

Geography attracts me because it has the special status of being a discipline that studies the whole. We are living in an increasingly interconnected world, and an increased awareness of geography is necessary to understand the human dimensions of global change. Let me clarify for the Admissions Committee my current academic status. I am in my second quarter of my second year in medical school at UWSOM. I was admitted as a member of the UW MSTP (Medical Scientist Training Program), one of 41 MD/PhD programs at various medical schools funded largely by an NIH grant. The program guarantees full stipend and tuition support during all years of training. I feel very honored and privileged to be part of this program. Our program is structured so that we complete our first two years of medical school prior to beginning work in earnest on the PhD portion. After completion of the PhD, we re-enter medical school for completion of the 3<sup>rd</sup> and 4<sup>th</sup> years. We do research rotations with faculty and researchers of our choice prior to our first year in medical school and in between our first and second year. Through my rotations, undergraduate work, and medical schooling thus far, I have been gradually drawn into the field of geography—specifically medical geography.

Simply put, I am a student of humanity. We human beings can be studied and understood on many levels. On the one hand, there is the constitutional and organismal view of humans which adopts the materialist lens. Our health and illness is understood at physiological, biochemical, genetic, anatomical, and other such biological levels. This way of thinking and understanding is held up by the pillars of the canonical, scientific, objective paradigm. This is the dominant research viewpoint that informs and advances much of our medical sciences. This is the mode of thinking and understanding that we frequently employ day-to-day in medical school. Gross Anatomy cadaver lab is a prime example of this modality. On the other hand, there is another perspective on the study of humans that recognizes that we are social, self-reflecting creatures with cultural, historical, and self-made identities. It is my belief that medical geography can blend and bridge these two seemingly irreconcilable perspectives. Medical geography is able to do this because it is a progressive, multidisciplinary field that lies at the crossroads of basic science and social science. Specifically, it draws on concepts and techniques from traditional geography, epidemiology and public health, clinical and basic science medicine, ecology and environmental science, and critical social and political theory. This enables medical geography to investigate distributions and patterns of health and disease at all levels, from local to global, with its panoply of lenses.

My solid introduction to this field began during the summer of 2002 during a research rotation with Professor Jonathan Mayer in the UW Geography Department. During this time, I took an intensive reading course in medical geography with Jonathan, learned basic techniques in health-based GIS mapping, and wrote a 12-page paper in which I answered the question: “Can disease ecology account for non-infectious diseases?” The paper explored the application of disease ecology principles to several non-infectious diseases such as malnutrition, cardiovascular disease, and obesity. These diseases have many risk factors and are caused by subtle forces that gradually accumulate. As such, modeling the complex origins of non-infectious diseases through disease ecology can help uncover multifaceted patterns of causation. This is one research avenue I am interested in further exploring. The summer I spent working with Jonathan prior to starting my first year in medical school was an incredibly enriching and rewarding

experience that has helped me to develop a concrete, real-world perspective to contextualize my medical school education. I began to understand the role that human behavior plays in propagating disease on a large scale, especially through environmental degradation, pollution, and misallocation of resources. In short, my summer exposure taught me a style of thinking and approaching problems that can most aptly be called “disease ecological thinking.” I seek to apply this holistic style of thinking in my graduate work to better understand the ensemble of factors that contribute to disease propagation by identifying what environmental influences and patterns of human behavior predispose one population over another to disease and poor health outcomes. Ultimately, this paradigm can be an avenue by which to identify positive interventions, both large and small, that can help maintain and improve human health. These interventions would take the form of both political and social policy changes and sound applications of the technologies and advancements of science and medicine. The power of medical geography in proposing such interventions derives from its ability to rigorously bring history, context, and value analysis into the academic milieu. To help guide technical implementation decisions of policymakers, the questions of what direction are we headed in, is this a direction that we should be headed in, and who benefits and who loses must be addressed and discussed. Rich, reflexive analysis of values and power that comes from social science, when synergistically coupled with disease ecology and an appreciation of the powers of technology, will prove valuable, if not essential, to grappling with the global disease burdens we face today.

I am particularly interested in studying human diseases that basic science pioneers have deduced—through satisfaction of Koch’s Postulates—to be infectious in origin. These diseases are exquisitely understood and traced with medical geographical tools and concepts because both humans that are afflicted by these diseases and the causative infectious agents themselves have separate and complex geographies that necessarily intersect. Often, there are additional living creatures that enter into the causal chain in their capacity to serve as vectors and reservoirs of the infectious agents. They too have geographies. Two particular diseases I am interested in studying are malaria and HIV/AIDS, both scourges in much of the developing world. These diseases are typical of the kinds of issues and problems that I would like to study in my graduate work: *not* erudite problems that are simply found within the confines of academia and academic journals; rather, I intend to focus on pressing issues of social concern that matter to the local, national, and global communities in which I live. During my work in Professor Carol Sibley’s malaria genetics research lab last summer, I began to appreciate many geographical insights into this parasitic disease. At the physical, environmental, and climatic levels, the female mosquitoes of the *Anopheles* genus tend to prefer some elevations and biomes over others. Accounting for this could help to explain the variability in malaria transmission and endemicity that one finds in the mountains, valleys, and plateaus of Tanzania, for example. At the molecular and genetic level, the *Plasmodium* transmitted to humans via the mosquitos’ salivary glands shows powerful adaptation and resistance development to common drugs used to treat malaria. This too has a geographical basis that can be elucidated by tracking the spatial distribution of resistance-conferring mutations from *Plasmodium* field sample isolates. This could help explain why traditional anti-malarials are effective in some countries and useless in

others. Beyond consideration of environmental and molecular factors which provide causal and explanatory knowledge about malaria, I am interested in stepping further into the malaria epidemic by considering how medical and public health resources might best be allocated in disease prevention and eventual eradication. I would like to consider how current large scale disease eradication and prevention projects spearheaded by NGO's and public-private partnerships such as the WHO, the Gates Foundation, and the Clinton Foundation operate. What do these programs implicitly and explicitly consider as facts relevant to their tasks at hand? What kinds of knowledge is being communicated by academics, in particular through the voices of scientists and physicians? What knowledge is considered important, and what is left out? Who wins, and who loses? A large part of the study of human geography is about recognizing and understanding how people view the world; I am especially interested in unpacking the worldviews of social policymakers.

In the area of HIV/AIDS, I am inspired by the work of Dr. Paul Farmer, MD, PhD who I have had the fortune of meeting on a few occasions. An all-too-clear example of the maldistribution of health care resources as a function of social and economic inequality can be seen in the massive spread of the HIV/AIDS epidemic. This is a topic that Farmer has written on extensively, most notably in *Infections and Inequalities* where he chronicles his personal experience of watching the emergence and mass proliferation of HIV in Haiti from his perspective as both a physician and medical anthropologist. When looking at the catastrophic pandemic of HIV, the traditional disease ecology models fall short. Even while accounting for landscape, lifestyle, and habitat conditions conducive to the spreading of the virus, these ecological models give us only limited insight into the reasons behind HIV's spread and distribution which, in Farmer's words, "tracks along steep gradients of power." Farmer's contributions to our understanding of HIV/AIDS goes further than his academic writing; he has brought first-world diagnostics and treatment technologies to some of the poorest people in the western hemisphere. His work challenges traditionally held beliefs of what is and is not cost-effective. His work has helped to unmask hidden power dynamics behind institutional decisions regarding health care access and delivery work. I would like to continue in the footsteps of Dr. Farmer's work. Through medical geography, I would be able elucidate the political forces, market forces, and social stigmas that conspire to retard preventative and curative measures to curb this truly treatable and containable epidemic.

I have a clear idea of the area in geography that I am specifically interested in: medical geography, with Professor Jonathan Mayer as my primary advisor. I would also like to work with and learn from other geographers in the department who study resource allocation, hunger, and poverty. In addition, I intend on branching out for my graduate work to collaborate with professors and researchers in other places in Seattle such as on campus at the School of Public Health and Community Medicine and at non-profit groups such as the Program for Appropriate Technology in Health. Through such collaborations, and through my own combined training, I hope to prepare myself for the holistic thinking and practice much needed for ameliorating our species' ills. Thank you for taking the time to read and consider my application.

Sincerely,  
Sunil Aggarwal (1/14/2004)