Global Health & Health Disparities Program
Objectives

- Provide an update on our health outreach work in northern Honduras
  - Direct medical work
  - Public health work
  - Education of US-based learners
  - Scholarship
- Provide an update on “GH2DP”
- Discuss challenges and future directions
Overview

- Have participated in medical relief and public health trips serving the same communities in northern Honduras since 2005
2,124 adults
?
overall utility of the work
2,124 adults
? overall
utility of the
work

2006
2008
2009
2010
2011
2012

YEAR

*New focus in Yoro
*Formal IM resident involvement: “CARE”
500 adult patients
Needs assessment survey
25 water filters
Mass deworming

*Formal IM resident involvement: “CARE”
Clinic Sites-Yoro
Clinic Sites - Yoro

Department of Yoro, Northeastern aspect, Honduras
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Adult Health Initiative (AHI)
57 water filters distributed
Mass deworming

2010

2011

2012

YEAR
Research Article

Individual Physician versus Team-Based Medical Encounters: Maximizing the Efficiency of a Medical Relief Service in Rural Honduras

Musculoskeletal/ Dermatology station

Gastrointestinal/ De-worming/ Multivitamin Station

Hypertension & Diabetes Screening Station

Clinician/ Summary Station

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Same communities
500 adult patients
AHI project
50 water filters
Mass deworming
Access to care survey
Access to clean water survey
• Despite being under the same local health authority, geographically remote Honduran communities experience greater burdens in healthcare access and barriers than neighboring communities of the same region.
Discussion

Are these findings explained by distance to health services alone?

How should these differences guide resource allocation of our relief brigade?
Water Chlorination Practices and Access in The Department of Yoro, Honduras

• Needs assessment examining chlorine use, access, and type among the rural communities of Lomitas, La Hicaca, and the suburban community of Coyoles

• 263 randomly selected participants completed a 20-item language-specific, interviewer-administered, anonymous water sanitation questionnaire
  – Chlorine and water sanitation practices
  – Self reported personal and diarrheal illnesses

Collaboration with Community Leaders; La Hicaca Ministry of Health Outpost
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- AHI project
- 50 water filters distributed
- Mass deworming

2011:
- *New focus in La Hicaca
- CARE → GH²DP
- 440 adult patients
- AHI project
- Mass deworming
- 91 water filters
- 50 dental extractions
- 170 eyeglasses
- Enough vaginal specula for large-scale CA screening
- 430 HbG checks
- Survey + microtesting project on filter utility
- Survey on indoor air quality

2012:
- *New focus in Yoro
- *Formal IM resident involvement: “CARE”
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Global Health & Health Disparities Program (GH²DP)
Internal Medicine Residency Program
Global Health & Health Disparities Residency Pathway
The Class of 2010’s Jeff Wang is first grad of global health & disparities residency track

Dr. Wang examines a patient in Yoro, Honduras. Photo courtesy of Mike Stevens, M.D., M.P.H.,’s blog, Bugs, Drugs & Global Health.

Jeff Wang, M.D., is the first graduate of VCU’s Global Health & Health Disparities Program (GH2DP) residency track.

Launched last year, the GH2DP track exists within the Internal Medicine Residency Program and is designed to provide motivated residents with a robust curriculum in global health as well as exposure to global health issues. The program has both domestic and international components, and residents have to apply and be accepted into the track. A second resident has applied to the program, which eventually may enroll as many as four trainees.

“While many medical students and residents have identified within themselves a passion to help medically underserved members of society, it can be overwhelming to know how to even begin to
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Global Health & Disparities Program

$ __________


VCU Medical Center
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*Continue focus in La Hicaca
*Clinic in 2 locations to accommodate more patients
330 adults/ 360 children
AHI project
Mass deworming
150 water filters
Dental extractions
Distributed eyeglasses
Enough vaginal specula for large-scale CA screening; ~ 60 pap smears
300 HgB checks
Chagas survey
Satisfaction with brigade care survey
Indoor air quality education project
January 2013 Planning Trip

- http://www.gh2dp.vcu.edu/Pictures/Pages/Yoro,_Honduras__January_2013.html
Goal: Maximize Clinic Visits For All Aldeas Given Travel Distances

MAPA DE ESTRATOS DE POBREZA SEGÚN N.B.I.
U.S. LA HICACA

La Esperanza 46%
La Florida 49%
Crucete 60%
La Culata 52%
Chorro Viento 44%
Puerto Rico 80%
Agua Caliente 60%
La Vega 60%
El Utraco 82%
La Lima 60%

Estrato de Pobreza
I 0 - 44%
II 45 - 62%
III 63 - 80%
IV 81 - 100%

n~2000
## Clinic Schedule

<table>
<thead>
<tr>
<th></th>
<th>En la Hicaca</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lunes 27 de mayo</td>
<td>Martes 28 de mayo</td>
<td>Miércoles 29 de mayo</td>
<td>Jueves 30 de mayo</td>
<td>Viernes 31 de mayo</td>
<td>Sábado 1 de junio</td>
</tr>
<tr>
<td>Aldeas citadas</td>
<td>No habitado</td>
<td>MAÑANA 8-12</td>
<td>MAÑANA 8-12</td>
<td>MANANA 8-12</td>
<td>MANANA 8-12</td>
<td>MANANA 8-12</td>
</tr>
<tr>
<td></td>
<td>Crucete</td>
<td>Portillo 1 y 2</td>
<td>Santa Maria</td>
<td>Chorro Viento</td>
<td>La Culata</td>
<td>La Lima</td>
</tr>
<tr>
<td></td>
<td>La Florida</td>
<td>El Urraco</td>
<td>Carmelitas</td>
<td>La Florida</td>
<td>La Culata</td>
<td>La Lima</td>
</tr>
<tr>
<td></td>
<td>TARDE 1-5</td>
<td>TARDE 1-5</td>
<td>TARDE 1-5</td>
<td>TARDE 1-5</td>
<td>TARDE 1-5</td>
<td>TARDE 1-5</td>
</tr>
<tr>
<td></td>
<td>Agua Caliente</td>
<td>Lomitas</td>
<td>La Esperanza</td>
<td>El Cerro</td>
<td>La Vega</td>
<td>No habitado</td>
</tr>
<tr>
<td></td>
<td>Puerto Rico</td>
<td>(y la Veguita)</td>
<td>San Félix</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VCU Medical Center
2013 Brigade

• http://www.gh2dp.vcu.edu/Pictures/Pages/Yoro, Honduras June 2013.html#grid
Public Health
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Satisfaction with brigade care survey
Indoor air quality education project
Background: Water Sanitation Project

- MOH surveillance data from La Hicaca and environs:
  - Diarrhea/ dysentery incidence rate 2005-2007 (before filter project): **2.45**/ 100,000 person days
  - Diarrhea/ dysentery incidence rate 2009-2010 (after filter project): **1.23**/ 100,000 person days
- 1/2012 Ministry of Health: less children dying of diarrhea
Filter Preparation
Bucket Preparation: Washing with Bleach
Clinical and Microbial Efficacy of a Water Filter Program in a Rural Honduran Community

- Study:
- Self-reported diarrheal illness and microbiologic efficacy of the water filter program

Clinical and Microbial Efficacy of a Water Filter Program in a Rural Honduran Community

<table>
<thead>
<tr>
<th>Number of Responses, % (N)</th>
<th>La Hicaca (n=37)</th>
<th>Other villages (n=28)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to clean water</td>
<td>100% (37/37)</td>
<td>54% (15/28)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No use of water sanitation</td>
<td>3% (1/37)</td>
<td>43% (12/28)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Use river/stream as main water source</td>
<td>0% (0/37)</td>
<td>14% (4/28)</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Clinical and Microbial Efficacy of a Water Filter Program in a Rural Honduran Community

![Graph showing percentage of diarrhea with and without a filter.](image)

$p<0.01$

Clinical and Microbial Efficacy of a Water Filter Program in a Rural Honduran Community

Clinical and Microbial Efficacy of a Water Filter Program in a Rural Honduran Community

- Clay filters made in country:
  - Efficacious for the reduction of coliform bacteria in drinking water
  - Associated with decreased incidence of self reported diarrheal illness
  - Inexpensive, sustainable and reliable public health intervention in resource limited settings lacking potable water

Background: Indoor Air Pollution

- IAP Identified as major issue by MOH and community leaders
  - We were asked to help address this problem
- Globally
  - Indoor air pollution resulting from the issue of solid fuels causes 1.5 million deaths/year
  - Half of these deaths are in children < 5 years of age
    - 4,000 deaths/day

www.globalissues.org
The Clean Air Initiative: Smoking Out the Causes of Indoor Air Pollution in Rural Honduras

- Cookstove location
- Use of biofuels
- Correlation to self-reported respiratory complaints

Le A, Sanogo K, Bearman G. Stevens MP. American Society of Tropical Medicine and Hygiene, Annual Meeting, 2012
Le A, Sanogo K, Bearman G. Stevens MP. American Society of Tropical Medicine and Hygiene, Annual Meeting, 2012
Anemia Assessment Project 2012

At the request of the Ministry of Health:
Fingerstick anemia testing performed on adults and children

<table>
<thead>
<tr>
<th>Gender</th>
<th>0-25</th>
<th>26-50</th>
<th>51-75</th>
<th>&gt;75</th>
<th>Avg Hemoglobin</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>11.98</td>
<td>11.86</td>
<td>11.9</td>
<td>10.75</td>
<td>11.89</td>
</tr>
<tr>
<td>M</td>
<td>13.13</td>
<td>13.72</td>
<td>12.91</td>
<td>11.77</td>
<td>13</td>
</tr>
</tbody>
</table>

Point of care HgB testing materials donated by Quest Diagnostics
Summary of Work to Date

• Since 2006 we have seen over 5,400 adult patients
  – Majority provided with anti-helminthic therapy per W.H.O. guidelines
  – Prenatal vitamins with folic acid for all women of child-bearing age
A Survey of Patient Satisfaction with Short-term Mobile Clinic Care in Northern Honduras

• 202 anonymous, IRB approved surveys were conducted in Spanish in June 2013
  – Convenience sample methodology
  – Responses from LH were compared to the surrounding villages (SV)
  – Statistical analysis was performed using the Pearson’s chi squared and Fischer exact tests
  – 22 different villages were represented
    • 60 respondents from LH and 141 from SV

A Survey of Patient Satisfaction with Short-term Mobile Clinic Care in Northern Honduras

<table>
<thead>
<tr>
<th>Item</th>
<th>LH</th>
<th>SV</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waited 2 to &lt;5 hours for an appointment</td>
<td>5% (3/60)</td>
<td>15% (21/141)</td>
<td>0.04</td>
</tr>
<tr>
<td>Traveled &lt; 30 minutes</td>
<td>92% (55/60)</td>
<td>10% (14/141)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Never visited the brigade before</td>
<td>12% (7/60)</td>
<td>30% (42/141)</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Reported understanding the providers “well”</td>
<td>23% (14/60)</td>
<td>39% (55/141)</td>
<td>0.04</td>
</tr>
<tr>
<td>“very satisfied” with their overall experience</td>
<td>62% (37/60)</td>
<td>38% (53/141)</td>
<td>&lt; 0.01</td>
</tr>
</tbody>
</table>

Knowledge and Perceptions of Chagas Disease in a Rural Honduran Community

- A 15-item, IRB approved, interviewer-administered, convenience sample questionnaire was employed on adult patients attending a brigade clinic in La Hicaca (LH) and surrounding villages (SV).
- Pearson chi-square and Fisher exact tests were used to compare knowledge and attitudes of Chagas disease, environmental risks, and access to treatment between LH and SV.
- 177 questionnaires completed
  - 90% of respondents (n=159) were aware of Chagas disease
  - Minority understood disease transmission (2%, n=3)

Donovan S, Stevens MP, Bearman G. American Society of Tropical Medicine and Hygiene, Annual Meeting, 2013 [submitted]
## Knowledge and Perceptions of Chagas Disease in a Rural Honduran Community

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<th>SV</th>
<th>P value</th>
</tr>
</thead>
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<tr>
<td>No significant difference in self-reported presence of the reduviid bug in homes</td>
<td>65% (n=42)</td>
<td>76% (n=85)</td>
<td>0.11</td>
</tr>
<tr>
<td>Never tested for Chagas disease</td>
<td>67% (n=43)</td>
<td>77% (n=75)</td>
<td>0.11</td>
</tr>
<tr>
<td>Perceived higher risk of contracting Chagas disease</td>
<td>23% (n=23),</td>
<td>38% (n=40)</td>
<td>0.05</td>
</tr>
<tr>
<td>Perceived access to treatment between</td>
<td>LH 44% (n=24),</td>
<td>54% (n=50)</td>
<td>0.23</td>
</tr>
</tbody>
</table>

Donovan S, Stevens MP, Bearman G. American Society of Tropical Medicine and Hygiene, Annual Meeting, 2013 [submitted]
Summary of Work to Date

• Have distributed 400 water filters (each of which will provide clean drinking water to an entire household for 2 years)
  – Have reached approximately 75% of the 2,000 people living in the region
  – No children dying from diarrhea in past 18 months
Summary of Work to Date

• Provided global health experiences to:
  – 52 2\textsuperscript{nd} year medical students
  – 3 3\textsuperscript{rd}-4\textsuperscript{th} year medical students
  – ~40 medicine/ pediatric residents
  – 8 pharmacy students
  – 5 VCU RNs (CCH3 and MRICU)
Summary of Work to Date

• Have involved 16 students and residents in research projects, leading to:
  – 28 presentations at local, regional, national and international conferences
  – 6 peer-reviewed publications; 3 manuscripts in process/ review
- Van Ta
- Dan Park
- Sara Ivey
- Sam Khandker
- Modjulie King
- Joanna Adams
- Tanja Zlatkovic
- **Shivani Shodhan**
- Dawn Butler
- Michelle Tsai
- Ricky Moore
- Sharon Pao
- Austin Smith
- Rajika Nanayakkara
- Bill Kaufman
- Neha Chande
- Renee Chen
- Loan Chinn
- Jason Emejuru
- Angela Hou
- Malini Krishnan
- **Bethany Morehouse**
- Archana Ramireddy
- Luke Spoonholz
- John Trujilo
- Sejal Patel
- Jen Pitotti
- Dan Knott
- Elaine Wang
- Guannan Ge
- Kate Chae
- Rebecca Sanderson
- Jasmin Singh
- Tara Wright
- Kelly Lace
- **Gaby Halder**
- Rebecca Krey
- Chloe Nielson
- Kate Pearson
- Priya Raju
- Kathym Shaia
- Walker Shaw
- Andrew So
- **Rachel Whitney**
- Audrey Le
- Caitlin Klimavicz
- David Asher
- Dustin Dalton
- Jackie Arquiette
- Lauren Clifford
- Maya Iyengar
- Wendy Shue
- Dan Katz
- **Reena Hemrajani**
- Dan Markley
- Jean Fiedler
- Ijeoma Okogbue
- Robert Sealand
- Varun Sharma
- Joe Pitcher
- Stephen Popovich
- Summer Donovan
- Jeff Wang
- Michele Sundar
- Marilena Lekoudis
- **Audrey Bowes**
- James Mendoza
- Kat Lawson
- Josh Pacious
- KC Pierce
- Meredith Weakley
- Diana Pionk
- Andre Mulhausen
1. Pearson K, Stevens MP, Bearman G. Access and barriers to healthcare vary among three communities in rural Honduras. VCU Global Health Symposium, Virginia Commonwealth University School of Medicine, April 27, 2013, Richmond, Virginia.

2. Halder GE, Bearman G, Stevens MP. Water chlorination practices and access in the Department of Yoro, Honduras. VCU Global Health Symposium, Virginia Commonwealth University School of Medicine, April 27, 2013, Richmond, Virginia.

3. Halder GE, Bearman G, Stevens MP. Access and Sanitation of Drinking Water and Diarrheal Disease in the Department of Yoro, Honduras. VCU Global Health Symposium, Virginia Commonwealth University School of Medicine, April 27, 2013, Richmond, Virginia.

4. Arquiette J, Stevens MP, Bearman G. Clinical and microbial efficacy of a water filter program in a rural Honduran community. VCU Global Health Symposium, Virginia Commonwealth University School of Medicine, April 27, 2013, Richmond, Virginia.

5. Le ANH, Bearman G, Stevens MP. The Clean Air Initiative: smoking out the causes of indoor air pollution in rural Honduras. VCU Global Health Symposium, Virginia Commonwealth University School of Medicine, April 27, 2013, Richmond, Virginia.


Regional Presentations

**REGIONAL**


2. Stevens MP. Global Health: Lessons From the Field, Virginia American College of Associates Meeting, Richmond, VA, 1/12/13


NATIONAL/ INTERNATIONAL

1. Stevens MP, Cosco D, Sam D. Going global: providing international health experiences to residents. Association of Program Directors in Internal Medicine Annual Meeting, May 2013, Orlando, FL.
2. Arquiette J, Stevens MP, Bearman G. Clinical and microbial efficacy of a water filter program in a rural Honduran community. The American Society of Tropical Medicine and Hygiene 61st Annual Meeting, November 2012, Atlanta, GA.
3. Le ANH, Bearman G, Stevens MP. The Clean Air Initiative: smoking out the causes of indoor air pollution in rural Honduras. The American Society of Tropical Medicine and Hygiene 61st Annual Meeting, November 2012, Atlanta, GA.
5. Setting Up Global Health Rotations for Internal Medicine Residents (Forum by Application). Association of Program Directors in Internal Medicine Annual Meeting, Atlanta, GA, 4/25/12
Papers

Arquiette J, Stevens MP, Rabb JM, Sanogo K, Mason P, Bearman GB. Clinical and microbiologic efficacy of a water filter program in a rural Honduran community. *Rural Remote Health* [under review]


Summary of Work to Date

- Administered 7 IRB approved survey-based projects exploring access to care, satisfaction with brigade care, access to clean water, microbiologic and clinical efficacy of water filter program, indoor air quality, knowledge of Chagas’ disease
- Pap smear clinic with 500 disposable speculums provided (2012 and 2013)
- Eyeglasses distributed (2012 and 2013)
- Anemia prevalence survey: 430 patients (2012), > 300 patients (2013)
Challenges

- Significant costs:
  - Each brigade costs approximately $33,000
- Poor infrastructure
  - No roads to get drilling equipment to villages = no sustainable water source
  - Hard to access many people
- Corruption
- Political instability
- Violence
Honduras: The Bloodiest Nation In The World

Analysis

By PALASH R. GHOSH: Subscribe to Palash’s RSS feed
June 1, 2012 5:58 AM EDT

The small Central American nation of Honduras has gained the unfortunate notoriety of being the most dangerous place on earth.

According to the United Nations, Honduras now has the world’s highest murder rate (four times greater than that of blood-soaked Mexico), with a homicide recorded every hour and 15 minutes, according to The National Commission for Human Rights.

In 2011, this tiny nation of only 8 million people recorded 86 murders per 100,000 inhabitants (the highest rate on the planet), up from 82 in the prior year, and double the rate from just six years ago. In contrast, Mexico’s rate is about 18 murders per 100,000 inhabitants -- it’s about five in the U.S., while Britain records just one.

While much of the unceasing carnage is directly tied to the illegal drug trade and disproportionately afflicts the poor, the middle-class, politicians and even journalists have been brutally gunned down in Honduras.
Future Directions

• Twice yearly missions
• More treatment of chronic illness
• Modify brigades to capture more remote patients
• Expand/ continue to support the water filter program
• Support creation of latrines in remote areas
• Address air quality issues
• Continued collaboration with the MOH
Global Health & Health Disparities Program (GH²DP)
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- Global Health & Disparities Program
- Memory, Aging & Health Research

Total Gift Amount: $
Global Health & Health Disparities Program

www.gh2dp.vcu.edu