COURSE DEVELOPMENT PROJECT: FINAL REPORT

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COURSE BACKGROUND
In Fall 2014 I designed and ran a course in Medical Geography (HLTH 403R). This course taught students about the importance of location in determining health status and also taught them basic skills in using Geographic Information Systems (GIS) for health endpoints.

LEARNING OUTCOMES
The learning outcomes for this course were:

a. Describe multiple ways in which location can influence health.
b. Know how to ask and analyze questions regarding health and location using current technologies.
c. Understand how geography can inform and improve current health care delivery.
d. Describe interactions between individual behavior, genetics and environment involved in common disease etiologies.

These outcomes were focused on the students gaining an increased ability to understand the role of location on health. They are meant to encourage critical thinking and a further understanding of interactions associated with health. This is not a course that is as content-heavy as it is focused on skills training and theory.

These outcomes are related to the program’s learning outcomes which are focused on improving students’ understanding of health on a population level, and their ability to work in diverse, underserved populations. An understanding of how health disparities and influence vary over space is essential to the student’s ability to do that in their future careers.

COURSE ACTIVITIES
The main course activities were student discussion about weekly readings and weekly GIS laboratory experiences that gave the students direct experience with mapping technologies. They completed an individual project in alignment with these goals where they created a public health map that would help clinicians and patients interact and promote behavior change. The class discussions and readings are primarily aligned with learning outcomes a, c and e. The GIS laboratory assignments were tied to outcome b, which focuses on knowing how to appropriately ask scientific questions in medical geography and be able to use the technologies available to them.

As more and more health groups are geocoding their own data, GIS skills in public health will help students in their pursuit of employment. An increased understanding of the role of location on health (including health care access) will help them become leaders in the field.

ASSESSMENTS OF STUDENT LEARNING
The primary assessments of student learning were a midterm exam, final exam, and individual project. As the laboratory assignments were primarily completed in class, they did not figure as heavily into grading. The midterm and final exams tested student learning in class and from reading assignments. The individual project, wherein they had to interview a health professional and create a map for them, assessed their skills in map making.

The exams were structured as about 30 short answer questions, with some multiple choice or fill-in-the blank mixed in. This structure was selected because it allowed me to get a better understanding of their level of critical thinking about geographic health topics. The learning outcomes are focused on students’ ability to think through theory and implications on health, rather than being a memorization-based course. Therefore, open-ended questions were a better assessment of their ability to describe and work through current thinking in the field.

The individual project gave students the opportunity to plan and complete a map from start to finish, including finding their own data sources. Having completed this project successfully showed that they could complete other projects in the future and overcome unexpected challenges associated with those projects. This is a good assessment because it goes beyond asking specific questions on their learning about the software, which is constantly changing. It instead forces them to use it to create something on their own.

**STUDENT ACHIEVEMENT OF LEARNING OUTCOMES**
The students were able to achieve the learning outcomes. As this was a first try at this course, it was a small group of only 8 students. This allowed for a lot of time being able to be spent with each student. Of the 8 students, 5 achieved an A or A- in the course. The average grade on the midterm exam was also very high, at 91.5%. Students demonstrated excellent mastery of the subject on this and the final exam, which had an average of 89.3%.

The grades on their final projects were also high, with a mean of 88.8%. No students scored below a B- . These grades were achieved in spite of grading them rather strictly. The group of students was very highly motivated and high-achieving.

Further assessments could focus on their ability to think of new geographic questions and to take spatial and temporal patterns of disease into account in making health care decisions. However, I feel that the assessments were a good, and rather direct way of understanding the level of student learning.

**STEPS PLANNED TO IMPROVE TEACHING AND STUDENT LEARNING**
In this course I want to increase the level of depth at which we explore ideas. The students who take this course have already completed a lot of courses in public health, including environmental health. Therefore I can prepare lectures that are deeper and require more challenging readings than the textbook I used. While I feel confident in many of the laboratory assignments now, we had many technical challenges this past semester due to software upgrades that made lab work difficult. I will make an effort in the future to make sure these issues are worked out before the start of the semester.
OVERVIEW
As stated in my Faculty Development Plan, my philosophy toward scholarship is that being actively involved in scholarship will strengthen my personal skills in my fields of study, help me stay in touch with recent developments to incorporate into my teaching, and provide opportunities for students to actively participate in the research process. I have narrowed my research focus to primarily be “spatial and temporal analysis of conditions influencing respiratory health.” This incorporates my medical geography background, as well as my interest in respiratory viruses, asthma and air pollution.

In the past year I submitted 4 papers for publication, exceeding my goal of 3 per year. One was accepted in January, 2015. Each submission was sent to a journal with an impact factor above 2.5, with an average of 5.692 (conditional, of course, on their acceptance). The publications are listed below:


PROGRESS TOWARDS GOALS (Note: several of these projects have been ongoing, hence the anticipation of completion of a large number of manuscripts within the next year.)

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<thead>
<tr>
<th>Project</th>
<th>Goals by 2/2015</th>
<th>Progress</th>
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</thead>
<tbody>
<tr>
<td>1. US Military Health System bronchiolitis; have submitted an R21 to NHLBI</td>
<td>Have completed and submitted 2 papers, and be working on the third.</td>
<td>I was part of two grant proposals (listed below) to fund further work. The first paper to result from this work is still underway, but will be done by the end of the semester. I presented results</td>
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<tr>
<td>2. Emerging Infections Program</td>
<td>Have 2 papers completed and submitted.</td>
<td>One paper was completed and submitted in Fall 2014. Two other papers are under preparation, but awaiting more data from CDC before they can proceed.</td>
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<tr>
<td>3. Detecting associations between infant bronchiolitis, sleep apnea and SIDS</td>
<td>Have 1 paper completed and submitted, and this project wrapped up.</td>
<td>This paper is being completed now and will be submitted by mid-March 2015, just short of the goal. We are submitting to AJPM.</td>
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<tr>
<td>4. Monitoring infant air pollution during inversions</td>
<td>Have 1 paper submitted and another in preparation.</td>
<td>Two papers are currently in preparation. The first will be submitted by the goal date of 2/28/14 to Health and Place. The second will be submitted by the end of the Winter semester.</td>
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<td>5. US awareness of Health Disparities</td>
<td>Have data collected and begin analysis.</td>
<td>Data collection is currently underway.</td>
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<tr>
<td>6. Global asthma network</td>
<td>Have sought and potentially secured funding to conduct this study in 2015-2016; this is a longer term project being thought about for future applications working with students</td>
<td>I have secured $20,000 in faculty startup funding to accomplish this project in Fall/Winter 2015-2016.</td>
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**Grants:**

I was included in the submission of two external grants in 2014, listed below. I was a co-investigator on the first, and a lead PI on the second.

1. **Funding mechanism:** R03 ES025295-01, NIEHS  
   **Title:** Modeling Environmental Impacts on Bronchiolitis in the Presence of Spatial Uncertainty.  
   **Principal investigator:** Matthew Heaton, Ph.D.  
   **Requested funds:** $100,000  

   This proposal represents a collaboration between Dr. Sloan in the Department of Health Science and Dr.’s Heaton and Berrett in the Department of Statistics. We will use data from a Military Health System Database to develop methods for dealing with spatial uncertainty in large datasets. This proposal is expected to be funded, as it was scored in the top 6% of proposals.

2. **Funding mechanism:** R21, NIAID  
   **Title:** Annual Burden of Infant Bronchiolitis Epidemics in the United States
Principal investigator: Chantel Sloan, PhD and Tina Hartert, MD, MPH (Co-PI)
Requested funds: $150,000

This study, if funded, will focus on investigating rates of infant bronchiolitis in comparison with rates of administration of RSV immunoprophylaxis nationwide. We will use data from 2 RSV cohorts as well as data from the Military Health System database to complete this study. It will be reviewed by the study section in March 2015.

ASSESSMENT

I met most of my goals for 2014. Some papers were not submitted as quickly as I had hoped, though much of this was outside of my control due to changes in databases and needing approvals from government sources to proceed. I am pleased with the grants we submitted, and that one of them was scored in the 6th percentile and is expected to be funded. I have worked to include students more on papers, and expect more papers that include students to be submitted in the coming year. I have learned that sometimes I have overly ambitious goals with my scholarship and am not able to meet deadlines I set for myself while working with the large collaborative groups of which I am a part. Of course, at times I am also the one who takes longer to accomplish analytic or writing tasks as quickly as hoped. I plan to set more realistic goals in the future that take teaching schedules particularly more into account.

GOALS FOR 2015

Beyond completion of the goals listed above, which will continue to produce publications, I have several other ongoing projects on which I plan to progress in the coming year.

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<td>1. SAMHSA Native American Mental Health</td>
<td>Submit a review/opinion article on policies regarding grants to Native American organizations for mental health research.</td>
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<td>2. Virus co-circulation</td>
<td>This paper is a collaboration with Vanderbilt University Medical center to investigate patterns of virus co-circulation during winter virus season. We will have a paper submitted by the end of 2015.</td>
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<tr>
<td>3. Autism rates</td>
<td>Working with my sister, Arielle Sloan, I am included on a paper investigating spatial distributions of autism rates in Utah which will be submitted by the end of 2015. It is currently awaiting approval for submission.</td>
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OVERVIEW
I have participated in citizenship in the Department continually through my first 1.5 years in the Department. As stated in my faculty development plan, I have been involved in Department and College committees. In the past year my assignments were in the merit pay committee, accreditation committee and ORCA review committee. The accreditation committee was particularly time consuming as we prepared our CEPH self-study binder. I will continue to be involved in these areas as well as in future assignments.

In my scholarship, I have collaborations with four outside groups- the Emerging Infections Program, the Department of Defense, SUNY Stony Brook and Vanderbilt University Medical Center. At BYU, I have collaborations with the Department of Statistics and with individuals within my department. I have also begun to develop collaborations with Intermountain Health Care, the Global Asthma Network, and the Utah County Air Task Force. These are listed in Section 2 (page 4) of my faculty development plan.

I am a member of the Association of American Geographers and the American Thoracic Society, though I do not currently hold any leadership positions. I also currently review for several journals in my specialty, including Spatial and Spatiotemporal Epidemiology and The International Journal of Health Geographics.

CITIZENSHIP IN THE BYU AND BROADER LDS COMMUNITIES
I believe it is important to be a good citizen of the broader BYU community in providing outside service. As such, I have served as the faculty advisor to the BYU Rotary Club. This is a service-oriented group of BYU students who conduct by-monthly service projects. My role will is to approve service projects and attend when possible. I participated in another student project through the Faculty Women’s Association called By Study:By Faith. It was an interview series with female faculty who describe their life path, and was meant to help encourage continued learning among male and female students. I also have given several interviews to The Daily Universe and appeared on the BYU Radio morning show twice to discuss current topics in infectious diseases.

In the last year I served in my ward as a youth Sunday School teacher, and have recently been released to serve as a ward chorister and choir director.

PROGRESS TOWARDS GOALS
My citizenship activities over the last year included increased responsibilities and engagement within the Department of Health Science, as well as outside groups. My most involved new assignment was serving as part of the Department Accreditation Committee. As part of this group I was assigned to focus on Workforce Development goals. We previously hosted a small conference each year for public health workers that we have since stopped running. The lack of
continued workforce development efforts was a major gap in our accreditation packet. Along with Dr. Robert Chaney from our department, I planned a new seminar series where we would bring in outside speakers as well as have internal speakers from the department to lecture on areas of specific need for those in the public health workforce.

**PLAN FOR NEXT 5 YEARS**
My plan to increase my citizenship role over the next 5 years includes serving in my committee assignments, while gradually taking more active leadership roles in those committees. I will also accept College and/or University assignments that may come, as long as they will not lead to my being over-committed to citizenship at the expense of teaching and scholarship.

I will also begin to be more involved with the scientific societies of which I take part- helping to advance the field and make BYU’s participation more visible in my field of study. I will continue to review papers for journals, and will begin to actively involve undergraduate and graduate research assistants in those journal assignments. This will give them valuable insight into the journal writing and revising process. Finally, I plan to become more involved with Utah organizations such as Intermountain Health Care and the Utah County Air Task Force to improve health and air quality among our local community.