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CLIMATE CHANGE
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Climate Change: A Super Wicked Problem

Anthony L. Esposito, MD

Climate change has been termed a "super wicked problem," writes Jeremy Hess, MD, and as such is characterized by "…enormous interdependencies, uncertainties, circularities and conflicting stakeholders implicated by any effort to develop a solution." This is a dramatic but compelling characterization of climate change to be sure. In this issue of Worcester Medicine, the Editorial Board has collected reports from a range of experts in an attempt to provide an accessible overview on the subject and to highlight the magnitude and complexity of the medical aspects of climate change.

Fred Pickhardt, a Florida marine meteorologist, articulately defines greenhouse gases and describes the sources of these molecules. He notes that greenhouse gases have been rising since the beginning of the industrial revolution, and he describes how such gases contribute to climatic warming.

Among the consequences of climate change and instability are extreme heat events killing thousands across the globe, torrential rains from increased evaporation, perilous winters, and insect-borne diseases swarming northward, write Cecil Wilson, MD, and Paul Epstein, MD. These authors emphasize the importance of educating health care providers about the medical impact of climate change.

George Luber, PhD, Associate Director of Center for Disease Control and Prevention's Climate Change Program, outlines a public health framework for identifying climate related changes in disease patterns and for prioritizing responses to those alterations. He highlights the importance of multiple data sources in helping health officials assess the relationships among climate change, weather events, ecological perturbations and health outcomes.

"…Microbes evolve, adapt and emerge in response to…changes in the physical and social environment," quotes Gerald Keusch, MD. And he cautions, "We have learned a lot but not enough." He observes that microbes possess evolutionary advantages over other species, and he outlines how climate change might accelerate microbial evolution and migration.

Gretchen Kaufman, DVM, reports that while public attention has focused on microbial diseases in humans associated with climate change, wild animals and livestock are also experiencing the consequences of flooding, drought and rising water temperatures. And like humans, animals are becoming subject to novel vector-borne diseases. To help confront the impact of climate change, physicians and veterinarians have begun working together under a concept which, Dr. Kaufman writes, "…embraces the inextricable relationships between humans, other animals and the ecosystems they share."

Martin Reichel, MD, outlines the relationships among the ozone layer, ultraviolet-B radiation and a rising incidence of skin cancers in North America. And he suggests that it is not an inconvenient truth that limiting the depletion of ozone will have an impact on the incidence of neoplasms of the skin.

Dr. Hess suggests in his review that "The greatest medical advance of the first half of the 21st century (could be) the mitigation of climate change..." After considering the articles in this issue of Worcester Medicine, I am certain many readers will agree.

Anthony L. Esposito, MD

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Climate Change and Its Impact on Public Health

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Climate Change, Its Health Impacts, and Our Role

Jeremy Hess, MD, MPH

Jeremy Hess, MD, MPH

An Issue Whose Health Impacts Are Coming into Focus

Climate change is a relatively new issue for the health community. The science underlying the issue, however, is surprisingly old. Tyndall established the principle for the "greenhouse effect" approximately 150 years ago with his discovery that atmospheric methane and carbon dioxide (CO2) regulate the Earth's surface temperature.1 Arrhenius built on this discovery and pointed out that fossil fuel combustion, markedly increased during the Industrial Revolution, might cause warming on a planetary scale.[2] Since, Keeling documented increasing atmospheric CO2 concentrations in the 1950s,[3] and a host of climatologists and atmospheric scientists expanded on the specifics of the theory using global circulation models. Their work has largely confirmed the broad-brush projections from the 19th century, namely that a doubling of pre-industrial atmospheric CO2 levels (to approximately 560 ppm) will correlate with a global average surface temperature increase of approximately 2-4.5°C, with a best guess of approximately 3°C. Atmospheric CO2 concentrations are currently at 392 ppm,[4] and the Earth has experienced approximately 0.6°C of warming to date.[5]

Had the specifics of just how this anthropogenic warming might affect human health gotten similar levels of attention over this time period, we would have more precise estimates of the human health effects of these changes now. As it stands, however, we only began asking questions about climate change health impacts recently,[6] and our projections of the likely health impacts are similar to the broad-brush warming projections of physicists in the 1800s. Climate change presents several direct exposures relevant to human health, including increased temperatures, changes in patterns of precipitation and extreme weather events, and rising sea levels.[7] Climate change is also associated with a host of indirect exposures,[8] from impacts on vector-borne and zoonotic disease ecology to regionally-specific effects on agricultural output and the nutritional content of certain staple foods.[9] Some other health effects, such as the devastating impacts of complex humanitarian emergencies on population health, are also likely, though they will be concentrated in certain regions[10] and it is difficult to project their likelihood given the complex causal nature of the exposures.[11]

While the World Health Organization has assembled an estimate of the current global burden of disease associated with climate change and has made limited projections of future disease burdens,[12] there are no comprehensive projections of current or future climate change health impacts. This is a function of both the resource intensity of generating such projections and the lack of data available for populating the models that would generate estimates of health outcomes. Baseline population demographics and other susceptibility data are required, as are data on exposure-outcome associations, some of which are place specific. There have been projections of specific outcomes such as mortality from heat[13] or ozone,[14] but these projections are typically focused on particular health outcomes in specific locales. In addition to resource and data constraints, other sources of uncertainty complicate projections, including incomplete understanding of climate dynamics and an incomplete catalogue of exposure-outcome associations (particularly for the indirectly mediated outcomes mentioned above). Despite these issues, we are able to state with a high degree of confidence that the net impact of unmitigated climate change on human health will be adverse,11 that the impacts will vary by location and vulnerability,[15] and that the most vulnerable ~ those least responsible for the problem ~ will be forced to deal with impacts that will, in some cases, pose existential threats.[16]

Present and Future Risks

Hints of these threats are already materializing. We are already seeing temperature increases and shifts in extreme precipitation events consistent with global circulation model projections. Depending on one's willingness to create a constellation out of a host of isolated events, ranging from the devastating European heat wave of 2003 which was associated with excess mortality of over 35,000,[17] to the dramatic northward extension of the range of Vibrio Parahaemolyticus,[18] to the determination that dengue is now endemic in southern Florida,[19] a shift of 0.6°C is already having significant health impacts. The IPCC Fourth Assessment Report stated that warming trends in North America will be essentially linear for the coming century; in 20 to 30 years, we can expect another roughly 0.5-1°C of warming, with some regional variation, in the continental US.[20] The distribution of both temperature and precipitation will continue to change: the averages will increase, as will the variance. As a result, we can expect that heat waves will be both more frequent and more severe, and risks of a variety of climate sensitive conditions, from cardiovascular disease[21] to kidney stones,[22] are expected to increase. Both droughts and extreme precipitation events will increase, as well, increasing the risk of morbidity and mortality from storm-related trauma, infectious diseases, and displacement. At the same time that these exposures are shifting, factors affecting population susceptibility ~ increased age, prevalence of chronic health conditions, rates of overweight and obesity ~ are also likely to increase overall vulnerability to climate sensitive concerns.[23]

These changes will likely be manageable, particularly for a developed country like the US, over the next several decades. On longer time scales, however, about four generations (our great-great grandchildren), the changes become more fundamentally challenging, even for a country with substantial resources. Estimates for changes through the end of the 21st century project more dramatic shifts, and the US is expected to warm by approximately 1°C more than the Earth as a whole.[20] Sea levels are likely to rise by as much as 1 m by then,[24] posing a significant threat to several US coastal cities and low-lying infrastructure.[25] Particularly challenging at this point will be managing truly extreme events: storm surge levels will increase proportionate to sea level, as extreme temperatures will deviate proportionately from an increased average. Severe extreme heat events, e.g. a heat wave that occurs once a century, could have a massive public health impact once average summer temperatures have increased this significantly.

What Is To Be Done

Not all health impacts will be adverse. Warmer winters will be associated with reduced cold-related mortality of various sorts, from seasonal infectious diseases to cardiovascular disease. Growing seasons will lengthen in certain regions and in some areas agricultural productivity will increase. And there are a host of health co-benefits to look forward to from aggressive climate change mitigation efforts, as several recent analyses have demonstrated.[26-29] Increasing active transport (walking and biking), decreasing animal product consumption, and changing sources of household energy production all have significant health benefits in a wide range of settings from the developing to the developed world. As physicians, we have an obligation to convey these findings to our patients and to policymakers.[30]

The medical press in the US has not taken up the issue of climate change in the way that its sisters have in other regions, particularly Europe. In 2007, Stott published an essay entitled "Climate Change – 2057" in the British Medical Journal.[31] His piece highlighted the role of the medical profession in bringing about what is widely acclaimed as the greatest medical advance of the first half of the 21st century, the mitigation of climate change, through a platform of information and advocacy leading to adoption of strategies to contract greenhouse gas emissions among industrialized countries and narrow in on a convergent carbon entitlement for all citizens, an entitlement that low-emitters could sell to higher emitters and thereby effect substantial wealth transfers while providing an incentive for reduced emissions overall. This may seem idealistic and perhaps assumes too much of health care's readiness to lead on this issue. In a health care system such as ours, advocating action on climate change may seem to be a relatively low priority. Nonetheless, his essay highlights the important role that physicians can play in bringing attention to the challenge.

One point that Stott does not mention is health care's role in contributing to the problem. Health care is remarkably energy intensive. In the US, the health care system is responsible for 8% of the

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country's total greenhouse gas emissions.[32] On a per-capita basis, these emissions are an order of magnitude higher than those of the health care system in Great Britain.[33] If the US health sector were a country, it would rank 10th in the world in terms of its annual emissions. There have been no estimates correlating these emissions with the harm they cause. For health professionals to disregard our own emissions, however, despite the fact that they occur in the course of pursuing a healing mission, is at best disingenuous, especially as efforts to reduce health care's carbon footprint have met with success.[34]

Climate change has been deemed a "super wicked problem." A wicked problem is characterized by "enormous interdependencies, uncertainties, circularities, and conflicting stakeholders implicated by any effort to develop a solution."[35] Super wicked problems have the added characteristics of being caused by the same group responsible for finding a solution, needing resolution on an accelerated time frame, having no central authority for generating and applying a remedy, and being subject to hyperbolic discounting rates in calculating costs over time of both impacts and remedies.[36] Such problems are exceedingly difficult to address, and climate change is perhaps the prime example. Yet, from a health perspective, there are very compelling reasons to try to mitigate climate change aggressively. Insofar as health professionals have an ethical obligation to promote measures that maximize both individual and public health, the health community should embrace this concern.

Dr. Hess is an emergency medicine physician with training in global environmental health. He is on the faculty of the Departments of Emergency Medicine and Environmental Health at Emory University. He also serves as a consultant to the Climate Change Program at the CDC's National Center for Environmental Health.

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Global Warming and Health a Meteorologist's Perspective

Fred Pickhardt

There has been much press and controversy about global warming ~ everything from doomsday scenarios to absolute disbelief. As a meteorologist, I suspect the truth is likely somewhere in between those two extremes. Although climatologists and meteorologists debate the merits of global climate change theory, there are some facts that are not disputed by scientists. One of these is that over the past 100 -150 years there has been a significant increase of some greenhouse gases in the atmosphere and a definite trend towards warmer temperatures.

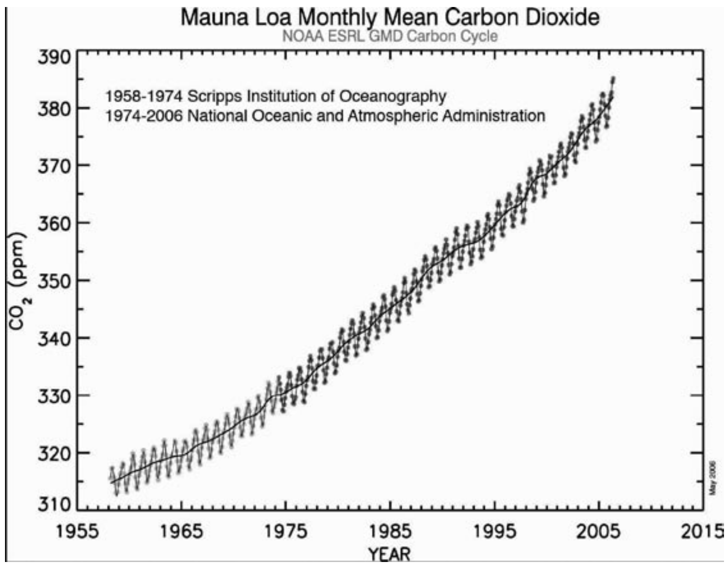


Image Credit:NOAA Link http://celebrating200years.noaa.gov/datasets/mauna/image3b.html

Just what are greenhouse gases anyway?

Greenhouse gasses are those gases that allow the atmosphere to retain heat and thus warm the earth's surface above what it would be from sunlight alone. Sunlight heats the earth's surface, and that heat is absorbed by gases such as water vapor, carbon dioxide and methane. Without these greenhouse gases, the earth's temperature would be more than 30 degrees Celsius (50ºF) colder than it is now, and our world would likely be a giant snow ball.

The issue today is that some of these greenhouse gases, particularly carbon dioxide and methane, have been increasing steadily since the beginning of the industrial revolution. Over the past approximately 150 years, the level of carbon dioxide, for example, has undergone a dramatic increase of some 35-40 percent, which cannot be accounted for by natural sources alone. Carbon dioxide is a very powerful greenhouse gas and is responsible for about 10% of the total greenhouse effect, even though it only represents a very small portion of the total atmosphere (about 0.04%).

Since the total greenhouse effect is more than 30ºC, a 35-40% increase in carbon dioxide means that over the past 150 or so years the earth's temperature could have risen about 1ºC, which is not far from the actual measurements. The actual temperature increase has been about 0.7ºC, the difference coming from the ocean's ability to absorb carbon dioxide.

The most significant greenhouse gas is not carbon dioxide, but water vapor, mostly due to its much larger volume in the atmosphere (1-4%) compared to carbon dioxide's 0.04%. Water vapor has also increased indirectly due to the rising atmospheric temperatures simply because warmer air can hold more water vapor, and this increase in water vapor then adds to the total greenhouse effect and so on. The increase in moisture in the atmosphere, more importantly, leads to more frequent heavy precipitation events with more frequent floods (just read the news) and heavier winter snow falls for some areas (just ask any New Englander).

How does that affect our health?

In general, warming temperatures tend to favor the spreading of diseases by increasing the habitat of disease carrying insects and animals. Global warming theory also predicts an increase in extreme weather events, such as major floods, that too often also produce conditions favorable for disease outbreaks among humans, animals and plants. Floods can increase the transmission of both waterborne diseases, such as typhoid and cholera, and vector-borne diseases (transmitted by carriers), like malaria, yellow fever and West

Nile Virus.

Malaria, the most deadly mosquito-borne disease, could spread as temperatures rise and as the frequency of extreme weather events rises. Some models suggest that the 3ºC temperature rise predicted by global warming by 2100 could increase the number of malaria cases by 50-80 million. Warming temperatures could also result in the expansion of Lyme disease and other tick-borne diseases into higher latitudes and higher altitudes.

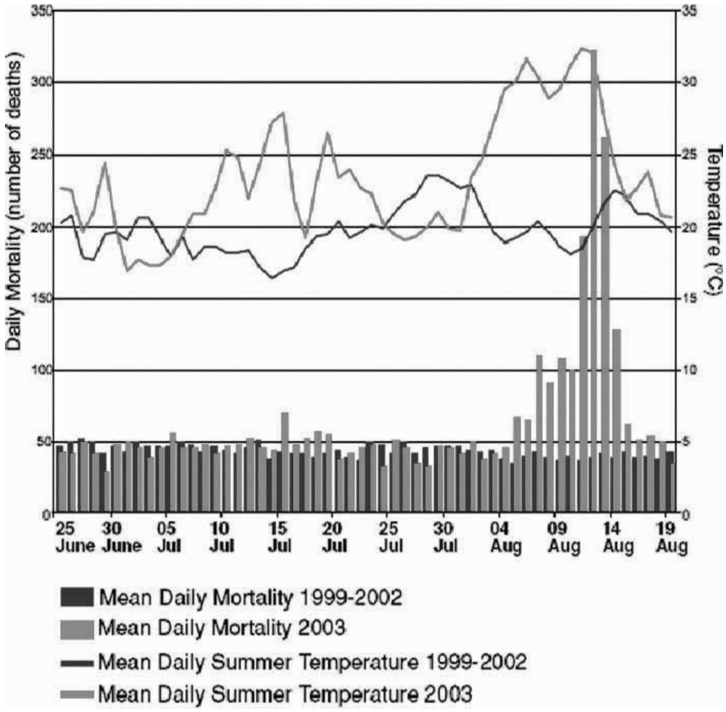


Image credit: IPCC link: www.ipcc.ch/publications_and_data/ar4/wg2/en/figure-8-2.html

Diseases carried by rodents and other mammals could also spread as temperatures warm and precipitation increases, particularly in some previously semi-arid areas. It is thought that increased precipitation enhances food resources for small mammals that serve as hosts for the infected fleas. A wetter climate is also thought to promote flea survival and reproduction. Other insect pests like ticks could also expand to higher latitudes and higher altitudes, possibly leading to an increase in Lyme disease.

Forests and agricultural crops are also susceptible to the spread of pathogens, especially following extended droughts and floods. Stress on agriculture will affect our food supply, which could lead to increased malnutrition. Marine life also will be affected. A 25-year trend of warmer winter temperatures along the eastern US coast has been implicated in the northward expansion of oyster diseases.

Other climate related effects might be an increase in the frequency of severe heat waves that cause an increase in stress on those already susceptible due to age or other chronic conditions. Particularly concerning would be a surge in mortality from strokes and heart disease due to more prolonged heat waves. During the August 2003 heat wave in Paris there was a significant increase in daily mortality.

In summary, I suspect the truth about global climate change is likely somewhere between ridicule and "The sky is falling." But, given the current evidence and significant consequences of global climate change, we must seriously attempt to control man-made greenhouse gases and be prepared to deal with their consequences.

Additional reading suggestions*:*

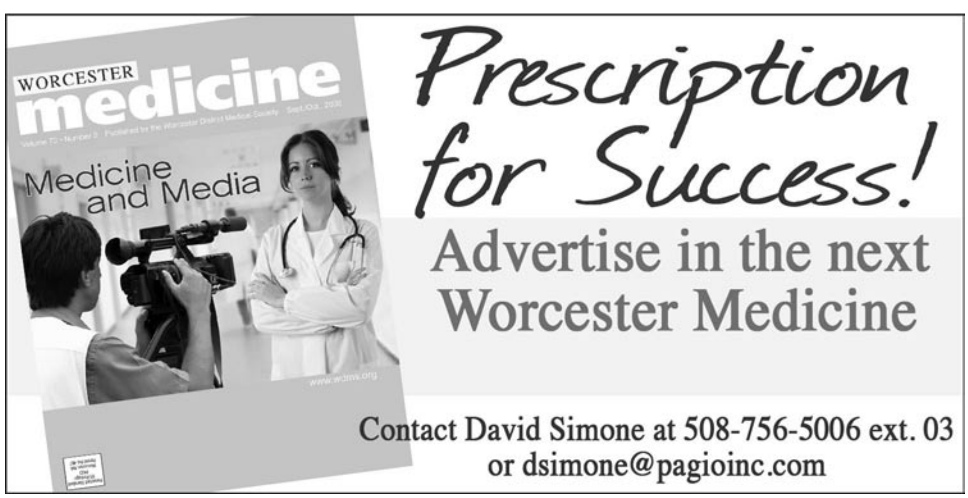
WHO: Flooding and communicable diseases fact sheet
www.who.int/hac/techguidance/ems/flood_cds/en/

NOAA: Greenhouse Gases Frequently Asked Questions
www.ncdc.noaa.gov/oa/climate/gases.html#watervapor

Climate Change Futures Health, Ecological and Economic Dimensions
The Center for Health and the Global Environment - Harvard Medical School
http://chge.med.harvard.edu/programs/ccf/documents/ccf_report_oct_06.pdf

Climate Change 2007: Working Group II: Impacts, Adaption and Vulnerability
www.ipcc.ch/publications_and_data/ar4/wg2/en/ch8.html

Fred Pickhardt, from Lutz, Florida, has spent more than 25 years as a professional marine meteorologist. His career focus has been on optimum ship routing, vessel performance evaluations and forensic marine weather event reconstructions.



Climate Change Endangers Public Health in the United States

Cecil B. Wilson, MD and Paul R. Epstein, MD, MPH

Note: Reprinted from the *Huffington Post*, December 14, 2010

The Cancún climate conference has ended with many issues unresolved and U.S. commitments will be hampered by the expected attacks from the incoming Congress on the EPA's authority to regulate greenhouse gases. Meanwhile, the urgency for solutions is rapidly increasing and leading medical and public health groups across the country agree: climate change is hazardous to our health.

In the past two decades, extreme heat events have killed tens of thousands around the globe, including populations here in the United States. Heat waves are more frequent, of longer duration, and more intense ~ and the lack of nighttime relief accompanying climate change makes today's heat waves all the more lethal. Heat waves can cause illness and death from heart disease, diabetes, stroke, respiratory disease and even accidents, homicide and suicide.

At the same time, increased evaporation arising from warming seas is generating heavier downpours. (The world ocean has accumulated 22 times as much heat as has the atmosphere since the 1950s.) Across the continental U.S., two, four and six inch-a-day rains have increased 14, 20 and 27 percent, respectively, since 1970. This year, sudden, heavy downpours ~ some lasting several days ~ caused lethal flashfloods in Rhode Island, Tennessee, Arkansas, Oklahoma, Illinois, Iowa, Wisconsin and Minnesota. Rains two inches a day and above are associated with water-borne disease outbreaks, when flooding overwhelms sewer systems and contaminates drinking water.

Increases in winter weather anomalies are emerging. Though winters have become shorter (two-to- three weeks shorter in the Northern Hemisphere, depending on latitude), they have grown more perilous. With warming, more winter precipitation is falling as rain rather than snow, increasing the chance of ice storms when temperatures do drop. Globally, westerly winds are also changing with climate change, affecting the shifts in weather fronts. And such conditions ~ along with heavier, wetter snowstorms ~ can be treacherous for travel and ambulation. (In Boston, we've dubbed this "orthopedic weather.")

Meanwhile, warmer winters favor insect migration. In the past decade, case reports of tick-borne Lyme disease rose ten-fold in Maine and northern counties are experiencing Lyme for the first time. In Alaska, especially warm winters have ushered in swarms of allergy-inducing, stinging insects along with mosquitoes and devastating pine bark beetle infestations. The spread of forest and crop pests ~ requiring chemicals for control ~ pose additional long term health and environmental risks.

There's more. Elevated carbon dioxide levels from burning fossil fuels boosts pollen production from ragweed and the pollen grains hitch rides on particulates from diesel and coal combustion, helping to deliver the allergens deep inside our lungs. Meanwhile, the allergy and asthma season has lengthened some two to three weeks with climate change, while, since 1980, asthma rates have more than doubled in the U.S.

The American Medical Association is working actively to educate health care professionals about the projected rise in climate-related illness. Medical and public health groups are also taking leading roles in advocating for climate and energy policies, and measures ~ like electric vehicles, "smart" grids and healthy cities initiatives ~ that will improve public health, create jobs, and combat climate change. And physicians and other health care professionals have begun serving as role models for patients by adopting environmentally responsible, energy- and waste-reducing practices in the health sector.

We are deeply concerned that climate instability and changing weather patterns threaten our health and the vitality of our life-support systems. The U.S. must take a leadership role in advancing the clean energy transformation and international climate negotiations over the coming year. The harm to our health and our well-being, and the associated health and social costs, will continue to mount unless we take comprehensive action to stabilize the global climate system.

Cecil B. Wilson, MD is President of the American Medical Association and Paul R. Epstein, MD, MPH is associate director, Center for Health and the Global Environment, Harvard Medical School.

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Confronting a Changing Climate: A Public Health Approach

George E. Luber, PhD

George E. Luber, PhD

Mounting evidence that the earth's climate is changing has led the United Nations Intergovernmental Panel on Climate Change (IPCC) to conclude that "…warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising of global average sea level." (IPCC 2007). And for the most part, the American public agrees. In a June 2010 US poll (Leiserowitz et al 2010), 61% of respondents reported that they believe that "global warming" is happening, and a majority reported that they worry about it; however, a minority of those polled reported that they thought "global warming" would harm them personally. This highlights one of the principal challenges that the public health community faces; they must provide evidence for, and communicate the fact that, a changing climate poses a threat to the health and welfare of Americans.

Because the United States is a wealthy country with a well-developed public health infrastructure, climate change is expected to have less of a health impact than in the developing world, where changes are likely to be devastating (Patz et al 2005). Nevertheless, even in the US, the health impacts of climate change may be significant:

• Extreme weather events will be more frequent and increasingly costly, and injury and illness secondary to these events may advance as a cause of morbidity and mortality (Greenough et al 2001)

• Outbreaks of vector borne diseases may become more frequent, widespread, and lengthy (Gage et al 2008)

• The severity of many chronic diseases now responsible for the bulk of mortality in the United States may increase secondary to climate change (Kinney 2008)

• The population will age, increasing vulnerability to extreme heat events and several other exposures associated with climate change (Luber and McGeehin 2008)

The health effects of climate change present a novel public health problem with unprecedented scope and complexity. It is important to recognize, however, that specific exposures resulting from climate change are not themselves novel. Certain diseases will undergo a geographic shift as ecologies change and health effects of extreme weather will increase as these events will widen in distribution, increase in frequency, and intensify in magnitude. It is in this manner that climate change will act a general stressor on the public health infrastructure, and gaps and weaknesses in our ability to respond to health threats must be identified and ameliorated.

A framework for identifying and prioritizing the key public health responses to climate change can be found in the "10 Essential Services of Public Health" developed in 1994 by the American Public Health Association and its partners (Public Health Functions Steering Committee 1994). An adaptation of these essential services provides a lens through which to view climate change from a public health standpoint.[1] These "Essential Services" include:

1. Monitor health outcomes to identify changing disease patterns and geographies.

Climate change will require a new approach to public health surveillance that will allow for the integration and monitoring of multiple data streams, including climate trends, meteorological data, ecological data, and changing indicators of population vulnerability. Enhanced surveillance programs, such as CDC's Environmental Public Health Tracking Network can provide the framework for the operationalization of such a set of "climate change indicators" and help health authorities to understand the associations among long-term climate changes, weather events, ecological changes, and health outcomes.

2. Diagnose and investigate health problems and hazards in the community.

Classic public health responsibilities include identifying, investigating, and explaining health patterns at the community level. In a future climate, with altered disease ecologies, public health laboratories will need the capacity to make rapid diagnoses and reports of altered geographic distribution and frequency of diseases.

3. Inform, educate, and empower people about health issues.

In an effort to re-frame climate change as a basic human health and welfare issue, health communicators can inform the public and policymakers about the health risks of a changing climate and actions that may reduce this risk. To build effective health communication strategies, we must target specific groups with specific attention to accounting for varying levels of education as well as cultural and ethnic differences.

4. Mobilize community partnerships to identify and solve health problems.

We will need to strengthen relationships among traditional partners, such as government agencies and academia, and develop new partners, such as faith-based groups and city planning departments. Many of these relationships will develop at the local and state levels, where services are delivered. As we identify vulnerable populations and implement a response, we must integrate community expectations, beliefs, and cultural values into adaptation efforts.

5. Develop policies and plans that support individual and community health efforts.

Although the responsibility for policies to reduce greenhouse gas emissions lies outside the scope of public health, health professionals can provide compelling evidence to support climate policies that have the additional co-benefit of reducing morbidity and mortality. Public health tools such as health impact assessments can provide evidence for positive and negative effects of various approaches to climate change adaptation and mitigation and allow health departments to collaborate across policy sectors and highlight key points for public health engagement.

In addition to addressing this core set of essential public health functions, preparing the public health community to face the challenge of a changing climate will require a coordinated effort at the local, state, and federal levels. Towards this goal, the Centers for Disease Control and Prevention's Climate Change Program has awarded over $5 million over three years to ten state and local health departments to assess threats, make plans, and develop programs to meet the public health challenges of climate change over the next three years. The "Climate-Ready States and Cities Initiative"[2] is building capacity at health departments to anticipate these health effects by applying climate science, developing adaptations, and facilitating interactions with climate scientists to understand the potential climate changes in their region. It is perhaps through this form of active, sustained collaboration, linking the local with the global, that we can begin to address this crisis that Margaret Chan, Director General of WHO, has described as "…one of the greatest challenges of our time" (Chan 2008).

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Footnotes:

1. For a more detailed treatment of the "10 Essential Services of Public Health" as they relate to climate change, please see: Frumkin H, Hess J, Luber G, Malilay J, and McGeehin M. 2008. Climate Change: The Public Health Response. American Journal of Public Health. Vol 98(3):1-11

2. For more information, visit www.cdc.gov/climatechange.

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Emerging Infectious Diseases: What's New?

Gerald T. Keusch, MD

Gerald T. Keusch, MD

Introduction

"The concept that infectious (and other) diseases emerge and reemerge is not new, and neither is the search for causes of disease emergence. However, societies frequently overlook or forget that microbes evolve, adapt, and emerge in response to nonmicrobial and even nonbiologic changes in the physical and social environment."[1] With these opening words in a special issue of the journal Emerging Infectious Diseases in 1998, Peter Drotman from the Centers for Disease Control goes on to briefly sketch the history of emerging infectious diseases (EIDs), acknowledging Rudolph Virchow, who in the late 19th century recognized that diseases change over time, and our modern debt to Joshua Lederberg, who in 1992 (and even earlier) had the prescience to recognize the problem of EIDs and the prestige to make society take note.[2] Almost on cue, three highly visible EID outbreaks occurred in the U.S. in the following year, 1993 ~ E. coli 0157:H7, cryptosporidiosis, and hantavirus pulmonary syndrome.[3] This paper will review what we have learned since 1992, and what remains to be done.

What have we learned?

First, we have learned a lot but not enough. It has proven impossible to predict where the next emergence will happen or what the threat might be. This precludes implementing the most cost-effective public health measures, prevention, at least until there are robust early-warning surveillance systems in place, able to detect the appearance of a new agent, identify unusual clinical syndromes for investigation, or recognize environmental changes that could provide "an epidemiologic bridge" to emergence.2 Since 1981, when HIV/AIDS was recognized, there have been numerous examples of emergence and re-emergence, as well as one example of deliberate re-emergence (or bioterrorism) of anthrax (Figure 1).[4]

Second, microbes have an evolutionary advantage in their short doubling times, ranging from minutes to days, compared to months to decades for mammals and birds, during which adaptational mutations to environmental change can occur. Antigenic changes, enhanced virulence, the capacity for species jumping, and other features all favor emergence.[5]

Third, it has become clear that almost 2/3 of EID agents are zoonotic, affecting animals as well as humans; the majority are viruses.[6] The drivers of emergence are diverse (Table 1). Surprisingly, pathogen evolution and climate change/global warming are much lower down on the list than health professionals would typically expect, but in fact factors that bring animals and humans into close proximity top the list.[7] For example, influenza, an RNA virus, constantly alters essential virulence factors through expected errors in RNA replication, resulting in new versions of the virus we recognize as outbreak strains of seasonal influenza. Host receptors necessary for virus infection are species specific, and the majority are present in birds. The human receptor is distinctive, but is shared by pigs, which also express bird receptors. Hence, a pig can be co-infected by both bird and human viruses, serving as a mixing bowl for gene reassortment and creating new viruses with attributes of its human and avian ancestors, such as the "bird flu"virus which emerged a few years ago.[8] It was highly virulent in humans but had not gained the capacity to transmit readily from person to person, thus avoiding becoming a serious human pandemic so far. Ecological settings in which large numbers of poultry, pigs and humans are cheek-to-jowl, such as live food markets in Asia, are therefore hotbeds of influenza evolution and emergence. When the drivers are mapped to the globe certain geographic areas emerge as "hotspots" where emergence is most likely to occur (Figure 2).[9] This is why the final chapter of the influenza story has not yet been written, and one major reason why emergence and re-emergence of various pathogens continues on.

We are now familiar with the consequences of the introduction of known agents where they have not been before; take, for example, the recent arrival of West Nile Virus (WNV) to New York. Poor communication between human and veterinarian health professionals about concurrent human and bird disease delayed recognition of the newly arrived virus, thus reducing the chance it could be

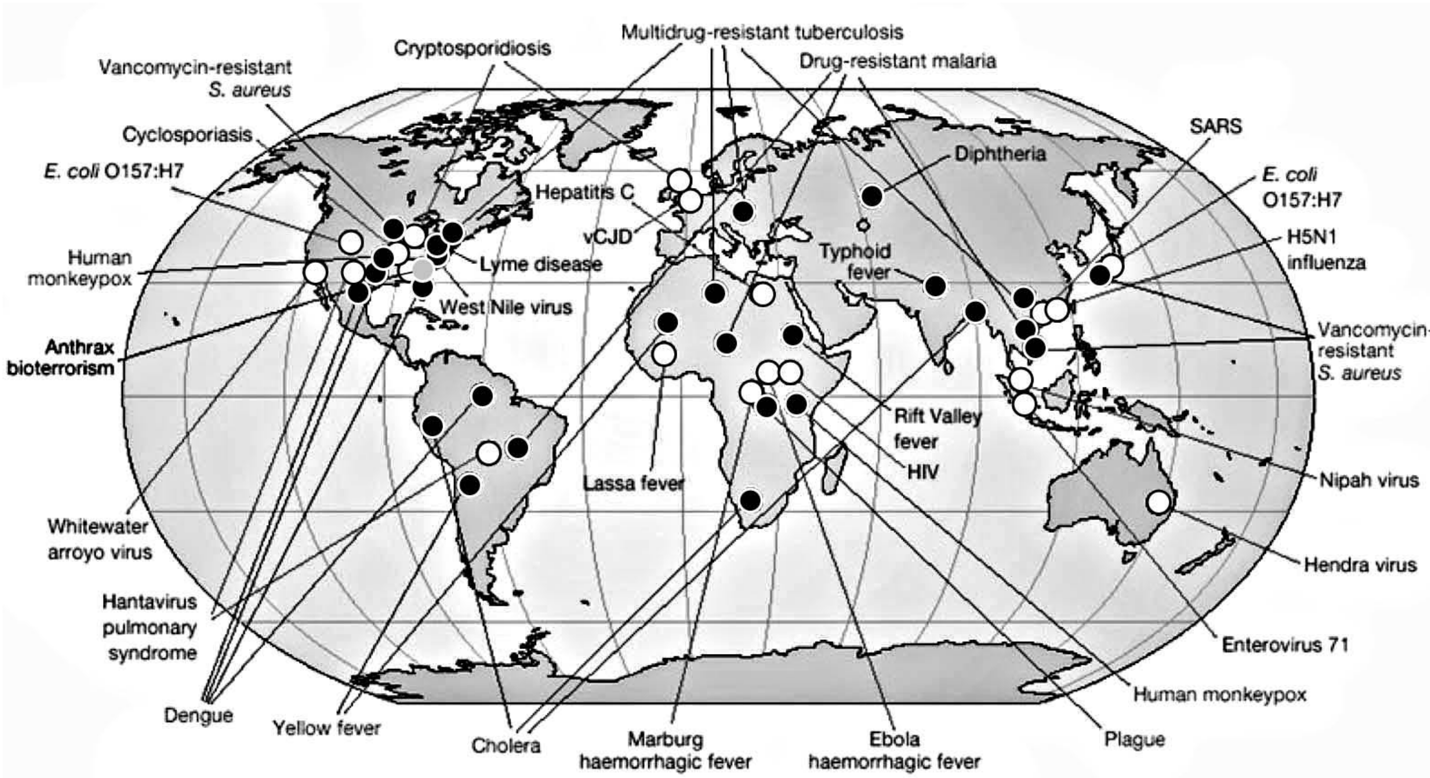

Figure 1: Some emerging infections across the globe over the past 3 decades. White represents newly emerging diseases; black, re-emerging/resurging diseases; grey, a "deliberately emerging" disease. From Morens DM, Folkers GK, and Fauci AS. Nature 2004:463:242-249.

eradicated before becoming endemic. Diseases transmitted through insect vectors, like WNV, are more likely to be influenced by climate change, affecting vector number, range, or microbial biodynamics within the vector.[10] In contrast, Hantavirus pulmonary syndrome, which emerged in Southwestern U.S. in 1993, was due to a previously unrecognized virus.[11] An explosive increase in the number of Hantavirusreservoir rodents preceded the outbreak.[12] It was the subsequent clustering of previously well patients in contact with rodents or their droppings who presented with respiratory failure that led to its identification.[13] Methicillin resistant Staphylococcus aureus is an example of a re-emerging infection, having acquired antibiotic resistance as its major new virulence property, which has spread from the hospital setting to the community.[14]

HIV is perhaps the most striking case of species jumping, as it evolved from simian viruses, and through contact with humans in remote forest areas in equatorial Africa gained the capacity to infect humans and be transmitted from person to person.[15] The rest is history.

Where do we go from here?

While we certainly need new research to develop drugs, vaccines and diagnostics, what is most important is to improve and integrate human and animal surveillance systems, making it easy for human and veterinarian clinicians to communicate and mobilize necessary investigations.[16] Co-training of physicians and veterinarians would help. These various attempts to integrate human and animal health have been called the "One Health Initiative."[17] Given the global nature of EIDs, and the rapid movement of people, animals and animal products around the world, these surveillance systems must be global, especially in emergent hotspots where surveillance is typically poor or lacking entirely. Local investment together with major international financing will be necessary.[16] The time is now, and it won't be easy.

Table 1: Drivers of EIDs, ranked by number of EID pathogens associated with each driver. From: Woolhouse MEJ, Gowtage-Sequeria S.Emerg Infect Dis. 2005;11:1842-1847.

RANK	DRIVER
1	Changes in land use or agricultural practices
2	Changes in human demographics and society
3	Poor population health
4	Hospitals and medical procedures
5	Pathogen evolution
6	Contamination of food or water
7	International travel
8	Failure of public health programs
9	International trade
10	Climate change, global warming

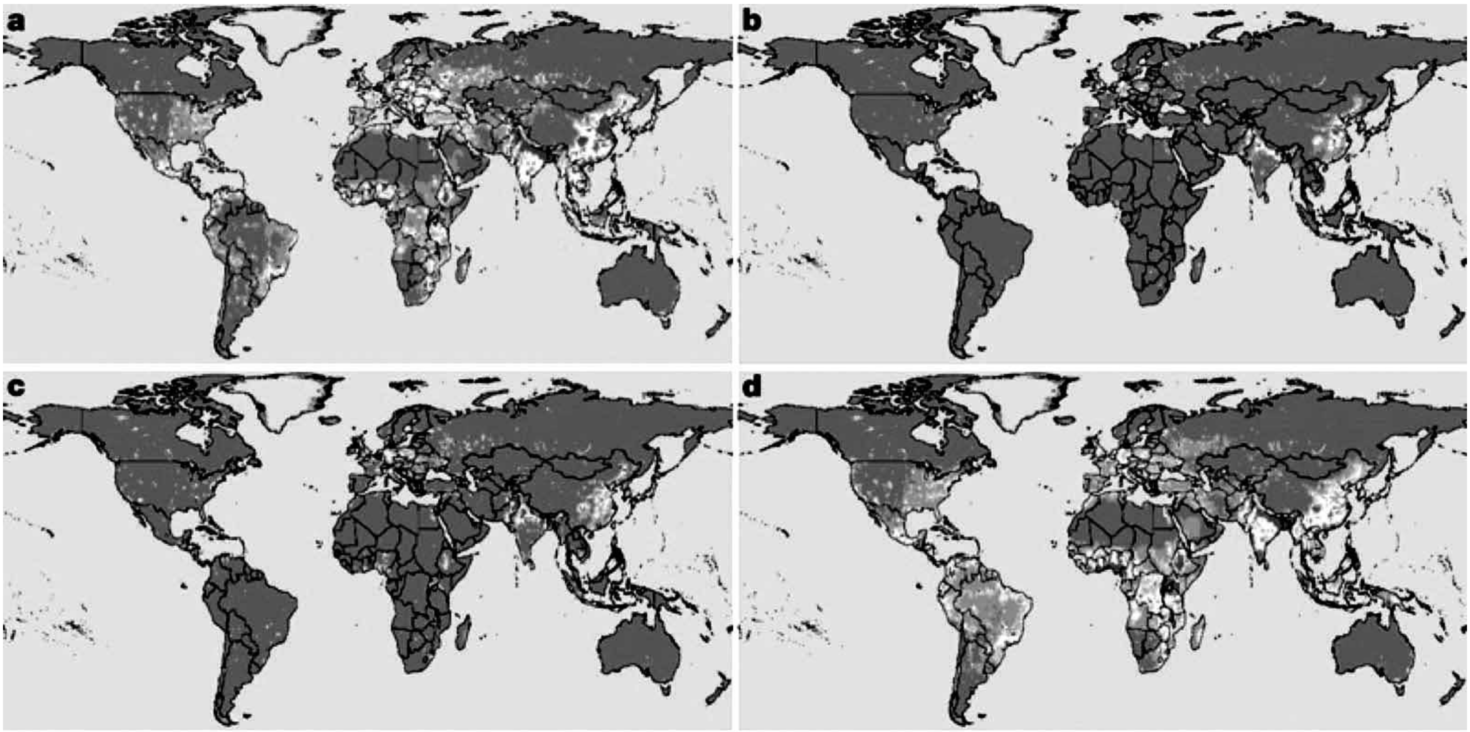

Figure 2: Hotspot map of the relative risk of an EID. From: Jones KE, Patel NG,, Levy MA, Storeygard A, Balk D, Gittleman JL, Daszak P. Global trends in emerging infectious diseases Nature;451: 990-993. doi:10.1038/nature06536.

Maps show EID events caused by a, zoonotic pathogens from wildlife, b, zoonotic pathogens from non-wildlife, c, drug-resistant pathogens and d, mapped on a linear scale from green (lower values) to red (higher values).

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Climate Change and Its Impact on Animal Health

Gretchen E. Kaufman, DVM

Gretchen E. Kaufman, DVM

Climate change is happening and its impacts are being felt all around the world. Profound changes predicted by the Intergovernmental Panel on Climate Change, including increased global temperatures, sea level rise, and increased variability and amounts of precipitation, will continue to affect all life in the biosphere, including humans, animals, and pathogens, for some time to come. The health of humans and animals, both wild and domestic, is being affected by climate change in similar ways. Some diseases are shared directly (zoonoses), while others reflect similar drivers or patterns of disease or involve similar pathophysiology. In addition, human health and well-being is dependent on sustainable livelihoods and good nutrition, both of which involve animal agriculture and animal health. Thus, disturbances in the health of our domestic food animals in particular can compound the direct effects of climate change on human health.

There are many parallels between humans and animals in this scenario. Humans, particularly the elderly, will experience increased issues associated with heat stress, as will their household pets such as dogs, cats and rabbits. Certain species in the wild are also expected to suffer in a warmer world, such as the heat intolerant moose, native to New England. Animals' need for clean water and safe habitat are no less critical than humans'.Severe weather, including hurricanes, tornadoes and storms, with resultant floods or extreme fluctuations in temperatures, will impact wildlife suffering by increased injuries and traumas from being blown out of nest sites, drowning in floods, and losing viable habitat. Many parts of the globe are expected to suffer prolonged droughts. This will concentrate livestock and wildlife to more and more limited water sources, providing greater opportunity for exposure to contaminated water and increased disease transmission.

Much attention has been focused on emerging infectious diseases and the expected increase in vector-borne or parasitic diseases in humans in response to global change. Conditions that support the development of emerging diseases include human population growth, global travel, intensive agriculture and development pressures on wildlife habitat, putting animals and humans in novel configurations and creating opportunities for pathogens to jump into new species. As temperatures increase, competent disease vectors are expected to increase their range and, in some cases, to broaden the range of diseases they can carry and transmit. Likewise, parasites are expected to increase their range, speed up annual life cycles, and become more virulent. We have already seen shifts of lung worm in caribou, broadening the range of this disease from northern pacific coastal areas to include Alaska and the Yukon region. Likewise, Lyme Disease, which infects dogs as well as humans, has moved northward into Canada.

Livestock are experiencing shifts in vector-borne diseases, as evidenced in recent years by the spread of blue tongue, an orbivirus primarily of sheep, into northern areas of Europe. West Nile virus, a disease spread by mosquitoes which affects birds, horses and humans, has occurred with greater frequency in Europe and the US over the last 10 years. Africa in particular is expected to suffer considerably due to the effects of climate change: in addition to blue tongue, livestock diseases such as African Horse sickness and tick-associated diseases are expected to increase. Likewise, diseases shared by animals and humans such as Rift Valley Fever, trypanosomiasis and malaria are also on the rise. In the last 10 years, significant outbreaks of Rift Valley Fever have killed hundreds of people and caused up to 70% mortality rates in domestic livestock as its range has moved northward to include Egypt and the Arabian Peninsula. This dynamic has been attributed to more rapid cycling of El Nino.

Similarly, increased rainfall, producing flooding or prolonged wet periods, is expected to increase water-borne infections in humans, including cholera, cryptosporidia, campylobacter and leptospirosis. Both cryptosporidia and leptospirosis also infect animals and in some cases may amplify the risks to humans in shared environments. These conditions also favor clostridial diseases in livestock, foot infections, dermatophilusskin infections, and liver flukes, producing significant morbidity. The interplay of severe draught, combined with periods of very heavy rain, favors organisms such as anthrax, which affects wildlife, domestic animals, and humans in the environments where it is found ~ most notably Africa, Asia and the Southwestern United States.

Animals in aquatic environments are experiencing health challenges due to increasing sea temperatures and increased frequency of El Nino events. One of the most striking examples is seen is coral bleaching, a phenomenon attributed to the die-off of normal algal commensals intolerant of higher temperatures, making the "naked" corals more vulnerable to disease. Thermal stress in the oceans retards growth and reduces immunocompetence in some species, increasing risks for disease. Changes in ocean chemistry, including salinity and pH, are expected to significantly change the ecology of ocean environments which will alter food webs, including pathogen distribution. In addition, these changes are expected to favor increases in the virulence and rates of transmission of parasites and pathogens.

Not all disease trends are negative; in some cases, diseases do better in cooler climates. For example, the fungal disease chytridiomycosis that is seriously threatening diverse frog populations around the world will not survive well in warmer environments, especially in low-altitude settings, but is expected to increase in pathogenicity in higher elevations currently too cold to support the fungus, threatening new frog species. The bottom line is that climate change effects are not straightforward and in many cases are difficult to predict. Ecological relationships among pathogens, environment, and hosts are exceedingly complex and disease dynamics are influenced by many factors, including social ones. Livestock disease control in particular is dependent on livestock production systems and management schemes which vary widely in their ability to adapt to climate change, and also depend on socioeconomic and political factors. Political instability is expected to increase with the societal pressures brought about by increased drought, scarcity of water and food, and severe weather events. These pressures will affect the ability of people to care for their animals and thus affect the control, transmission and treatment of disease.

All health professionals need to be aware of the potential impacts of climate change and to think broadly about the global implications for all living things, as this phenomenon does not respect boundaries or species. Recently, health professionals, including physicians and veterinarians, concerned with these problems, have been coming together under the umbrella of the "One Health" concept which embraces the inextricable relationships among humans, other animals and the ecosystems that they share. The fact that humans are largely responsible for the rapid global changes we are facing, whether this be from greenhouse gases or development pressures or excessive resource depletion, puts us in a position of responsibility that obligates us to effectively address these urgent concerns in a comprehensive manner.

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Climate Change and the Skin: Here Comes the Sun

Martin Reichel, MD

Martin Reichel, MD

The study of modern climate change is the study of long-term changes in weather patterns due to human activity and non-human factors. Climate change may affect the ozone layer and the ozone layer may in turn effect climate change. Human activities may affect both climate change and the ozone layer. Global ozone levels are lower than in the 1970s when they were first recognized as decreasing. This is believed to be largely due to the effects of man's use of halogenated hydrocarbons containing chlorine and bromine. Fortunately, since the enactment of the Montreal Protocol, the concentrations of ozone depleting substances in the atmosphere have been decreasing. Ultraviolet-B radiation (UVB, 280-315 nm) represents the spectrum of solar radiation that is largely absorbed by the ozone layer. Decreased ozone allows increased UVB to reach the earth's surface. Although UVB radiation has notable salutary effects such as Vitamin D biosynthesis, too much UVB may cause direct DNA damage and carcinogenesis.

Over the past half century, the early clinical and histological recognition of malignant melanoma has been radically transformed.

Since the 1950s, the incidence of skin cancer in North America and Europe has been reported to be steadily increasing. One of the most controversial subjects in the study of the most common malignancies of the skin is the cause of this purported dramatic increase in the incidence of basal cell carcinoma, squamous cell carcinoma, and malignant melanoma. Many scientists attribute this increased rate of skin cancer to increased exposure to UVR, in particular UVB, because of atmospheric thinning of the ozone layer as well as changes in our lifestyle. However, this reported increased rate in the development of skin cancers may be due to better screening and increased recognition and diagnosis of early lesions.

UVB appears to be the most important factor in the development of squamous cell carcinoma. Squamous cell carcinoma occurs most commonly in the elderly and usually develops in areas which receive direct exposure to the sun, such as the head and neck and dorsum of the hands. UVB is known to directly damage epidermal keratinocytes. There are multiple other complex mechanisms involved in UVB-induced tumorigenesis. Squamous cell carcinomas arise from actinic kerstoses and suncreens have been shown to prevent the development of actinic keratoses.

The role of ultraviolet radiation in the development of basal cell carcinoma is less well established. Basal cell carcinomas are also predominately found in sun exposed areas of the skin. However, there is a poor correlation between UVB dose and frequency of tumors. Immune inhibition by UVB has been hypothesized to play an important role in the development of basal cell carcinoma. Mutations in the PATCHED1 gene, part of the sonic hedgehog signaling pathway, were initially identified in the nevoid basal cell carcinoma syndrome and subsequently shown to be present commonly in sporadic basal cell carcinomas.

The role of the sun in the development of malignant melanomas is the constant subject of zealous debate. This heated discussion may be due to the fact that the rendering of a common histological diagnosis of malignant melanoma encompasses a group of malignant neoplasms of melanocytes which have heterogeneous etiologies, clinical features, and prognoses. The prime histological evidence of sun damage in the skin is solar elastosis, characterized by thickened fibrillary basophilic material in the upper dermis abutting the epidermis. If we take a broad, somewhat rudimentary view, malignant melanomas may be divided into two groups: 1) Thin neoplasms arising in the sun-damaged skin of the head and neck and sun exposed skin of the elderly that have a relatively good prognosis 2) Neoplasms of variable thickness generally in older or middle-aged or even younger individuals without necessarily significant evidence of sun damage who have a more uncertain prognosis. Climate change, a decrease in the ozone layer, and increased UVB exposure could well account for the putative increasing incidence of the first group, generally referred to as lentigo maligna. However, it's likely that other factors more important than UVB exposure would account for any increased incidence in the second group.

Over the past half century, the early clinical and histological recognition of malignant melanoma has been radically transformed. We are now able to correctly diagnosis the earliest stages of malignant melanoma, in situ. Despite numerous reports of an increasing incidence of malignant melanoma, mortality has remained constant. This strongly suggests that the number of malignant melanomas is not, in fact, increasing and that physicians' ability to identify and treat early thin lesions now may account for a specious rise in the number of overall malignant melanomas reported.

Thinning of the ozone layer led to the Montreal Protocols, aimed at eliminating chlorine and bromine pollution from the atmosphere and reducing the loss of ozone. In the future, global warming will be man's primary influence on ozone levels. Ultraviolet radiation is a major environmental risk factor identified in the development of squamous cell carcinoma and may play a lesser role in the development of basal cell carcinomas and some malignant melanomas. Whether or not we can limit depletion of ozone by limiting greenhouse gas production and global warming may have real effects on the development of malignant neoplasms of the skin. And this is not an inconvenient truth.

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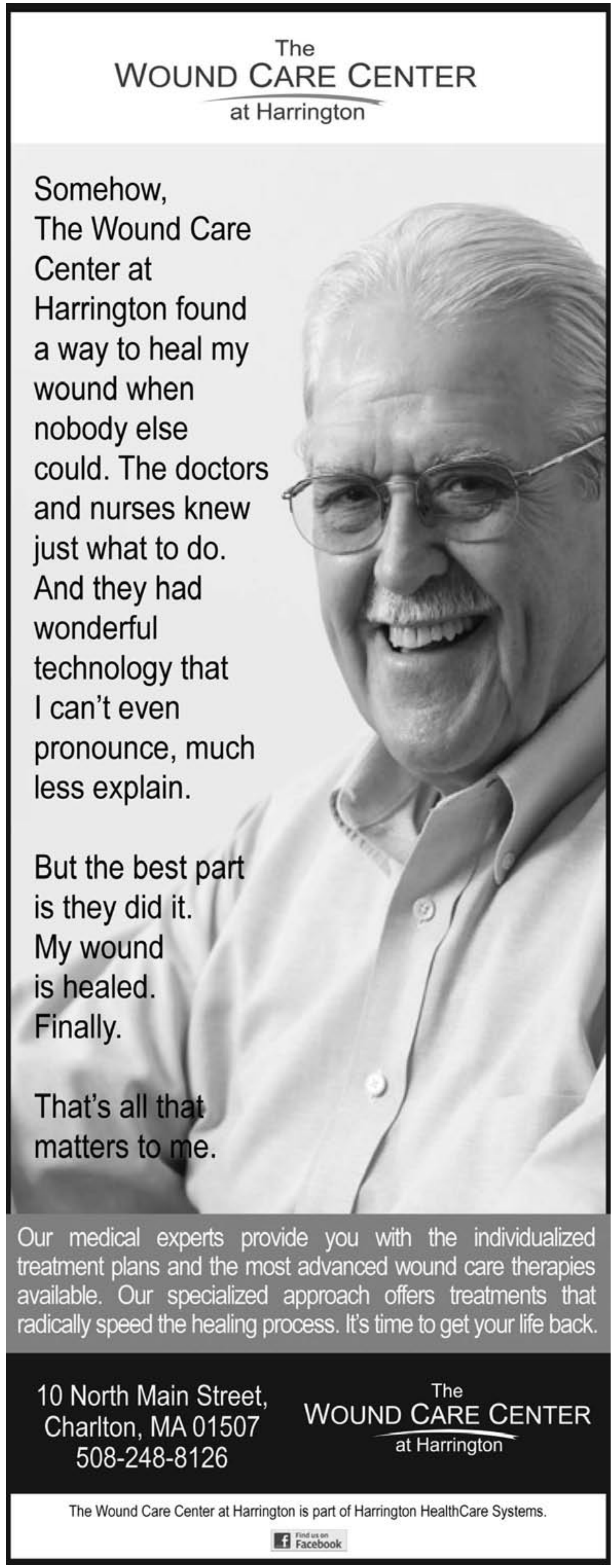

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The Inflation "Trade"

The human element…

Tomorrow's economic conditions will not be determined by data points and statistical trends. Tomorrow's economic conditions will be determined by people interacting with other people ~ millions of times, every day.

If humans were inherently predisposed to inaction, GDP growth would be hard to accomplish; shrinkage would be the norm, not the exception. Fortunately, according to famed British economist John Maynard Keynes, people possess "animal spirits," an innate "optimism…a spontaneous urge to action rather than inaction."

Animal spirits explain why consumers buy new cars even though mathematical analyses might favor retaining the old ones, or why they go out to dinner even though home-cooked meals might be cheaper and more nutritious.

Forecasting follies…

The influence of animal spirits on economic conditions largely explains why economic forecasts sooften miss their marks and why they so often lead investors astray.

Remember the rosy forecasts that preceded the economic and stock market crash of 2008? How about the dire warnings that preceded the dramatic economic and market recovery from early 2009? Investors who paid too much attention each time would have done badly.

Today, the economy is doing surprisingly well: consumer spending is up, industrial production is up, capital investment is up, GDP is up, and stock prices are up.

Economic forecasts are up, too, although a growing number of investors "see inflation coming" in higher prices in the grocery store or at the gas station. An imminent inflation spike, they fear, could reverse consumers' animal spirits and thus reverse the economic recovery so evident in today's economic data and statistics.

Inflation facts…

Inflation is currently about 1.6%, significantly lower than the 4.4% per year average of the last 40 years. Most economists project 2011 inflation rates of 2.0% or less.

Do they not see the higher prices caused by rising commodities and energy costs? Of course they do. But they also see that the "goods" most affected by rising commodities costs represent only one-third of total consumption in the U.S.; the "services," representing the larger two-thirds, are more influenced by still-low labor, low capacity utilization, and low capital costs.

Of course, inflation is all about expectations and, the low current numbers notwithstanding, if enough consumers "see it coming" and act accordingly, it will come.

The "inflation trade"…

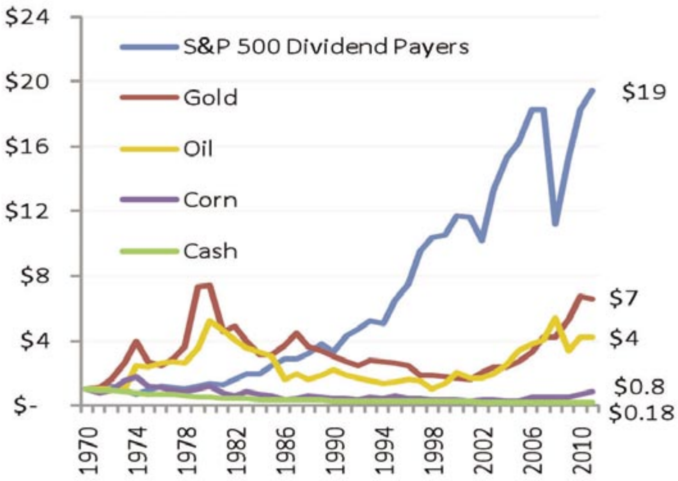
For investors, this debate creates a dilemma. Should they listen to the economists looking at hard data or should they listen to the investment analysts predicting changes in animal spirits? For that matter, should they listen to either?

Instead, maybe investors should "listen" to history ~ not in the expectation that the past will predict the future, but in hopes that the past may clarify the validity of common-wisdom perceptions about inflation.

The chart on the next page shows the after-inflation performance of $1.00 invested in selected investments 40 years ago.

Any that ended with a value greater than the initial $1.00 not only kept pace with inflation, but provided increasing purchasing power as well. Clearly, dollar-denominated investments can do well, even as the dollar is debased.

Gold and oil did well when inflation spiked in the mid-1970s, but it did not track the gradual inflation of the subsequent years at all. Corn did not do well, probably due to productivity gains. Cash was terrible.



"Real" Inflation Protection - Source: ThomasPartners Research

Dividend-paying common stocks did not do well when inflation spiked but did particularly well over the whole inflationary period. Presumably, dividend-paying stocks, in general, have the ability to grow their cash flows. In fact, they may actually benefit from inflation.

What do you think…?

Using history only as a guide, not a prophet, investors might want to exercise caution before acting on economists' rosy forecasts or the dire warnings of selected analysts.

A "bet" on gold or oil in anticipation of imminent inflation could backfire if inflation increases are only normal. Even if inflation does spike, recent price increases of gold and oil during a period of declining inflation could suggest that the "easy money" has already been made.

Those not inclined to speculative "bets," however, might want to consider dividend-paying stocks. Dividend-paying stocks have demonstrated the ability to grow in periods of low or no inflation; they have demonstrated the ability to grow in periods of normal inflation, as well.

PIAM, a subsidiary of the Massachusetts Medical Society, has selected ThomasPartners to be their designated provider of financial planning and investment management services to MMS members at discounted fee arrangements. If you would like additional information, please contact Amos Robinson at amos@thomaspartnersinc.com or at 888-431-1430.

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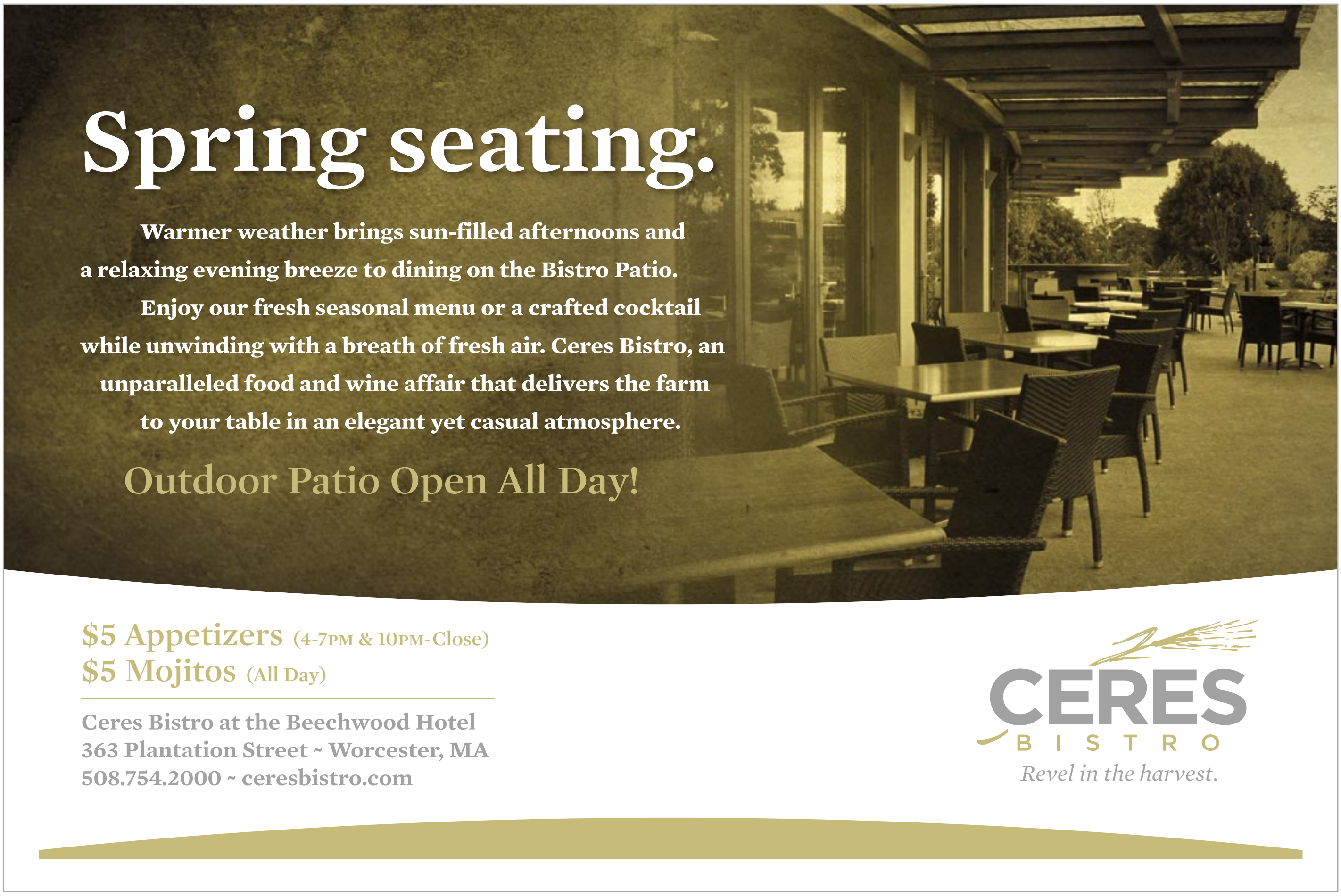


A Stark Accounting

Peter Martin, Esq.

Peter Martin, Esq.

In western Pennsylvania, a two-man physician group, which ordered over a third of the nuclear studies at the local hospital, subleased a nuclear camera to that hospital under an agreement that paid the physician group its pass-through lease costs plus an amount in return for the physicians' non-compete agreement with the hospital. Because the valuation of the non-compete was based upon the hospital revenues resulting from the non-compete, a judge ruled the sublease payments "took into account" the physicians' anticipated future patient referrals to the hospital and thus did not comply with the Stark Law. This case raises a number of troubling issues for physician-hospital business arrangements and is part of the evolving legal landscape that is driving those relationships increasingly toward an employment model.

There were a number of other issues that made the transaction problematic for both the hospital and the physicians. For example, the parties did not in fact adhere to the terms of the written agreement, but substituted a revised arrangement manifested by letters and invoices which the parties initialed. Although other courts have found similar paper trails to be sufficient evidence of an agreed-to course of conduct, the judge in this case did not. As a result, the arrangement did not meet the applicable Stark Law exception's requirement that the arrangement be set out in writing.

This case raises a number of troubling issues for physician-hospital business arrangements and is part of the evolving legal landscape that is driving those relationships increasingly toward an employment model.

Also, the physicians personally guaranteed the equipment lease with the nuclear camera manufacturer, and signed the sublease with the hospital personally. As part of the transaction, the hospital guaranteed the physicians' buy-out obligation to the manufacturer, and in fact did reimburse the physicians for payments related to that buy-out. Consequently, the physicians and the hospital had a direct financial relationship rather than the intended indirect financial relationship, with important consequences for Stark Law compliance.

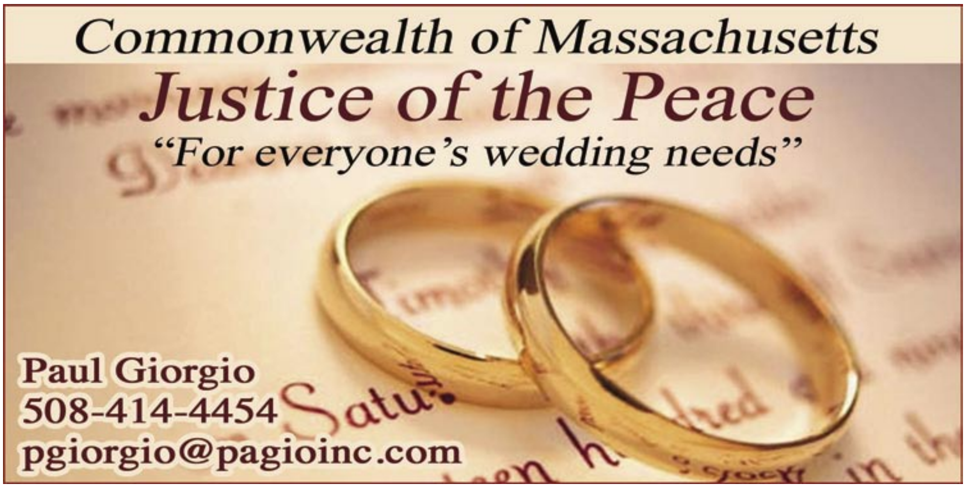
However, the most troubling aspect of the case was the court's analysis of that portion of the sublease payments related to the physician group's covenant not to compete with the hospital for the provision of nuclear cardiology services during the term of the sublease. An accountant hired by the hospital concluded that the payments under the sublease were reasonable, based on an estimate of the extra profit the hospital could expect to make from the nuclear imaging referrals to be anticipated from the physician group. The hospital and the physician group both proposed payments for the non-compete provision, and arrived at a negotiated number. The sublease payments ended up being comprised of approximately $6,500 a month for the physician group's costs under its equipment lease, and about $23,700 per month for other rights under the sublease, including the covenant not to compete.

The hospital argued that these flat-amount payments satisfied the Stark Law's requirement that compensation arrangements be commercially reasonable, fixed in advance, and not vary over the term of the arrangement in any manner that takes into account referrals or other business generated between the parties. The hospital thought it could rely on its accountant's analysis of the value of the non-compete covenant. The court disagreed, saying that even though the monthly payment had been negotiated by the parties and did not vary over the course of the sublease, the way it was calculated "took into account" anticipated future referrals from the patients. The court held that the proper measure of "fair market value" in such a case is the amount the hospital would pay under a similar arrangement with someone not in a position to generate referrals or other business for the hospital.

This analysis in turn raises the question of whether hospital payments to physicians or physician groups for non-competes can ever be acceptable, as they might be construed in any event as a requirement to refer to the hospital, which except in limited contexts is not protected under a Stark Law exception. For example, one Stark Law exception permits physician compensation to be conditioned on a requirement the physician make referrals to a particular provider only when such compensation is from a bona fide employer, and there are exceptions for patient preference and medical appropriateness.

That final consideration leads one to conclude that this decision, like other regulatory constraints found not just in the Stark and anti-kickback laws, is part of an overall environment driving prudent practitioners toward employment by hospitals or other health care institutions. The pitfalls associated with what appear otherwise to be straightforward business arrangements are so great, and so hard to predict, that physicians and others may feel that any other type of compensation arrangement is not worth the risk.

Peter J. Martin, Esquire, is a partner in the Worcester office of Bowditch & Dewey, LLP, whose practice concentrates on health care and non-profit law.



WDMS Remembers Its Colleagues

Arnold Gurwitz, MD
(1932-2011)

Arnold Gurwitz, MD died on January 15, 2011 after a long illness. A life-long resident of Worcester, interrupted only by service in the United States Air Force, he practiced pediatrics for more than 35 years. In addition, he served Worcester, as Commissioner of Public Health from 1969-1994. His efforts on behalf of the City were recognized and deeply appreciated. It was my privilege to have known him as a friend and colleague for 48 years. Despite many personal tragedies, Arnie demonstrated extraordinary acts of generosity and devotion.

His dear wife Rhoda died at age 44, leaving him with four children. During Rhoda's illness we met weekly for breakfast at 7am and continued the ritual for thirty plus years.

Arnold never complained. He always met his obligations in life responsibly, demonstrating service above self. He never uttered, "Why me?"

A few years after Rhoda's death, their youngest daughter Barbara, an accomplished dancer, developed bone cancer that necessitated an amputation and chemotherapy. During a college semester while studying in Italy, she died suddenly of a cardiac arrhythmia, a presumed risk from a specific chemotherapeutic medicine.. And throughout his own lengthy illness and confinement he never complained, always answering health inquiries with, "I'm still here."

Among his many accomplishments as Commissioner of Public Health, three events are Most memorable. In 1969, there was a very significant increase in Hepatitis A virus infection in Worcester, including the infamous outbreak that befell 90 of 97 members of the varsity football team of the College of the Holy Cross. The diagnosis was based on solid clinical and epidemiological information prior to the era of specific laboratory viral confirmation. Worcester was becoming known as "Hepatitisville" and there was increased community concern as well as national and international awareness. Dr. Gurwitz and I were interviewed on the Holy Cross college radio station and fielded questions from the college community, offering assurance that the municipal water was safe to drink. Years later, when laboratory science had advanced, HAV was precisely confirmed from frozen specimens.

In 1978, on the occasion of the one hundredth anniversary of the WDPH, Dr. Gurwitz as Commissioner hosted an academic conference dedicated to the "Conquest of Disease."During the program, Dr. Albert Sabin was presented with an engraved Paul Revere Bowl from the school children of Worcester in recognition for his development of the live oral poliomyelitis vaccine.

And, in 1985, in the presence of a protracted outbreak of Hepatits B Virus infection that involved 1300 people with eight deaths, the City was offered the first use of a newly developed HBV vaccine to immunize intimate contacts of those infected to extinguish the infection in similar fashion to smallpox eradication.

Dr. Gurwitz was very early to rise and was very well known on Water Street. Each Sunday in advance of our 7am breakfast appointment he had already delivered fresh hot bulkie rolls and bagels to the staff in the Nursery, ICUs, and ED,s at three hospitals. He loved grocery shopping and cooking and his turkey stuffing and cabbage soup recipes have been published.

In 1999, Arnold Gurwitz received the Career Achievement Award from the Worcester District Medical Society. In 2003, he was awarded an Honorary Doctor of Science degree from the University of Massachusetts Medical School where he was an Assistant Professor of Clinical Pediatrics and a member of the Residency Advisory Committee for the Preventive Medicine Residency program.

Dr. Gurwitz is survived by his three children and their spouses ~ Dr. Jerry Gurwitz, Executive Director of the Meyers Primary Care Institute and Professor of Geriatric Medicine, University of Mass. Medical School and his wife Dr. Leslie Fish, Senior Director of Pharmacology Services for the Fallon Community Health Plan, Linda Mogren, Esq. and her husband Professor Eric Mogren of Sycamore, IL, and Elaine Atlas and her husband Dr. Ian Atlas, of Randolph, NJ ~ and by his sister Blossom Zabarsky and seven grandchildren.

Everyone has a history. Despite his tribulations, Arnold Gurwitz's shoulders were extremely strong. He practiced most compassionate medicine on his patients and served as a very dependable guardian for their parents. He did it very well.

Because of who Arnold Gurwitz was, he will always be remembered.

Leonard J. Morse, MD

Worcester District Medical Society 2011 Annual Business Meeting

Joel M. Popkin recognized as 2011 Community Clinician of the Year. (left to right: Jane Lochrie, Joel Popkin, George Abraham and Anthony Esposito)

Passing the Gavel:
Michael P. Hirsh elected President of the Worcester District Medical Society and the Worcester Medical Library, Inc.

Congratulations to our 25 and 50 year members

Above, 25 year members (left to right: David A. Wilner, Joseph J. Savitt, Muddana Haribabu, Bruce G. Karlin, Janet Abrahamian, Elliot lach, Ludmilla L. Tonkonogy, Peter C. Lindblad, David P. Lyons, Daniel R. Massarelli)

Note: For a complete listing of anniversay members, visit our website, www.wdms.org.

Left, 50 year members (left to right: Clement E. LaCoste, Leonard J. Morse, Rudolf J. Utzschneider)

Worcester District Medical Society

2011

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AWARDS

Take a moment to recognize a deserving colleague

21ST Annual Dr. A. Jane Fitzpatrick Community Service Award

Established by WDMS to recognize a member of the health care community for their contributions beyond professional duties, to improve the health and well-being of others and to commemorate the life-long community contributions and exemplary efforts of Dr. Fitzpatrick in the Worcester Community.

2011 WDMS Career Achievement Award

Established to honor a WDMS member who has demonstrated compassion and dedication to the medical needs of patients and/or the public, and has made significant contributions to the practice of medicine.

TO NOMINATE AN INDIVIDUAL PLEASE INCLUDE:

1) A letter of nomination
2) A current curriculum vitae of the nominee
3) Letters of support are encouraged

Return to:
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Worcester, MA 01608

Fax, Phone or E-Mail
Fax 508-754-6246
E-Mail: wdms@massmed.org
Phone: 508-753-1579

DEADLINE:
July 29, 2011

Please print all information

Nominator ______________________ Phone ______________________

Email ______________________ Fax ______________________

Award ______________________

Name of Nominee ______________________

Email ______________________ Hospital Affiliation ______________________

Ichabod Washburn

Hospice Residence

The Eastern Orthodox Management Corporation is pleased to announce the historic renovation of the property formerly known as the ***Washburn House*** is complete. This grand 115 year old Victorian structure has been gracefully renovated to meet the contemporary accommodation needs of patients and their loved ones. We are proud to return this elegant residence back to service to the greater Worcester area.

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The ***IWHR*** is now accepting patients that require residential hospice care and is open to the general public.

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