

APPLYING A COMMUNITY WELLNESS/DISEASE MANAGEMENT MODEL TO INTERPROFESSIONAL GLOBAL HEALTH EXPERIENCES

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OBJECTIVES

- » Describe a basic community wellness model
- » Identify relationships that fit this model
- » Construct interprofessional collaborations that fit the community wellness model

SCIENEERING AT VIRGINIA TECH

- » Program focused on interdisciplinary undergraduate studies and research, with funding from a [Howard Hughes Medical Institute Science Education Grant](#)
- » Science and engineering sophomores and juniors selected to become Scieneers participate in coursework leading to minors in Interdisciplinary Engineering and Science; or Science, Engineering and Law
- » Interdisciplinary research mentored by faculty outside their major discipline
- » Scieneers come from more than 10 majors and perform interdisciplinary research under the direction of one of over 100 voluntary faculty mentors in a complementary discipline

SCIENEERING AT PEDIATRIC MEDICAL DEVICE INSTITUTE / VT MECHANICAL ENGINEERING

- » PMDI is a non-profit **Dedicated to facilitating the transition from pediatric medical device needs to clinically beneficial tools**
- » Collaboration started by founders Muelenaer the life sciences “MD, MS”, and Wicks the engineering “PhD”
- » Applied research
- » Muelenaer mentors the engineers and Wicks the life sciences students
- » On each device project an engineer is paired with a life sciences student (medical students/residents)

SCIENEERING IN MALAWI 2013

- » The facts:
 - » In Malawi, severe shortage of personnel in all technical fields related to healthcare
 - » Without adequate **WASH** -Water, Sanitation and Hygiene; much of international relief is wasted
- » While visiting Mzuzu University in January 2013 it occurred to me that the Mzuzu University Centre of Excellence in Water and Sanitation and SMART Centre could provide students I work with an opportunity.....



Dr. Charles C.V. Mwansambo
Principal Secretary
Ministry of Health
Malawi

“JIM, IF I CAN FIGURE OUT A WAY TO GET A COUPLE STUDENTS HERE THIS SUMMER, WILL YOU HOST THEM?”



“SURE!”



SCIENEERING IN MALAWI 2013

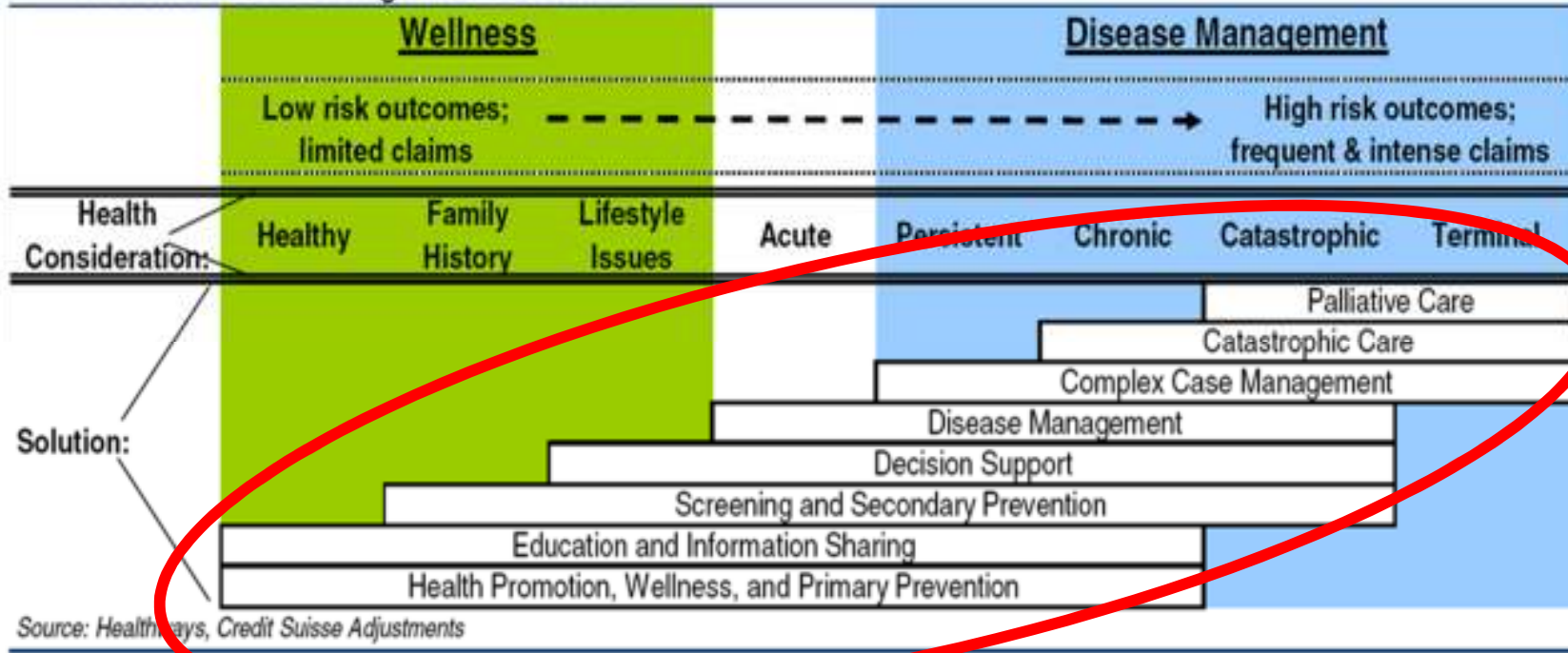
» Global Goals

- » Foster global perspectives of undergraduate students enrolled in Scieneering
- » Stimulate ideas for improving conditions in developing countries
- » Create sustainable relationships that promote interdisciplinary models for development
- » Encourage evidence-based applied scholarly research

» Vision

- » Utilize a community wellness model as the framework to integrate the activities of a disparate group of young investigators and mentors

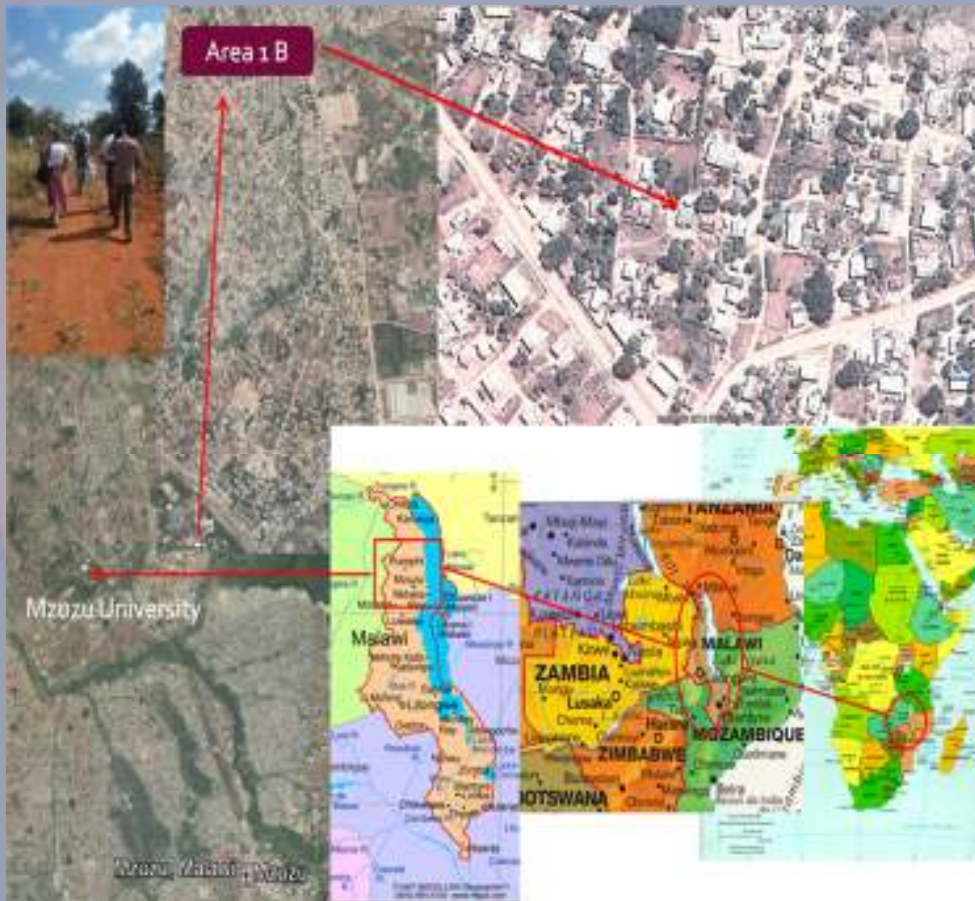
Exhibit 6: The Disease Management Continuum



SCIENEERING IN MALAWI 2013

Experience

- 2- Scieneering students (PMDI Summer interns)
- Faculty chaperone from VTCSoM- Penelope A Muelenaer, MD, assistant professor of pediatrics, also graduate student at VT in MPH program.
- 4 weeks in Mzuzu: field experience, project ideas, establish collaborations



2013-2014 WASH DATA ANALYSIS AND GLOBAL AIR

Understanding and Improving Water Sanitation Practices
to Improve Health Outcomes in Malawi, Africa

Capstone Final Document
Penelope A. Muelenaer, M.D.

May 12, 2014



ME Senior Design

Garret Burks
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SCIENEERING IN MALAWI 2014

- » Summer 2014- July
- » Introduce appropriate affordable technologies at 8 hospitals throughout Malawi
- » Establish better working relationships with educational partners. (Mzuzu and Mulanje)
- » Follow up educational activity for Penny's research



Global AIR

- Engineers
- Physicians
- Nurses
- Respiratory Therapists



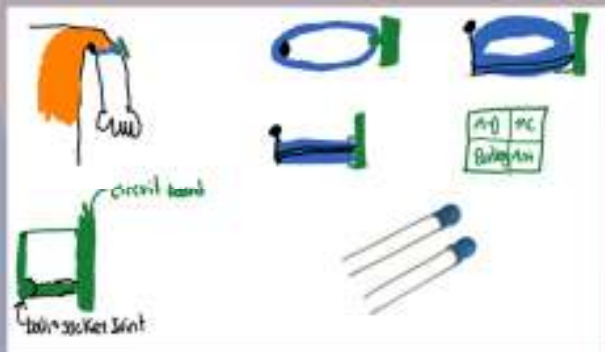
INSPIRE

- Physicians
- Nurses
- Engineers
- Business
- Public Health



Google Glass

- Surgeon
- Pediatricians
- Engineers
- Biochemist
- Nurse



Wireless Thermometer

- Neonatologists
- Dieticians
- Engineers
- Nurses

COMMUNITY HEALTH EDUCATION



Posters created by Scieneering students, Rachel Stein & Ashkan Katirai, and middle school student, Nikhil Hajra

M-COLI BLUE 24: CASE STUDY

- » The need: reading colony counts in austere settings where **laboratory technicians** are in short supply
- » **Engineer** interested in computer vision and use of low cost Raspberry Pi computer
- » **MD** working with WASH project suggests that machine count could be more efficient
- » Engineer develops device
- » **Biochemistry/premed** student learns technique from Penny Muelenaer and Leanne Krometis, **Biological Systems Engineer**
- » System is tested in lab
- » System goes to Malawi where additional applications of technology are identified by **lab techs**
- » **High school student** creates microscope adapter to image AFB



Visual Display of Culture Plate

Specimen Tray

Figure 1. Plate Scanning Device

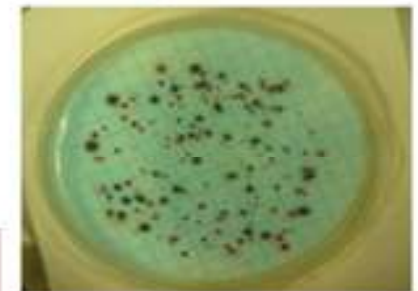


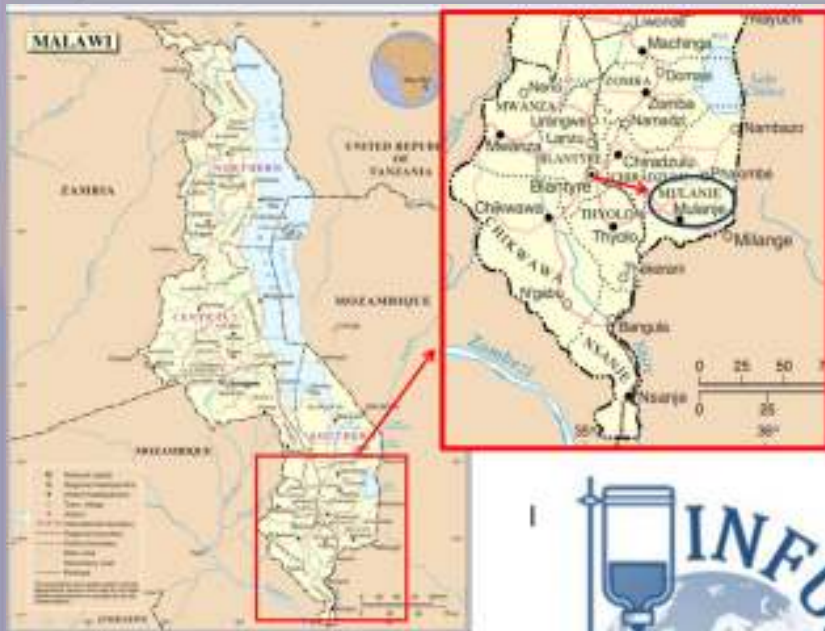
Figure 2. Culture plate demonstrating red and blue colonies.



TEAM Malawi

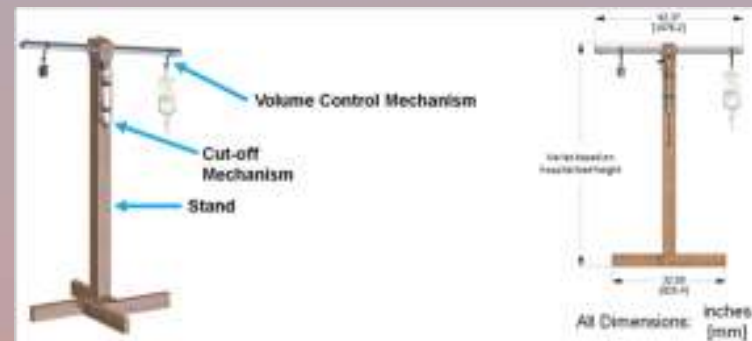


Technology Education
Advocacy Medicine



Jeff Turovskiy, BS, ME 2015
Ben Drew, BS, ME 2015
Ashley Taylor, MS & MPH candidate
Kevin Kochersberger, PhD, ME

2015



TEAM Malawi



Technology Education
Advocacy Medicine



2016

Experience

- Students
- Faculty chaperones and graduate student mentors
- 4-6 weeks: field experience, project ideas, establish collaborations

Partners

- Engineering
- Public Health
- Education
- Medical School
- Small businesses
- International NGOs
- Urban Affairs and Planning

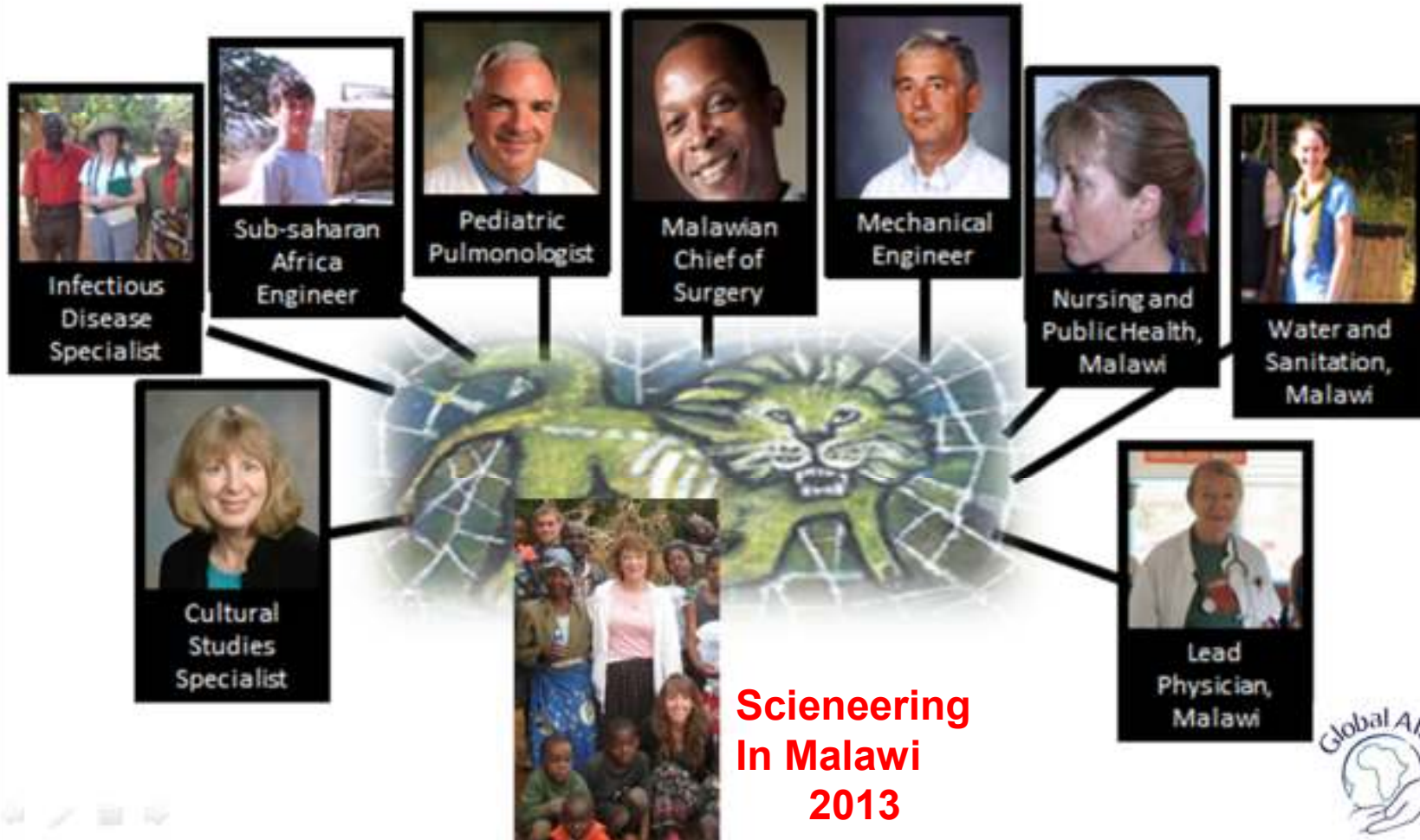
CONCLUSIONS

- A disease management/community wellness model can serve as a common framework to bring together professionals from very diverse backgrounds
- The simple cycle of SCREEN-DIAGNOSE-TREAT-PREVENT facilitates easy identification as to where one fits in this approach
- We have demonstrated that within this paradigm, meaningful interprofessional activities can flourish



When spider webs unite, they can take down a lion.

—African Proverb



**Scieneering
In Malawi
2013**

