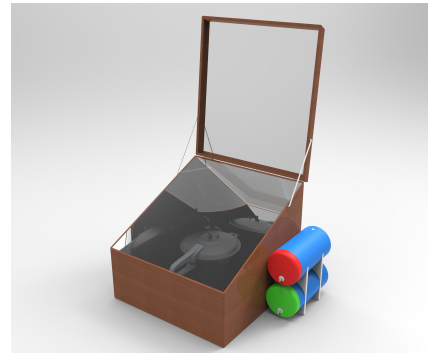


Figure 2: SolidWorks Model

KEY FEATURES

- Heat exchanger condenses steam to produce sterile water
- All components ship in box
- Adjustable lid for maximum solar capture

RESULTS

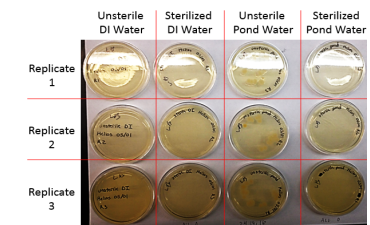
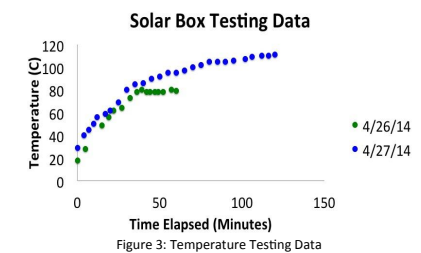


Figure 4: Water Sterility

ACKNOWLEDGEMENTS

We would like to thank the Biomedical Engineering Department at Carnegie Mellon University, and more specifically Dr. Zapanta and Trent Wells. We would also like to thank Dr. Carl Ross, SURG, OIE, CIT Travel Grant, and Global Medical Brigades.

REFERENCES

- [1]The World Bank. How we Classify Countries. The World Bank. <http://data.worldbank.org/about/country-classifications>. Published 2013. Accessed December 10, 2013.
- [2] World Health Organization. (n.d.). *Health care-associated infections: Fact sheet*. Retrieved from World Health Organization: http://www.who.int/gpsc/country-work/gpsc_ccisc_fact_sheet_en.pdf