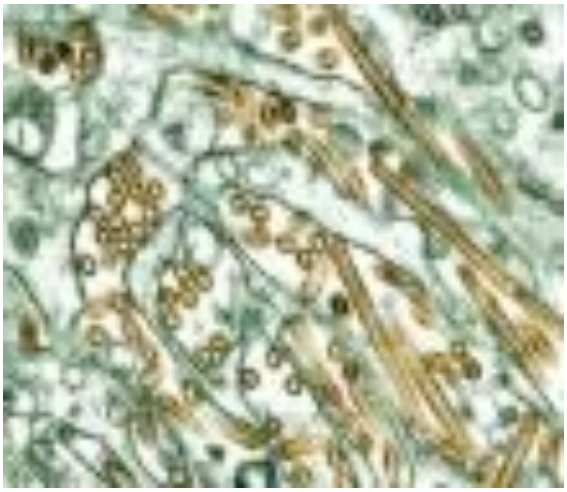
How to Survive a Swine/Bird Flu Pandemic



H5N1 viruses growing in cells

By

Clark M. Thomas

Forewords By

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The View From 2009

This book was originally entitled "How To Survive the Bird Flu Pandemic." It was finalized after many revisions in June of 2006, with forewords, just about the time that the media panic (but not the objective threat) over the increasingly lethal H5N1 variant began to recede. Even though this book was and is the best of its breed, it never found a regular publisher, which is fine with me.

Traditional publishers can take a year to get out books; but emerging pandemics can go around the modern world in weeks. Fortunately, H5N1 has not (yet) mutated into a variant that can easily spread from human to human. If and when it ever does, we are all in for a very bumpy ride.

It is now time to introduce this book to a wide audience. Even though much of the original essay is restricted to the lethal variant of H5N1 — which persists in Egypt, Indonesia, and elsewhere to this day — the same lessons learned in 2006 apply to many other viral threats. The fear we had then of H5N1 by itself soon morphing into a human-to-human monster was blessedly overblown.

The reason I am releasing this essay in May of 2009 is because the new "swine flu" has shown a mongrel's ability to combine several strains into a new one. It has so far not been particularly lethal — but that fact could easily and instantly change if it were to properly combine (reassort) inside only one human who is simultaneously infected with H5N1. That swine/bird variant could return to the Northern Hemisphere this fall and winter with virulence possibly greater than the 1918-1919 avian H1N1, known then as the Spanish Flu.

The first wave of the Spanish Flu was relatively mild. The second and third waves killed tens of millions. After the milder fourth wave was finished, modified H1N1 joined the pool of so-called human influenza viruses. Indeed, the 2008-2009 regular influenza included many cases

of "human" H1N1, which may help explain why this summer's mongrel H1N1 seems to attack the young in preference to older people.

Since 2006 several key developments have occurred, but basically the same population vulnerabilities remain:

Among the changes, Tamiflu remains fairly potent against both H5N1 and the swine H1N1. However, this "miracle drug" swiftly became almost totally worthless against the regular influenza that traveled around the world during 2008 and 2009. Since some doctors are all too eager to write Tamiflu prescriptions, it is reasonable to assume that danger lies in putting all of our hopes on Tamiflu. Agile viruses always find a way to get around individual drugs; it's only a matter of how soon they do it. Natural selection assures that the newly immune variant wins out over the earlier, vulnerable-to-Tamiflu variant.

H5N1 bird flu kills not only birds, but also bird eggs. That's one reason it is so hard to produce avian influenza vaccine in quantity. Living chicken eggs are where we grow new vaccine cultures. There are better technologies in the pipeline, such as growing viruses in mammalian cells; but those new cultures will not be ready for dealing with global swine/bird flu in the next two years. In ten years things will be much better. That's great, but not great if the next super-killer pandemic begins this fall or winter.

There is brave talk from the vaccine industry about having billions of injections ready within a year. I hope they can succeed, but I am skeptical, except for a small number of affluent nations. Pandemics sweep around the world in weeks; new vaccines take months to develop and produce.

In 2006 I was the first writer to research and develop multiple ways to deal with or prevent the very thing that kills so many young adults: cytokine storms in the lungs. Essentially, the body overreacts, and floods the lungs with bloody fluids, to where the patient can die within hours. In 2009 the young are still more targeted than the older, unlike

conventional human flu. If a Frankenstein variant appears this fall or winter, we will see more cytokine storm deaths. That is why my chapter on multiple ways to ameliorate cytokine storms remains as important today as it was in 2006.

Up until 1957 most influenzas were milder variants of the 1918 H1N1. Even though the so-called swine flu is partly swine, and partly mild avian, it is also partly "human" H1N1. This is possibly why those over fifty are less vulnerable to the current strain. Nevertheless, a viral reassortment with H5N1 could produce a monster that even previous exposure to any H1N1 would not stop. That unknown danger is why vigilance and science are so important.

The spring of 2009 allowed levels of government to try out their bird flu public safety protocols. Frankly, I was not impressed. Because the threat was very minor, public hygiene measures seemed to work, and medical resources were never tested. A lot of ignorance floated about. Let's hope we can do better when the real wolf shows up at our door.

It is my greatest hope and prayer that this entire book will become an obscure footnote somewhere, and never need to be anything more. If not, this book will be a survival manual for the wise.

Foreword

(2006)

Edward W. Pearson, MD, DABHM

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As a preventive medicine specialist, I view my patient's problems in an optimistic light. I believe a physician should be supportive and positive in explaining the problems found, in light of the newfound hope for healing and prevention of future illness. Optimism within prevention benefits us in all aspects, from health to happiness, considering the state of the world in which we live. The moment one begins to look at the world as an evil place, or envision humanity as an evil race, is the moment we are truly losing in life.

There are many things prevalent in our current era that can be viewed as concerning: the American healthcare system, war, religious differences, obesity, cancer, and diabetes, to name a few. If we choose to understand them as problems – the knowledge of which gives us opportunity for ongoing correction – instead of unavoidable evils, we can continue to ensure humanity a better state as part of our mother earth.

It may be hard to look back on all of humanity's problems as such. With the current threat of a new and especially deadly viral pandemic, we must try to learn from our past pandemic experiences. We should view them not as failures, but as learning experiences. With emerging technology we can have a much greater level of success the next time a similar problem occurs.

Our current healthcare system, however, is broken. America has the most expensive healthcare industry in the world, yet is 38th or lower on the list of the health of nations. Chronic degenerative disease such as arthritis, Alzheimer's, and heart disease are epidemic and considered "common" or "expected" as we age.

Cancers, obesity, diabetes, among a few, are also dramatically on the rise even in younger patients. There is new evidence that all of these diseases are linked to low-level autoimmune imbalance, inflammation, and oxidation. Such problems result from high levels of stress and toxicity, and low levels of nutrition from food industry processing. Uniquely American ideas instilled in us by the healthcare system have us believing that insurance will pay for what is necessary, and that you don't need to take care of yourself until sickness occurs (which it will), at which point the newest purple pill or surgery will fix you quickly.

The avian influenza virus (H5N1) in all likelihood is about to present humanity with another of those crucial tests of our ability to minimize the casualties in "global killer" type events. In the following pages, author Clark M. Thomas has put together what I view to be the best and only preparatory and explanatory volume to inform the rest of humankind why we should take this threat seriously, learn from our past, and use our intelligence. We should embrace what this book gives us: the truth and knowledge beforehand as to what pandemic flu is, why it occurs, and exactly what we can do to prepare and survive this inevitable experience, whether it occurs this year, or years from now.

The facts are simple: viruses exist, they are not evil but simply filling a void in the biological chain, and are not out to get us. Pandemics do and will happen, and we as a species have progressed to where there is much we can do to be prepared for this event. Through knowledge and wise action we can make a difference.

As a physician, what I appreciate most about this volume is its concise flow from beginning to end. The author explains the history of humanity's susceptibility to pandemics, the reality of why the avian flu has what it takes to be the most successful pandemic virus ever, and why our current situation as a population will help ensure its success. We learn what we should do to ensure our own survival, and the survival of as many others as we can get this information to, as we prepare before the pandemic is upon us.

Most importantly, there is not and will not be an effective vaccination or medication for this influenza. There are few current medications or treatments in our medical system to cure illness, and there will not be for this health crisis either. Health problems can and will arise for which prior knowledge gives the keys to success and overcoming the crisis. I provide the keys to my patients every day, by

screening them for signs and markers of all the chronic degenerative diseases experienced by nearly 80% of the American population today. Optimistically, as I show them they are in the earliest stages of developing these health problems, I am at the same time giving proactive answers for correcting them before they actually occur.

In the same way, Thomas is giving us a comprehensive guide to surviving the next great worldwide pandemic. It is up to us to seriously put these keys and tools to use. Or we can ignore them, leaving our bodies open for disease and sickness, while hoping for the latest and greatest invention to keep us going.

Unfortunately, with this avian flu there will be no last minute cure. In a way, that makes it the most immediate and deadly threat to humanity. Many of my patients have been able to continue ignoring their chronic problems by using artificial medications to maintain their existence, albeit not in a very functional state, for several years or even decades. In contrast, with this current threat of pandemic, lack of preparedness may position us for a quick and unpleasant demise.

The information in this book is clear, concise, and imperative for our future survival during this and any forthcoming pandemics. We should stay optimistic, and know that we are being given keys to preparation and survival. We are fortunate that Mr. Thomas has the keen interest, intelligence, and desire to share this timely information with us.

Foreword

(2006)

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Are we in for a worldwide "bird flu" pandemic? Can we handle it if it happens? How likely is it? Are the authorities ready?

Concerns over these issues have been raised repeatedly, and like many a reader my first gut inclination has been to just avert my eyes, hope for the best, and get back to the daily tasks at hand. Clearly this isn't a good answer.

According to Clark Thomas, in all likelihood it *is* coming. If not the current avian flu, it will be another equally malicious influenza virus, probably in the next few years. Bringing sound academic scholarship, thorough analysis and progressive thinking, Mr. Thomas meticulously documents the possibility for a truly catastrophic pandemic. He likewise illustrates that our system is in no way ready, nor will it soon be. Alarm bells are easy to sound, and I am not one given to obsessing on worst-case scenarios. However, the facts are the facts, and the data is indicating that all the elements that have been in place for prior flu pandemics are in place now, only worse. Influenza virus H5N1 (avian flu) is shaping up into a ferocious player, and we need to be prepared.

One of the key issues in our lack of readiness is the inherent lack of capacity of the healthcare system. If a substantial pandemic of avian flu should occur, the conservative estimate of those affected is in the millions. As one with over ten years experience as an Emergency Department physician, I have seen what public panic can do to the healthcare system.

Should the events unfold as Mr. Thomas suggests they well might, our system may quickly become overwhelmed. We have a system that is already substantially near capacity. Emergency department waiting times are long, hospitals are all too often understaffed, and there are never large numbers of available critical care beds at any major facility. In a pandemic there will inevitably be many people with the true avian flu who quickly overwhelm the available critical care equipment.

In addition there will be staggeringly *higher* numbers of people who have other common viral-type conditions who *think* that they have it and rush the system in terror. I have seen this occur numerous times on a small scale when viral threats (such as West Nile) are in the news, even when the actual local threat is miniscule. When the threat is real and present, the system will become quickly paralyzed and unable to serve the masses seeking help and attention. It will be up to many to do what they can to care for themselves.

As an integrative and holistic physician, I have also come to realize the need for broad-minded, holistic approaches at all levels of healthcare. In a situation such as an avian flu pandemic, we will need to call upon every possible resource. The shortcomings of the standard western medical model – narrow focus on biomolecular mechanics and high-tech procedures – will be ever more evident under such circumstances. The current offerings of our standard healthcare system for treating this virus are few, and the ones that hold promise are woefully behind in development. We don't have any magic technological fixes for deadly influenza viruses. Tamiflu can be effective, but supplies are and will be completely inadequate. Additionally, our system has not placed a high priority on self-care and personal health responsibility. In this pandemic scenario, these will be critical to our survival. Panic will tend to spread in a more contagious manner than the virus itself. We must move to integrated and progressive thinking if we are to stem the effects of a large pandemic, in terms of both the panic and the illness.

What do we need? We need information. We need to be empowered with options and plans that we can institute on our own to help combat the virus. We need to be aware of all available avenues that are reasonable, practical, and achievable.

The best integrative medicine texts are ones that combine serious and thorough scholarship with open-minded, openhearted progressive thinking. This book is one of those works. In addition to containing just

such a blend of information, Mr. Thomas' exceptional skills as a writer make this book highly readable. He brings us a no-holds-barred academic and thoughtful analysis of the current state of the avian flu, and where our predictive models are showing it to be leading. He painstakingly details the overwhelming inadequacy of our current preparedness, and shows us ways that we can prepare and protect ourselves.

We need to act intelligently and proactively, given the best information we have available. Our healthcare system can't meet this challenge. It will be up to us. We need a guide. Here it is.

I.
Preface

"Good grief, here comes another bird flu book! Just what we need to read over morning coffee."

Actually, yes. And better over morning tea.

This is the last book I too would want to read, or write. However, I want to drink my morning coffee and tea for years to come, not months to come. That reason alone would justify the effort, if my efforts paid off. Paying off is the big mystery with a super-flu that already has slain more than two hundred million innocent birds, and started to jump the species barrier.

Ten years hence science should have a handle on such viruses, but not now. At the rate influenza viruses mutate, we could be looking at an unfolding global disaster beginning months from now, not a decade hence. Therefore, what can we mere mortals do now to minimize the potential slaughter within our own species, not just among the birds?

The near term answer for everybody is understanding and preparation. It is critical for us to understand and accept that "they" cannot save all of us over the next three years. They are the good doctors and distant government we rely on, and the pharmaceutical companies. The halls of power do not have the power. These pillars of our society will fail to save many of us who fall ill with avian flu in the near term, and for clear reasons this book will explain.

Fortunately, the most basic rules of social avoidance and hygiene will serve most of us well. If we follow all the right hygiene rules with extreme devotion, most of us will survive the potential eighteen months of pandemic waves. Crisis gives us a unique opportunity to learn, not just survive. Hopefully, lessons learned will help us build a better world. There is always hope.

We cannot honestly blame any opportunistic virus for simply doing what viruses have done in nature for hundreds of millions of years. We see

ourselves as masters of this planet. They see us as just another food source. When it comes to understanding why so many people are exposed to opportunistic bacteria and viruses, both Democratic and Republican presidents are personally to blame for doing too little, too late. But can we really blame even them, when our elected leaders are in reality the most skillful followers? Potential philosopher kings in this modern world get pushed aside by greed, the lowest common denominator. In this matter we quarrelsome primates have been our own worst enemy – setting the viral dinner table for a human feast.

One of the critical new tools for understanding and fighting any rapidly emerging threat is the Internet. The Internet allows us to read abstracts or full texts of cited references. Therefore, books such as this don't need to be too long, gratifying our modern short attention spans. I have made an effort to include web page addresses for nearly all of my notes. In this elegant way a short book for some could transform into a long book for others.

When I was a student at the University of Virginia and at Harvard I would wander in amazement through endless stacks of books in the Alderman and Widener libraries, all covered with the dust of forgetfulness. In sharp contrast, online references are vividly alive for all to see. Readers receive additional information by direct and easy access to supportive data. It's just a click away. The Internet is indeed the second Gutenberg revolution.

Clinical medicine has lagged behind the accelerating pace of laboratory medicine. Today's doctors in the field are not much better equipped to fight a highly lethal pandemic influenza than doctors were in 1918. *It's not their fault.* The reasons for this almost century-long failure to acquire enough potent tools against a persistent enemy are known to some, and should be known by all.

Ten years from now doctors will have precise DNA vaccines to effectively protect the majority of our population within a few months of an initial outbreak of virulent flu. If the world supports the vaccine makers, then there could be enough futuristic vaccine to take care of the planet, at least after the first pandemic wave. But that's a rosy and too distant future for the here and now.

Flu pandemics are still not primarily medical phenomena. They are cultural, economic, and political, with a medical component. If medicine

had today the chemical and DNA tools to effectively and immediately intervene, genocidal influenza pandemics would not fully unfold in the first place. We are almost a decade away from this happy point in time.

Doctors on the front lines of this near term pandemic will be just like everybody else, highly concerned and defensive. Every doctor is trained and motivated to cure patients and save their lives, first and foremost. It is also part of a doctor's duty to witness beloved patients die, after doing everything possible for them.

A *worst case pandemic during the next three years* would present additional challenges:

- Doctors can write an herb-based Tamiflu prescription, but there probably won't be enough for you. The pandemic strain could become somewhat immune to Tamiflu and its chemical cousins by the time you need it.

They can refer you to the hospital – but hospital beds and emergency rooms already are nearly filled with sick people suffering from vehicle wrecks, childbirth, pneumonia, cancer, strokes, heart attacks, methamphetamine, and self-inflicted diseases of civilization.

During an ordinary seasonal flu epidemic nearly all of our country's ventilators are already in use. Seasonal flu and viral/bacterial pneumonia, along with emphysema and COPD, will all be here in full force at the same time as the pandemic flu. There is virtually no ventilator surge capacity to save all the additional lives at risk. High-efficiency masks and other protective equipment may quickly become scarce.

Doctors cannot individually prod vaccine manufacturers to radically increase their woeful production capabilities.

Doctors cannot prevent or stop social panic. Public health protocols are problematic in a panic scenario.

We love our doctors. They work hard and long hours. They are the best trained in the world. But they alone cannot be our easy saviors in this decade. We patients can't patiently sleep our way through a major pandemic crisis.

This book has as one of its primary goals giving everyday people some of the tools they need to NOT panic. I speak of the need to develop a *military mentality*. We for too long have had a childlike relationship with our doctors. It is time we assumed more adult responsibility for our health, using our doctors as partners in life's journey.

There is a lot of work to do beyond the hospitals and clinics. All areas of private life need to get up to speed, and fast, and now. If and when the H5N1 bird flu makes a rapid transition into a lethal human-to-human form, it could arrive in our communities by airplane within one month or less. Informed defense could be our best offense. Scientific troops will arrive, but mostly not for years. Let's lower the body count.

Only after we move away from passivity, even fatalism, can we use what resources we have here and now to protect our families. I will spend a lot of space in this basic book explaining our "enemy," so that we can understand its few weaknesses, not just its many strengths. We are not talking about evil spirits; we are talking about energetic microbes. This super-flu is so very different from so-called "stomach flu."

I trust you will stay with me when the going gets technical. I will try to keep the jargon to an essential minimum. If you hit a patch of jargon that makes your head spin, simply skip to the next paragraph that makes sense.

Not just individuals, but especially their places of work, need to prepare. Many employers are procrastinating, hoping this problem will go away. It won't. Even if the H5N1 virus were not the next great global killer, there would be others. The question is not if, but when. Every disaster preparation plan needs to incorporate how a work place will survive as much as eighteen months of wave after wave of assaults from an invisible enemy in our midst. It's like the blizzard that won't go away. Smart companies that prepare now will survive and prosper. Companies that fail to adequately prepare today may see their better-prepared competition seizing market share. Many companies of marginal profitability will simply go out of business. If all you care about is today's bottom line, there may be no bottom line for you tomorrow.

In early 1981 there was little awareness of the new monster, AIDS. The cause was unknown. There had been only two cases in New Mexico, both lethal. This odd new disease appealed to my herbalist curiosity. I wrote about it in Santa Fe when I was a newly hired community newspaper

editor. The departing editor accused me of wasting space on something irrelevant. That something irrelevant has already killed 25 million people worldwide.

In my essay I identified the cause as likely being a virus, and even described an organic modality for managing the virus. I explained the ecology of this human-virus relationship with a "seed and soil" metaphor to explain latency and how to control it. My essay on the AIDS virus came out just before the Pasteur Institute scientists in France announced their viral discovery. Even today, two decades later, there is no fully effective HIV vaccine. Viruses that cleverly morph can be very tough to trap.

Two years later, while living in Dallas, I wrote and freely distributed a thirty-page essay, *Aid Your Immune System.* This unique document did not get much traction. If I had concocted an herbal "magic bullet" for HIV, I would have been a cultural hero. Instead, I suggested rational lifestyle changes, along with certain botanicals, to help buy time for science to develop a vaccine or other effective medicines.

The battle against bird flu will soon challenge our modern world at a level of ferocity few of us have ever imagined. This pestilence won't go away any time soon. We will be forced to deal with it. Whether this great challenge to civilization creates a global death toll equal to that of several exploding hydrogen bombs, or just one, will depend in part on how wisely we now prepare our defenses.

Viruses have the molecular intelligence of swarms. We, the food source, have large brains. Which type of intelligence will win?

II.
What Could Happen

When the asteroid that obliterated large dinosaurs first appeared in the sky as a tiny, unmoving point of light some 65 million years ago everyday life routinely continued as before. Likewise, the great bird flu pandemic of the early twenty-first century may first appear as just another case of flu. But there will be a difference.

This alpha case will be the first opportunity in this century for a mutated avian influenza virus with exceptional killing power to infect people so they can directly infect each other without the inefficient intervention of another species.

It is my best guess that this historic pandemic will silently begin very late in 2006, and peak two or three times in your community during 2007. It could start sooner. It could start a year or two later. It will eventually start, according to the World Health Organization.[1] Where and how it goes is partially up to you and me.

Wild bird species have been rapidly spreading along their migratory routes throughout the eastern hemisphere several variants of highly lethal H5N1, exponentially increasing contacts among humans and infected poultry.[2] Here are maps:[3] The United States may "welcome" this virus from wild birds migrating down from Alaska,[4] after having mingled with Asian birds. Infected birds could fly over from Europe. The virus could first be brought here by bird smugglers.[5]

Despite all this activity, human pandemic flu will not be the same as avian pandemic flu. Some infected birds flying to North America would not by themselves start our pandemic, even if a few humans on this continent die. The virus needs to mutate some more, somewhere on this planet.

As late as 2006, how H5N1 really spreads in the wild is not known. After the virus flew from China, and then rapidly appeared in multiple locations in Europe and Africa, models were challenged. Vittorio Guberti, head

veterinarian at the Italian National Institute for Wildlife, has been studying influenza in wild birds for more than ten years. He was reduced to saying: "We don't even know where to focus. We have to sit and wait for the big epidemic to occur, and in the meantime there will probably be small outbreaks all the time."[6]

After Murphy's Law of Mutations sufficiently works, first one person will catch it, and then others in the alpha community will soon fall ill. The location will possibly be in a village in Indonesia[7] or Africa[8] having traditional alienation from outside authorities. Now that H5N1 has just reached India, there are another billion potential human "mixing bowls" for the virus to seek the "right" combination.[9]

Once the alpha community suspects that these bird flu cases are not ordinary, and that danger is high, panic could ensue. Some residents will flee to relatives' villages in all directions, spreading the local epidemic geometrically. By the time health authorities determine exactly what has happened, hundreds or thousands of people will be infected with what will soon become the most severe disease outbreak in recorded history. Tamiflu will be rushed in, but miss many of those infected by the rapidly replicating nano-warriors.

Once the alpha community suspects that these bird flu cases are not ordinary, and that danger is high, panic could ensue. Some residents will flee to relatives' villages in all directions, spreading the local epidemic geometrically. By the time health authorities determine exactly what has happened, hundreds or thousands of people will be infected with what will soon become the most severe disease outbreak in recorded history. Tamiflu will be rushed in, but miss many of those infected by the rapidly replicating nano-warriors. Geometric spreading will quickly occur until nearly all communities in the world are infected and affected.

The great pandemic of 1918-1919 took only weeks to spread by steamship and rail. Only American Samoa and a few other extremely isolated small communities remained free of this infection. Samoa did it by sealing itself off from the world.[10] Last century's great avian influenza pandemic killed around 50 million people (estimates range from 20 million to 100 million). The so-called *Spanish Flu had about a 3% death rate* in a world with one third of today's population.

Influenza viruses are among our planet's most highly contagious pathogens. Even though this early period may appear to allow world

health authorities a few more weeks to mobilize, it won't be enough time for inadequately available resources to stop the inevitable.[11] According to Dmitry Lvov, Director of the Russian Academy of Science's Virology Research Institute, one-third of the world's population might become infected in a short period of time.[12]

The virulent virus particles will not consciously mean us harm. Indeed, to the virus particles there is no human organism, just a nice warm nutrient soup full of host cells within which to breed and spread. We will not be dealing with evil, just with a force of nature intersecting social humans and their domesticated animals – animals that have been placed too close to wild animals, the reservoir for such viruses.

The World Health Organization (WHO) and other health entities could misguidedly rush many thousands of doses of Tamiflu into the alpha region in a belated attempt to stop its spread. This WHO containment strategy will be partially inspired by what was done a few years ago in China and Canada with less contagious SARS. Containment through sanitation in Africa likewise worked with the lethal, but less contagious, Marburg virus.[13] Containment at the source is now part of WHO paper policy. But the WHO is a paper tiger without the ability to enforce its will on remote village behavior, even while traditional people are confronted by a culture-disrupting virus.[14]

Flu spreads through the air and casual contact easily and fast, and there are human carriers who stay healthy long enough to infect multiple others, who in turn geometrically infect multiple others. It's like the first splitting atom in an atomic bomb, leading to billions of fission events, leading to a nasty atomic explosion. All the late arriving Tamiflu will do is deplete soon-to-be-needed supplies for elsewhere.

If the human-to-human pandemic starts in Asia within the next two years there may also be an attempt to quarantine the local area by travel restrictions, and by inoculating many thousands of people with the newly developed, and fairly scarce, bird flu vaccine. But it only takes one moving "Typhoid Mary" to bypass and thereby defeat this effort.

The opening drama of modern humanity's greatest natural calamity has begun. It will be just a few days before newspapers feature this alpha event with bold headlines on their front pages. It was fearfully anticipated by science, but wished away by average people and the cowardly politicians who "lead" them. It was understood by virologists and

epidemiologists, but totally misreported by media obsessed with sex, Hollywood gossip, "reality" TV, game shows, and sports. Ahead are the avoidable deaths of millions of innocent people, many in the prime of their lives.

Many of those deaths could have been prevented by wiser government actions almost a decade ago. The deadly H5N1 virus first appeared in 1996 on a Chinese farm, then took flight in 1997 to Hong Kong, killing one third of the people infected by sick birds. *That's a 33% death rate.* Following a mass eradication of all fowl in Hong Kong, ordinary people and politicians tried to forget about what had happened. Problem is, nobody eradicated this mutating and increasingly virulent virus at its source in China. Scientists were not forgetting,[15] but nobody with the power to effectively act was listening to their warnings.

A *Washington Post* article[16] in October of 2005 highlights the sharp contrast between science and traditional cultures in the modern world of nation states. Although China is usually seen as the source of many flu epidemics, there are other Asian nations capable of hosting the alpha community. According to this article:

"Indonesia, in particular, is a worry to U.N. and other international experts, partly because it has Southeast Asia's largest population of both people and poultry. The country also has an impoverished health care system that has deteriorated significantly since the 1997 Asian financial crisis and the weakening of central government authority following the 1998 ouster of the longtime dictator Suharto.

In an interview with *The Washington Post* this spring, Tri Satya Putri Naipospos, Indonesia's national director of animal health, first disclosed that officials had known chickens were dying from bird flu since the middle of 2003, but kept this secret until last year because of lobbying by the poultry industry. She also revealed that the government had not set aside any money this year to vaccinate poultry against the virus, though officials had trumpeted this as the centerpiece of their strategy to contain the disease.

Naipospos repeated her allegations late last month, but this time in Indonesian in an interview with the influential local newspaper *Kompas*. A day after the article was published, the Agriculture Ministry fired her."

Yes, this pandemic will be an "act of God." However, the scope and intensity of its effects will partially be due to inaction, or wrong action, on the part of us humans. That is why this survival guide is being written. I am not trying to play God, or even explain God, just trying to help mitigate the effects of this viral mutation. Each individual and family we

can save through wisdom and timely rational action will be a testament to our being "in the image of God."

Dr. David Nabarro of the World Health Organization has been appointed by the U. N. to head up a worldwide drive to contain this pandemic. He stated in a news conference in September 2005, and also during an interview with the BBC, that the quality of the world's response could determine whether it ends up killing five million, or as many as 150 million.[17] Bureaucrats at the WHO quickly and nervously tried to distance themselves from the higher number, arbitrarily estimating that only as many as seven million may die. Let's see… seven million is about what would happen if a thermonuclear bomb exploded over New York City.

A more recent analysis of the potential effects of an H5N1 pandemic was published in February 2006.[18] The study was prepared by a division of The Australian National University, in association with The Brookings Institution in Washington,
D.C. One plausible scenario, where seniors are not partially protected like they were in 1918 by previous exposure to a similar strain, would yield about 142 million global deaths.

It's OK if this number is too big to fill your head with horror. Stalin said, "One death is a tragedy. A million deaths is a statistic."[19]

Meanwhile, the H5N1 body count as of January 23, 2006 stood at 82 out of 151 people infected, according to the World Health Organization.[20] *That's a 54% death rate.* Many of those who died had first-rate hospital care, including Tamiflu and ventilators. This pathogen is hopefully predicted to become more "user friendly" when it moves into human-to-human form, with a much lower mortality rate. If not, we could be looking at a tragedy of Biblical proportions.

The pandemic will most likely begin after a critical mutation early in 2007. But the key mutation could happen as soon as mid-2006. Already, there have been several mutations that move the virus closer to us. If we get lucky it won't happen until 2008, or maybe 2009. But it likely will happen, and dreadfully soon.

The "it" mutation may also be a series of adaptive mutations resulting in the same epidemiological impact as one massive genetic shift, turning purely avian H5N1 into a much more contagious variant. The mutation, or mutations, could occur strictly within the avian strain, or between the

avian strain and either a pig or human strain, leading to the emergent pandemic strain.

Those who rationally and properly prepare now will have the best chance for survival.[21] Those who don't prepare will need more than prayers to protect themselves from endless billions of viral assassins swarming through their bodies.

Human nature, when confronted with an unprecedented level of threat from an enemy that can't be seen, and hardly understood, retreats to its most primitive layer of defense, prayer and denial.[22] If we pray for something to go away, maybe it will. If we deny something, maybe it will go away. If we partially deny something, maybe things will get better, or maybe it won't be so bad. Or maybe science and "they" will find a last-minute cure to rescue us.

Yes, doing nothing of substance will eventually "make it go away" — along with millions of smiling faces. Prayer and denial alone are not wise humans acting "in the image of God."

We can do better, but will we? Otherwise rational adults reverting to childlike fantasies and mysticism are not going to reduce the forthcoming death toll. Communication efforts such as this book can make a great difference – but only if people heed now the warnings in time to either avoid this illness altogether, or survive the blow when it comes. Those who dance in denial are top candidates for the mass burial pits. Make your choice.

Did We Just Get Lucky?

Through the winter of 2005-2006 there were dire fears about explosive spreading of H5N1 into Africa, and then back into Europe during the spring and summer of 2006. Fears were tied to the return of migrating wild birds. So far, those fears have not turned into fact. What happened?[23]

Amazingly, scientists don't know the answer to this key question. It is likely that infected birds did not survive the long trip. That scenario would bode well for American soil avoiding H5N1 brought in by migrating birds. The public and federal government were gearing up for H5N1-bearing flocks swooping into North America. This scenario almost certainly will not happen. Even if it did happen, that is probably not the real human pandemic danger.

Another hopeful fact from the spring of 2006 is the sharp drop-off of reported H5N1 infections, both in poultry and humans, in areas of Asia worst affected. Officials are quick to credit their efforts at vaccination of domestic poultry and culling infected flocks. I suspect they are mostly correct. However, there are other natural variables in spring beyond human control, such as wild birds dispersing to mate. Vaccination of poultry could ultimately be worse than no vaccination. Many domestic birds may still harbor the virus, but not show outward symptoms. Vaccinations could increase natural selection pressure on H5N1 to mutate around the old vaccine, so that it could self-perpetuate.

Even though much of the world is experiencing a bird flu lull, this is not true for several countries that either cannot or will not do what China, Vietnam and Thailand have done to fight its spread. Myanmar, formerly Burma, is Southeast Asia's version of North Korea. Its 46 million people are dealing with ongoing H5N1, and we don't know how bad it is there.

Indonesia is another prime example of the ongoing threat. According to the World Health Organization, as of May 8, 2006 Indonesia had 33 laboratory-confirmed human cases, 25 of which were fatal.[24] *That's a 75% death rate.* The May 19th WHO report revealed the total in Indonesia was up to 41 confirmed cases, 32 of which were fatal.[25] *That's a 78% death rate.*

Just because some birds made their way back from Africa without infection, it's way too early to think of H5N1 as Y2K #2. More likely, we have been given some more time to prepare, which will save more lives. It is important to remember that H5N1 "vanished" after all the stricken birds in Hong Kong were eliminated in 1997, only to reappear in a more virulent form years later. H5N1 is still aggressive in multiple areas of the world. It has not vanished. It has only not reappeared in birds flying back from Africa, and it has been for now diminished in the Asian areas worst hit in 2004 and 2005.

What the period of time from late summer 2006 into winter holds for the world is yet to unfold. Even if we again "get lucky" this winter of 2006-2007, the lethal virus will still be around, constantly shape shifting to pick the lock of our defenses.

Meanwhile, the World Health Organization in May of 2006 rushed to analyze an extended family on Indonesia's island of Sumatra, where seven members came down with avian H5N1, and six died.[26] This may be

the first documented cluster where there is a double jump from human to human to human.[27] On the other hand, it most likely is not the only significant cluster.[28] Six out of seven dead: *That's an 85% death rate*.

Relative Risks

Recommendations in this book would be changed if we were 100% certain that H5N1 would never spread easily among people. There are arguments both for and against this bad *possibility*. At the same time, nobody knows the *probability* of a highly contagious human variant emerging. Probability is our best guess before the event.

If the probability is zero, then we are safe from this threat, but not necessarily safe from other lethal viral candidates. If the probability is 100%, then H5N1 is virtually certain to become a human pandemic. Waiting years to find out which guess about the future becomes fact is absurd. Pandemic preparations take much longer. Once the fateful evolution has occurred, humanity moves from preparation to survival.

There are careless people who gamble with their personal safety. Few careless people will be readers of this book. Perversely, television is profiting from safety-conscious people who view "reality" shows featuring attractive money-seekers gambling with their safety. An anthropological argument could be made that both risk tendencies in human nature have helped our species evolve toward temporary supremacy on this planet. Risk can be fine for a species, but what about our personal survival?

If the probability for an accident is low, and the cost of the accident itself is minimal – then a prudent person might be tempted to not prepare.

In contrast, if the probability for another type of accident is low, but the cost of that accident could be catastrophic – then a prudent person would be very wise to fully prepare. That is why we wear safety belts in cars, and obey traffic laws. Failure to protect our bodies against an unlikely major crash could instantly lead to death or disability. Even with full safety preparation, some people will die on the highway.

A worst-case H5N1 pandemic threatens human life like a major car crash, except that the probability of an H5N1 pandemic this decade is generally recognized to be much greater than the probability that you and your family will be in a major car crash.

It is therefore equally wise to always use your vehicle safety equipment, and to fully prepare now for the approaching viral horror.

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III.
How Pandemic Influenzas Appear

There is only one influenza A species. There are many variants within this species, actual and possible. There are other influenza species, but only this one causes deadly human pandemics. These ancient organisms are still on Earth because they can morph into new forms faster than forces against them work. They exhibit evolution at its finest, or worst, depending on the perspective. Some viruses even infect bacteria. They are not independently alive. They are a combination of protein and genetic material that must hijack the mechanisms inside cells to reproduce.[1] Long after the last humans have vanished viruses of every type will be robustly reproducing wherever and whenever they can.

We humans are not without resources to combat viruses. Yes, a perfectly targeted vaccine that also proportionately stimulates T-cells is best. However, there are other tools we can employ. One of the strongest tools is sheer knowledge of our natural adversary. In this chapter we will learn enough to appreciate their power, and start to see ways we can manage, not defeat, them in our lives.

One of the best sources of information is the 2005 *HHS Pandemic Influenza Plan*.[2] Here is a portion of Appendix B:

"Pandemics of influenza are extreme infectious disease outbreaks. Although many infectious disease outbreaks (e.g. Severe Acute Respiratory Syndrome [SARS], Ebola, HIV, or West Nile Virus) can cause devastation, these infections are typically limited in their spread to either localized areas or regions, or to at-risk populations. Pandemic influenza, by contrast, is an explosive global event in which most, if not all, populations worldwide are at risk for infection and illness. In past pandemics, influenza viruses have spread worldwide within months and are expected to spread even more quickly today given modern travel patterns.

It is the sheer scope of influenza pandemics, with their potential to rapidly spread and overwhelm societies and cause illnesses and deaths among all age groups, which distinguishes pandemic influenza from other emerging infectious disease threats and makes pandemic influenza one of the most feared emerging infectious disease threats.

A. Influenza viruses

The agent of pandemic influenza is the influenza virus, which is also responsible for causing seasonal influenza, known by most persons as the flu. Seasonal influenza, a common disease characterized by symptoms such as fever, fatigue, body pain, headache, dry cough, and sore throat, affects large numbers of people each year. Although most people infected with flu recover, it is still responsible for approximately 36,000 deaths[3] and 226,000 hospitalizations each year in the U.S."

Seasonal influenza is underrated. Only because we are accustomed to its regular appearance do we tolerate its deadly toll. Its carnage is typically about 10,000 below the annual carnage on our highways.

The big difference is that anybody of any age can perish instantly in a car wreck, whereas seasonal "human" flu takes more people who are very old or already sick. Vehicle wrecks can be gory, but passing away in the hospital looks more normal.

Seasonal influenzas come in like regular tides. Pandemics can come in like awesome tidal waves. The total number of seasonal influenza deaths since 1920 would rival or exceed the body count now from a nasty pandemic of bird flu – but that's comparing 86 years to one year.
The HHS pandemic background document continues:

"Influenza viruses are negative-stranded RNA viruses that have been classified taxonomically as orthomyxoviruses; they are divided into two types: "A" and "B" viruses. Influenza type C is not known to cause disease in humans and so is not applicable to this discussion. The remarkable variation of influenza strains—particularly type A—and their ability to cause annual epidemics of respiratory illness of varying intensity and severity, continue to be the focus of intense investigation. Only type A viruses are known to cause pandemics. Type A viruses are further divided into subtypes based on the specific hemagglutinin (H) and neuraminidase (N) proteins on the virus surface. Currently, two subtypes of A viruses are in worldwide circulation in humans: H3N2 and H1N1. The emergence of both of these subtypes in the 20th century led to separate pandemics. For example, the 1918 pandemic resulted from the emergence and spread of the H1N1 virus while the 1968 pandemic was associated with the H3N2 virus. The 1957 pandemic was associated with the emergence and spread of the H2N2 virus; however, this virus subtype stopped circulating in 1968. Influenza pandemics are believed to have occurred for at least 300 years at unpredictable intervals.

B. Why influenza pandemics occur

1. Drift and shift
An important feature of influenza viruses that helps to explain much of their epidemiological patterns is the ability and propensity of these viruses to modify (drift)

or replace (shift) two key viral proteins, hemagglutinin and neuraminidase, on the viral surface. Because these proteins are the main targets for the immune system, changes in these proteins can have minor to profound effects on the antigenicity of influenza viruses.

a) Drift

Influenza viruses can change through antigenic drift, which is a process in which mutations to the virus genome produce changes in the viral H or N. Drift is a continuous ongoing process that results in the emergence of new strain variants. The amount of change can be subtle or dramatic, but eventually one of the new variant strains becomes dominant, usually for a few years, until a new variant emerges and replaces it. In essence, drift affects the influenza viruses that are already in worldwide circulation. This process allows influenza viruses to change and re-infect people repeatedly through their lifetime and is the reason the influenza virus strains in vaccine must be updated each year.

b) Shift

In contrast to drift, pandemic viruses arise through a process known as antigenic shift. In this process, the surface existing viral H and N proteins are not modified, but are replaced by significantly different H and Ns. Since influenza A viruses that bear new (or novel) H or H/N combinations are perceived by immune systems as new, most people do not have pre-existing antibody protection to these novel viruses. This is one of the reasons that pandemic viruses can have such severe impact on the health of populations."

Left to their own devices in an abstract world unrelated to their hosts, influenza viruses (if they existed at all) would never mutate. They would exist as particles frozen in limbo between not-life and life. It is because they are actively interacting with their living hosts, and with each other, that these viruses mutate.

Birds are more distantly related to humans than mammals, so it may be harder for the right combination to emerge from birds to humans without any intermediaries. This is why a mammalian mixing bowl can establish a dominant strain that can transfer from human to human easily. It has been suggested that the alpha case of the 1918 flu began with a man who was reported cleaning hog pens prior to his infection.[4]

Here is more of the same HHS document:

"Novel influenza viruses occasionally emerge among humans as part of the natural ecology and biology of influenza viruses. Wild birds are considered the reservoir for influenza viruses because more influenza A subtypes (15) circulate among wild birds than humans or other animal species. Normally, animal influenza viruses do not infect

humans. However, avian influenza viruses can sometimes cross this barrier and directly infect humans. This was demonstrated in 1997, when an outbreak of avian influenza A (H5N1) viruses infected both domestic poultry and humans in Hong Kong, leading to 18 hospitalizations and 6 deaths. Since then, other outbreaks of avian viruses (such as H9N2 in 1999, H7N2 in 2002, H7N7 in 2003, and H5N1 again in 2004) have occurred and been found to directly infect people. Fortunately, these avian viruses lacked the ability to spread easily from person-to-person and therefore did not precipitate larger outbreaks or a pandemic.

Pandemic viruses can also arise when some of the genes from animal influenza viruses mix or reassort with some of the genes from human influenza viruses to create a new hybrid influenza virus. This can occur when a single animal (for example, a pig or possibly a person) is simultaneously co-infected by both a human influenza virus and an avian influenza virus. In this situation, genes from the human and avian viruses can reassort and create a virus with the surface proteins derived from the avian virus (hence, creating a new subtype) and the internal proteins derived from the human virus, enhancing the transmissibility of the hybrid virus. The process of reassortment is not theoretical. Reassorted viruses have been frequently identified and are thought to have been responsible for the 1957 and 1968 pandemic viruses."

This mixing bowl concept is amplified by the observations of Dr. Robert G. Webster, when he notes:[5]

"Swine have been considered a logical intermediate for the re-assortment of influenza viruses, for they can serve as hosts for viruses from either birds or humans. Additionally, pigs have receptors for both avian and human influenza viruses, and are susceptible to infection with all of the avian subtypes so far tested (H1 – H13)."

Because genetic drifting and shifting is essentially random, it is also a numbers game. It's like buying lottery tickets. The number you pick is random, and the winning number is random. The more tickets you buy, the greater your chance of winning. Therefore, the more opportunity a lethal avian virus has to become a human-adapted pandemic virus, the greater the probability for success.

China had in 1968 (when the most recent pandemic broke out) a human population of 790 million, a swine population of 5.2 million, and a poultry population of 12.3 million. Just thirty-eight years later, China offers spectacularly more genetic opportunities for a "winning combination" of human-to-human transmissibility to occur. There are an estimated 1.3 billion people there, with 508 million swine, and 13 billion poultry. Similar changes have occurred elsewhere in Southeast Asia.[6] If you were a gambler, would you bet against those new odds?

I continue this chapter tutorial on influenza viruses with a selection from the "Pandemic Influenza" essay published by the Infectious Diseases Society of America.[7] Pay close attention to the end discussion regarding the physical characteristics of influenza A viruses, because here is part of the answer for how we can defend against them:

"• Family: Orthomyxoviridae
Enveloped virions are 80 to 120 nm in diameter, 200 to 300 nm long, and may be filamentous.
They consist of spike-shaped surface proteins, a partially host-derived lipid-rich envelope, and matrix (M) proteins surrounding a helical segmented nucleocapsid (6 to 8 segments).
The family contains five genera, classified by variations in nucleoprotein (NP and M) antigens: influenza A, influenza B, influenza C, thogotovirus, and isavirus.

• Genus: Influenzavirus A
Consists of a single species: influenza A virus.
Influenza A viruses are a major cause of influenza in humans.
All past influenza pandemics have been caused by influenza A viruses.
The multipartite genome is encapsidated, with each segment in a separate nucleocapsid. Eight different segments of negative-sense single-stranded RNA are present; this allows for genetic reassortment in single cells infected with more than one virus and may result in multiple strains that are different from the initial ones.
The genome consists of 10 genes encoding transcriptases (PB2, PB1, and PA), surface glycoproteins (hemagglutinin [HA] and neuraminidase [NA]), nonstructural proteins (NS1 and NS2), matrix proteins (M1 and M2), and a nucleocapsid protein (NP).
The virus envelope glycoproteins (HA and NA) are distributed evenly over the virion surface, forming characteristic spike-shaped structures. Antigenic variation in these proteins is used as part of

the influenza A virus subtype definition (but not used for influenza B or C viruses).

• Influenza A virus subtypes
There are 16 different HA antigens (H1 to H16) and nine different NA antigens (N1 to N9) for influenza A. Until recently, 15 HA types had been recognized, but a new type (H16) was isolated from black-headed gulls caught in Sweden and the Netherlands in 1999 and reported in the literature in 2005.
Human disease historically has been caused by three subtypes of HA (H1, H2, and H3) and two subtypes of NA (N1 and N2).
More recently, human disease has been recognized to be caused by additional HA subtypes, including H5, H7, and H9.
All known subtypes of influenza A can be found in birds, and feral aquatic birds are the major reservoir for influenza A viruses. Feral birds generally do not develop severe disease from influenza.
Two subtypes (H5 and H7) have caused severe outbreaks of disease in domestic bird populations (referred to as highly pathogenic avian influenza [HPAI]).
Influenza A viruses have traditionally been known to also cause disease in horses, pigs, whales, and seals; however, the range of several influenza A subtypes is

expanding to different mammalian species. H5N1 influenza A recently has been shown to infect cats, leopards, and tigers. Cases of canine influenza have been recognized in the United States and are being caused by H3N8 influenza A, a subtype traditionally found in horses.

• Influenza A virus subtype strains
Antigenic strain nomenclature is based on: (1) host of origin (if other than human), (2) geographic origin, (3) strain number, (4) year of isolation, and (5) HA and NA type. (Examples are as follows: A/Hong Kong/03/68[H3N2], A/swine/Iowa/15/30[H1N1].)
H5N1 strains have been differentiated into genetic clades, with nonoverlapping case distributions. All human H5N1 strains are grouped in clade 1.

• Classification of influenza A strains by pandemic potential
Strains from past pandemics: "Noncontemporary" strains are those from previous pandemics that pose some degree of risk to the public owing to decreased immunity in the current population. The term is currently used to describe strains from the Asian flu (H2N2) but could be applied to strains from the earlier Spanish flu pandemic (H1N1).
Nonpandemic strains: These include recent and current circulating strains belonging to H1N1, H3N2, and H1N2 subtypes.
◦ *Potential pandemic strains*: Potential pandemic strains must have the following features: (1) have an antigenic makeup to which the population is immunologically na•ve, (2) be able to replicate in humans, and (3) efficiently transmit from human to human. Because of homosubtypic immunity, new pandemic strains are most likely to be of subtypes not previously recognized in human populations. Currently, strains of H5 and H7 subtypes are of greatest concern.
Animal pandemic strains: Animal strains such as avian influenza (H5N1) are not considered human pandemic strains unless the above criteria are met, but they have significant potential to evolve into new human pandemic strains through the process of genetic reassortment.

• **Physical characteristics of influenza A viruses**
Strains are sensitive to lipid solvents, nonionic detergents, formaldehyde, and oxidizing agents.
They are inactivated by ionizing radiation, pH extremes (>9 or <5), and temperatures greater than 50iC.
Viruses remain infectious after 24 to 48 hours on nonporous environmental surfaces, and less than 12 hours on porous surfaces."

It is tempting to place all of the above into a textbook framework, mostly theoretical and historical. However, today's avian events will lead to tomorrow's human drama. Consider this evolving news report out of Vietnam:

Reuters reported in November of 2005 that the director of Vietnam's center on bird flu research revealed that 24 samples of virus taken from poultry and humans showed significant changes in surface proteins, the

HA and NA molecules. These changes can result in the appearance of pandemic viruses. Their tests revealed that the PB2 gene in a virus sample from a patient who died earlier this year had mutated in a way that allows more effective breeding of the virus in mammals.[8]

Consider this more recent evolving news report in January 2006 from Turkey:[9]

"The World Health Organization confirmed that the H5N1 strain of the virus that infected Turkey's fowl and its human victims is a more infectious version than most that have cropped up in East Asia. *In at least one case, the virus was able to bind more easily to human cells than cells in birds, WHO reported.* The agency compared the strain to others found in Hong Kong in 2003 and Vietnam in 2005."

1918 and 2006

There were three pandemics in the 20th century. The ones in 1957 and 1968 were "wimps" relative to the first one. There is another great difference between the first one and the last two – how the pandemic viruses were assembled.

The 1957 virus came from a reassortment between two viruses. The 1957 variant probably involved an infected human or pig, whereby an avian H2N2 influenza virus combined with a human H1N1 virus.

In 1968 this virus was replaced by another reassortment event involving both human and avian strains, yielding H3N2. Descendants of that virus afflict us today, and five of today's H3N2 genes have their origin in the 1918 pandemic. A version of H3N2 has been the dominant strain during the winter of 2005-2006.

New pandemic influenza viruses don't need to combine with other variants. The recently reconstructed Spanish Flu strain was a pure avian strain that adapted to humans.[10] One speculation says H1N1 may have been active in military Europe two years before it became a pandemic. If so, that H1N1 strain was gradually acquiring the ability to attack humans, and then it quickly completed the final pandemic metamorphosis. That scenario, if true, would parallel what seems to be happening now with avian H5N1.

We should not be thinking that just because something has been primarily a bird flu, that it never will adapt enough to also become a human flu. 1918 proved otherwise. In Turkey during 2006 H5N1 has shown it is already starting to move our way.

Comparing Colds to Influenza

Everybody has had a series of colds. How do these pesky viruses stack up against influenza viruses? Because there are so many people getting infected with colds, the sheer numbers look like a "pandemic" every year. This is an illusion, because each genuine pandemic involves basically one very contagious pathogen that races around the world, with some modification in its genes over the course of the pandemic. In contrast, there are many viruses that yield typical cold symptoms during any one season, none of which achieves pandemic status. There are some similarities in their many varieties, and similar precautions are advised to avoid and manage both colds and influenza.

Here is some of what the National Institutes of Health says about the all-too-common cold:[11]

"In the course of a year, people in the United States suffer 1 billion colds, according to some estimates.

Children have about 6 to 10 colds a year. One important reason why colds are so common in children is because they are often in close contact with each other in daycare centers and schools. In families with children in school, the number of colds per child can be as high as 12 a year. Adults average about 2 to 4 colds a year, although the range varies widely. Women, especially those aged 20 to 30 years, have more colds than men, possibly because of their closer contact with children. On average, people older than 60 have fewer than one cold a year.

More than 200 different viruses are known to cause the symptoms of the common cold. Some, such as the rhinoviruses, seldom produce serious illnesses. Others, such as parainfluenza and respiratory syncytial virus, produce mild infections in adults but can precipitate severe lower respiratory infections in young children.
Rhinoviruses (from the Greek *rhin*, meaning "nose") cause an estimated 30 to 35 percent of all adult colds, and are most active in early fall, spring, and summer. More than 110 distinct rhinovirus types have been identified. These agents grow best at temperatures of about 91 degrees Fahrenheit, the temperature inside the human nose.

Scientists think coronaviruses cause a large percentage of all adult colds. They bring on colds primarily in the winter and early spring. Of the more than 30 kinds, three or four infect humans. The importance of coronaviruses as a cause of colds is hard to

assess because, unlike rhinoviruses, they are difficult to grow in the laboratory.

Approximately 10 to 15 percent of adult colds are caused by viruses also responsible for other, more severe illnesses: adenoviruses, coxsackieviruses, echoviruses, orthomyxoviruses (including influenza A and B viruses, which cause flu), paramyxoviruses (including several parainfluenza viruses), respiratory syncytial virus, and enteroviruses.

The causes of 30 to 50 percent of adult colds, presumed to be viral, remain unidentified. The same viruses that produce colds in adults appear to cause colds in children. The relative importance of various viruses in pediatric colds, however, is unclear because it's difficult to isolate the precise cause of symptoms in studies of children with colds.

The weather

There is no evidence that you can get a cold from exposure to cold weather or from getting chilled or overheated.

Other factors

There is also no evidence that your chances of getting a cold are related to factors such as exercise, diet, or enlarged tonsils or adenoids. On the other hand, research suggests that psychological stress and allergic diseases affecting your nose or throat may have an impact on your chances of getting infected by cold viruses.

THE COLD SEASON

In the United States, most colds occur during the fall and winter. Beginning in late August or early September, the rate of colds increases slowly for a few weeks and remains high until March or April, when it declines. The seasonal variation may relate to the opening of schools and to cold weather, which prompt people to spend more time indoors and increase the chances that viruses will spread to you from someone else.

Seasonal changes in relative humidity also may affect the prevalence of colds. The most common cold-causing viruses survive better when humidity is low, the colder months of the year. Cold weather also may make the inside lining of your nose drier and more vulnerable to viral infection.

SYMPTOMS

Symptoms of the common cold usually begin 2 to 3 days after infection and often include

* Mucus buildup in your nose
* Difficulty breathing through your nose
* Swelling of your sinuses

* Sneezing
* Sore throat
* Cough
* Headache

Fever is usually slight but can climb to 102 degrees Fahrenheit in infants and young children. Cold symptoms can last from 2 to 14 days, but like most people, you'll probably recover in a week. If symptoms occur often or last much longer than 2 weeks, you might have an allergy rather than a cold.

Colds occasionally can lead to bacterial infections of your middle ear or sinuses, requiring treatment with antibiotics. High fever, significantly swollen glands, severe sinus pain, and a cough that produces mucus, may indicate a complication or more serious illness requiring a visit to your healthcare provider.

TRANSMISSION

You can get infected by cold viruses by either of these methods.

* Touching your skin or environmental surfaces, such as telephones and stair rails, that have cold germs on them and then touching your eyes or nose
* Inhaling drops of mucus full of cold germs from the air TREATMENT

There is no cure for the common cold, but you can get relief from your cold symptoms by

* Resting in bed
* Drinking plenty of fluids

* Gargling with warm salt water or using throat sprays or lozenges for a scratchy or sore throat
* Using petroleum jelly for a raw nose
* Taking aspirin or acetaminophen, Tylenol, for example, for headache or fever

A word of caution: Several studies have linked aspirin use to the development of Reye's syndrome in children recovering from flu or chickenpox. Reye's syndrome is a rare but serious illness that usually occurs in children between the ages of 3 and 12 years. It can affect all organs of the body but most often the brain and liver. While most children who survive an episode of Reye's syndrome do not suffer any lasting consequences, the illness can lead to permanent brain damage or death. The American Academy of Pediatrics recommends children and teenagers not be given aspirin or medicine containing aspirin when they have any viral illness such as the common cold.

Over-the-counter cold medicines

Nonprescription cold remedies, including decongestants and cough suppressants, may relieve some of your cold symptoms, but will not prevent or even shorten the

length of your cold. Moreover, because most of these medicines have some side effects, such as drowsiness, dizziness, insomnia, or upset stomach, you should take them with care.

Over-the counter-antihistamines

Nonprescription antihistamines may give you some relief from symptoms such as runny nose and watery eyes, which are commonly associated with colds.

Antibiotics

Never take antibiotics to treat a cold because antibiotics do not kill viruses. You should use these prescription medicines only if you have a rare bacterial complication, such as sinusitis or ear infections. In addition, you should not use antibiotics "just in case" because they will not prevent bacterial infections.

Steam

Although inhaling steam may temporarily relieve symptoms of congestion, health experts have found that this approach is not an effective treatment.

PREVENTION

There are several ways you can keep yourself from getting a cold or passing one on to others.

* Because cold germs on your hands can enter through your eyes and nose, keep your hands away from those areas of your body
* If possible, avoid being close to people who have colds
* If you have a cold, avoid being close to people
* If you sneeze or cough, cover your nose or mouth.

Handwashing

Handwashing with soap and water is the simplest and one of the most effective ways to keep from getting colds or giving them to others. During cold season, you should wash your hands often and teach your children to do the same. When water isn't available, CDC recommends using alcohol-based products made for washing hands.

Disinfecting

Rhinoviruses can live up to 3 hours on your skin. They also can survive up to 3 hours on objects such as telephones and stair railings. Cleaning environmental surfaces with a virus-killing disinfectant might help prevent spread of infection.

Vaccine

Because so many different viruses can cause the common cold, the outlook for developing a vaccine that will prevent transmission of all of them is dim.
RESEARCH

Thanks to basic research, scientists know more about the rhinovirus than almost any other virus, and have powerful new tools for developing antiviral drugs. Although the common cold may never be uncommon, further investigations offer the hope of reducing the huge burden of this universal problem.

Much of the research on the transmission of the common cold has been done with rhinoviruses, which are shed in the highest concentration in nasal secretions. Studies suggest a person is most likely to transmit rhinoviruses in the second to fourth day of infection, when the amount of virus in nasal secretions is highest.

Researchers also have shown that using aspirin to treat colds increases the amount of virus in nasal secretions, possibly making the cold sufferer more of a hazard to others."

Two Recent Discoveries

(1) Early in 2006 scientists using 3-D electron microscopy reported that they now basically understand how all influenza A viruses, including H5N1, replicate inside our cells.[12] Anytime we understand a critical reproductive link there is an opportunity to disrupt that link. A chain is only as strong as its weakest link – so too the replication of viruses inside our cells may have a similarly weak link.

Researchers need to discover and test something that will disrupt that intra-cellular gene link. Time is not on our side. Basic science could be a decade away from delivering anything to your doctor's office. Here is great science today for the grateful doctors and patients of tomorrow.

(2) Dual reports in March of 2006 related to lung receptor sites where H5N1 attacks. Unlike seasonal flu, the killer variant prefers to lock onto cells deep in the lungs. Upper respiratory infections can spread more easily by coughing. That one difference mostly explains why, so far, humans have not been easily infected other humans.

The March 23, 2006 article in *The New York Times* explained the second discovery with a cheery headline suggesting a pandemic is not imminent. However, buried in the article were these sobering words of caution:[13]

"The H5 strain of avian flu has so far failed to develop a pandemic form. Some virologists fear it may need only better transmissibility. The new findings suggest that the virus could acquire such a property by switching its preference from the cell

receptor found in the lower lung, known as alpha 2-3, to the receptor found on cells in the upper airways, known as alpha 2-6.

A team of scientists at the Scripps Research Institute reported in *Science* last week that only a couple of mutations might be needed to enable the H5 virus to make this switch to the alpha 2-6 receptor. This is the about same number of mutations made by the H1, H2 and H3 viruses when they adapted to infect people. Since viruses mutate fast, a two-mutation step is not such a big hurdle.

Because the H5 virus has killed about half of the 187 people it has infected, 'a lot of its genes are already optimized for virulence,' said James C. Paulson, a member of the Scripps team. For H5 to become pandemic, 'the key gene that needs to be mutated is the HA gene,' he said, referring to the hemagglutinin gene that makes the protein probe used by the virus to latch onto a cell's receptor sites."

How Bad Gets Worse

One of the key events in the Spanish Flu era was how the virus started out less lethal than it later became. Indeed, the second wave in early fall of 1918 was the great killer. Logically, one might think that a less-lethal virus should have better survival potential than a more-lethal variant, since victims of the less severe strain would survive longer to transmit that strain. Pandemic influenza may challenge this old model, since its attack rate (infectivity) is so high in modern, mobile society. On the other hand, the model is somewhat confirmed in that the third wave in the winter of 1918-1919 was less lethal than the second.

Research at the University of North Carolina points to cellular oxidation as a stimulus for viral mutations. The RNA-based influenza viruses are notoriously unstable. Anything, such as a diet deficient in antioxidants, that enhances their tendency to mutate while replicating could lead to more lethal strains. Here is part of what these researchers found:[14]

"Our laboratory has shown, using a mouse model of coxsackievirusinduced myocarditis, that a host deficiency in either selenium or vitamin E leads to a change in viral phenotype, such that an avirulent strain of the virus becomes virulent and a virulent strain becomes more virulent. The change in phenotype was shown to be due to point mutations in the viral genome. Once the mutations occur, the phenotype change is stable and can now be expressed even in mice of normal nutriture."

More recent research from the same group, using influenza virus, found that such mutations occurred not in the usual suspects, the HA, NA, or M2 genes, but in the M1 matrix protein genes, previously thought to be more stable. Here is part of their conclusion:[15]

"Selenium is a component of the peroxide-destroying enzyme glutathione peroxidase, and a dietary deficiency in Se leads to increased oxidative stress in the host due to a loss of this antioxidant protection. Because a host Se deficiency had been shown earlier to increase the mutation rate of a Picornavirus, coxsackievirus B3, we theorized that a decrease in host Se status might do the same for the influenza virus. If the oxidative stress status of the host altered the genome of a virus outside the Picornavirus family, this would suggest that RNA viruses in general may be susceptible to oxidative damage. This could provide a novel mechanism for the emergence of viral diseases."

Because H5N1 is now spreading into rural Africa and India, as well as into other poor areas, it will encounter a huge number of human "mixing bowls" deficient in dietary selenium.

What we don't see with our own eyes is much more complex than what we do see. The human body is a dynamic system of systems, with trillions of components, some of which are working against our continued existence. Other components will die to protect our existence. Our internal universe is just as fascinating as the external Universe.

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IV.
Brief History of Pandemics

Before Humans

Viruses and bacteria are among the most ancient and durable creatures in the universe. One theory has early Earth being seeded by microbe-laden Martian meteorites ejected from the surface of Mars by large meteor strikes. This scenario could have happened more than once during the era of Mars' being warmer and wetter than it is now.[1]

It is also possible that comets or other distant bodies have delivered primitive microbes to early Earth, or at least the organic molecules needed for their construction.[2] A variant of this theory is called **panspermia**. Under panspermia, whenever microbial life forms it does not die off, just spreads from one hospitable location to another, such as Earth. This means our microbial ancestors could have been "aliens."[3]

We don't need to get tangled up with unanswerable questions of first cause, intelligent design, or Darwinian natural selection[4] to appreciate the elegant fact that viruses have long been on this planet, have always been with us humans, and will be here well after our delicate species has joined the long list of extinct species.[5]

Birds are closely related to the giant feathered dinosaur species such as T-Rex.[6] Birds are actually avian dinosaurs. Aquatic birds such as wild ducks are typical carriers and natural reservoirs of many types of influenza virus. Every now and then a truly nasty variant of the influenza virus takes down even wild birds, such as the current avian pandemic caused by H5N1, which has killed untold millions of them.

Why then couldn't individual herds of dinosaurs have been decimated by **dinoviruses**, just as tiny microbes killed off H. G. Wells' giant Martian invaders in *The War of The Worlds*? Evidence clearly points to that great Yucatan asteroid as the primary culprit in their final extinction,[7] but what

effect did ongoing dinovirus pressure have on all those magnificent beasts?

Any social animal on land or in the sea is potentially prone to viral infection, which could weaken its species viability. Less than one percent of all species that have ever lived on Earth are here with us today.[8] Over ninety-nine percent have vanished. I am clearly not blaming viruses and bacteria for killing off all these species, but pathogenic microbes should be considered as part of natural selection.

Were many earlier pandemics partially the result of weakened immune systems brought about by stressful global environmental changes? Or were some prehistoric pandemics alone sufficient to tip the balance to where one species totally loses out to its competitors? Sometimes what we don't see can be worse than what we do see.

The Black Death

The story of plagues in Europe is important, because it helps show what works and what doesn't work in the face of such threats. It also points to how societies sometimes change their cultural paths after such events. Although there have been episodes of the plague in Asia before it came to Europe, the European experience is more educational for our modern era. We can learn when and why it started, and we can learn what worked and what did not work to combat this long lasting pandemic. It is interesting to note that during the mid-fourteenth century the word, *influenza*, was coined.[9] It has an Italian origin, and relates to the idea of a disease being influenced by outside forces, such as the stars or fate.

Otherwise intelligent humans are quick to attribute the unknown in nature to the supernatural. The Islamic world suffered at least five plague epidemics before this disease devastated Europe. Muslim theory said the plague was not a punishment from God, but an opportunity for martyrdom from a compassionate and merciful God. Conversely, Christians in Europe theorized that the plague was a stern punishment from God for the sins of all Christians.[10]

Bacteria and viruses were unknown as such until very recently, even though Dr. Jenner's discovery of smallpox vaccinations in 1796 pointed there. It wasn't until the nineteenth century that Pasteur advanced his *germ theory of disease*. Note that it took from 1796 until the end of the twentieth century to eradicate viral smallpox – and this is a disease that

only lives in humans.

Even as late as the American Civil War physicians typically did not wash their septic/dirty hands when treating battlefield wounds. They were so arrogant that they thought they would not spread disease like lower class health workers could do.[11] Two-thirds of all Civil War military deaths were caused by infectious diseases, many of which could have been prevented by *basic antiseptic practices*.[12]

An event within the population of rodent species reportedly preceded the arrival of the Black Death in medieval Europe. The southern black rat was muscled out by the more aggressive Norway rat, our ubiquitous gray rat. The black rat did not like to cozy up to humankind, but the gray rat found itself right at home with us. The coincidental arrival of the Little Ice Age in Europe intensified this cohabitation in winter. On the backs of these rats rode the flea population infected with plague. Even today the bubonic plague reappears now and then in remote areas of New Mexico, typically brought to humans by field rodents and their fleas.

Sometimes cause and effect is warped by prejudice. The ancient Egyptians had worshipped cats. The medieval Europeans hated cats, especially black cats, which they saw as associates of witches, the natural healers of their day. House cats repel and eat rats around the house. If more cats had been welcomed during the medieval period in Europe, possibly plagues would have been fewer and less severe. Then again, possibly not:

There is a strong argument that the great plague era from 1347 to 1670 in Europe was actually caused by directly infectious plague, a *hemorrhagic plague*, not a bacterium spread only by fleas riding on rats. Did the plague simply evolve to where it could be passed in the air from lung to lung? There are multiple arguments to support the theory that classical bubonic plague was not THE plague that took the lives of nearly forty percent of the population in 14th century Europe, and more lives in subsequent waves, even though ordinary bubonic plague was also part of the scene.[13]

The arrival of plague in Europe dates from a fleet of Genoese merchant galleys packed with infected rats and sailors that unintentionally brought the pestilence to Sicily from the Crimea in autumn of 1347. Militant Genoese Christian merchants had been attacked by Muslims in the Crimea. Because the Christians were well entrenched behind fortress walls, the Muslim army could not penetrate those defenses. At the same

time there was plague in the attackers' camp. The attackers hit on the idea of catapulting corpses into the Christian fortress. It worked to infect the citizenry and their defenders. Soon the Christians and their fleas were in their galleys and fleeing back to Europe, where they brought this pestilence to an Italy totally unprepared for what was to come. Within months it was in remote areas of Scandinavia.

Most cities suffered a terrible death toll. However, Milan did not. The town leaders couldn't know what it was, but they figured out that it traveled within families, and then spread to other families. They simply and cruelly locked up entire households inside their own houses when the first member got sick. Weeks later they opened the doors to a dead household. The disease hardly spread. Lives overall were saved in Milan, however cruelly, by this social distancing and total quarantine.[14]

The late medieval plagues were a major reason an entire social order fell in the fourteenth century. Before then, nobility and serfs knew their place. After massive and widespread deaths rural nobility were forced to sweeten the deal to repopulate farmlands. Also, the rise of cities competed with estates, offering former serfs an entrepreneurial future. Cities and industry became enriched by new thought focused more on science, and less on divine providence, helping to spark the great Renaissance of the fifteenth century.

Another factor in the transformation of society was the abrupt shift in climate and extended period of cold rain after 1315, when the medieval warm era was followed in Europe by the Little Ice Age, which generally lasted until the middle of the nineteenth century.[15] The average temperature during this time of radical climate change was only a few degrees lower than before. The Earth is very sensitive to small changes in climate. What will happen with global warming in the later 21st century? What would happen to Europe if global warming melts the Arctic and Greenland ice, and stops the Gulf Stream, leading to another localized ice age?[16] It's not nice to fool with Mother Nature, either on a very large or very small scale.

A lesson in limits is here for the 21st century. Offensive defenses can in certain situations be effective, as the Milanese discovered. The recent success containing SARS shows that aggressive containment can make a difference.

Problem is, flu can travel with the speed of jet airplanes, mutating always into more or less severe strains. SARS was from a malicious coronavirus, but the much more infectious flu virus travels among a populace that is used to seasonal flu. Locking families in their houses won't stop influenza. Ordinary flu strains, even Type A influenza, kill only a small percentage of those they infect, mostly among the elderly. The emerging bird flu could make ill thirty percent or more of our population, even with public hygiene in place. With no strong vaccine, and precious little antiviral medicine that works, a *ten percent* death rate among those clinically infected is possible. That would kill nine million Americans. Spread the numbers worldwide, and you have something on the scale of a limited nuclear war, without radiation.

No terrorist attack could do this much damage – unless, of course, they got access to certain pathogens now being created for surreal reasons by "anti-terrorist" government labs. Or maybe they got a vial of the recently recreated Spanish Flu virus![17] You can appreciate the massive irony: It's like World War One being called the "war to end wars." Or the infamous Vietnam War justification for the My Lai massacre: "In order to save the village, we had to destroy it."[18] If rogue Muslim terrorists going after the "Great Satan" America manage to destroy most of humankind with purloined pathogenic bugs, including millions in their own Muslim countries, how many virgins will be awaiting those jihadists in heaven?

Europeans and American Indians

When Columbus "discovered" America he was at least 15,000 years too late. An estimated seventy-five million aboriginal Americans in a mosaic of cultures already inhabited the entire western hemisphere. Columbus' motives were complex, but those who followed him were mostly interested in gold, land, and power. The problem was, Europeans were few, and the proud Indians warriors were many. Also, there wasn't much superiority of European weaponry over tribal Indian, except for the warhorse. Even the horse could be brought down by Indian weapons such as arrows and spears. So why were the cocky Conquistadors so quickly able to conquer vast lands teeming with warriors?

They had *a weapon of mass destruction, their own wretched diseases*. First and foremost was smallpox, which was well known to Europeans, but totally unknown to the Indians, much as the H5N1 virus is unknown to everybody in today's world, including Europeans. With no aboriginal

American defense against the European diseases, all classes of Indians dropped like bug-sprayed flies.

By 1619, an estimated 90 percent to 95 percent of the Mesoamerican Indian population levels of 1519 had been killed by European diseases.[19] When a population, however organized, loses ninety percent of itself, including most of its leaders, that population and its culture are shattered. Into that cultural vacuum rode the gold-crazed, disease-bearing Spanish conquistadors, with God and Pope on their side.

Up north, the 17th century English were at first restricted to the coast, due to the overwhelming power of native society, such as the Powhatan Confederacy. English weaponry was hardly better than Spanish. Inside the forest Indian warriors were fighting on their home turf, and willing to use highly effective guerrilla tactics against the few white invaders.

Alas, the English shared the pathogenic "nuclear option" so readily used by their fellow Europeans. In New England they thinned the heathen herd in the 18th century (including women and children) by giving neighboring Indians blankets that had been wrapped around smallpox victims.[20] By the late eighteenth century there were few healthy North American aboriginals in this region standing in the way of so-called Manifest Destiny.

From the Spanish Flu Until Today

Coming into the 20th century science was ascendant. We thought that Darwin, Pasteur, Bell, and other brilliant scientists were leading us into the promised land of rational technology, where mankind would be free from the fickle forces of nature. High on this list of self-praise was the idea of triumphant bacteriology. Success achieved in identifying pathogenic agents of horrible diseases such as cholera, plague, syphilis and anthrax lent credence to the idea that vaccinations would soon sweep away the scourge of disease. One supposed disease organism was the imaginary influenza bacterium, *Haemophilus influenzae,* as postulated by the famous German bacteriologist, Richard Pfeiffer, in 1892.[21]

At the turn of the 20th century the idea of a world war was also outside their consciousness. Simply contrast the image of happy bourgeoisie seen in impressionistic paintings at the turn of the century with the insane reality of life in World War One trenches. At a time when we in America are aghast at the "barbarism" of the Muslim jihad warriors, we need only look at the barbarism of the so-called flower of Western Civilization during

that era. More than ten million would-be civilized Christian Europeans died for absolutely nothing other than cultural lunacy. This era was a classic example of highly educated naked apes acting like raving lunatics. In contrast, viruses and bacteria are quite logical and methodical. They simply eat us, multiply, and move on.

While we are casting stones inside our glass house, let's look at one coincidental reason for the end of WWI. The war ended when both sides ran out of healthy bodies to throw against the mustard gas, machine guns, and tanks. The war's end was accelerated by what came to be known as the Spanish Flu.

The **Spanish Flu** was unlike anything else, because it killed at least 2.5 percent of all people infected, and in some age groups as much as ten percent. It became a worldwide pandemic killing 50 million (maybe 100 million) people. In America about 650,000 were killed over two years.[22] Unlike the prolonged Black Death era in Europe, which eventually killed tens of millions, this flu epidemic did its worst over two months.

Very often, a previously healthy young person would wake up in the morning feeling fine, and be dead by that night from what we now know was a **cytokine storm**. My unremarkable hometown in America has a mass burial pit into which deceased flu victims were tossed and quickly covered with dirt. There's still plenty of fresh ground remaining for another round of mass burial pits, and three times as many bodies on this planet to slay.

The so-called Spanish Flu was possibly a mutated avian influenza from Asia, or even from the WWI battlefields, but also likely a mutated avian flu variant from Kansas or the American east coast. There is uncertainty as to its origin, because modern science wasn't tracking that epidemic to its source. Many different influenza strains circulate at any one time, with many mutations, leading to the possibility that a formerly benign variant could mutate into a potent killer.[23]

The 1918 killer virus has just been brilliantly reconstructed with a zeal befitting Disney's sorcerer's apprentice,[24] and it's not a very close relative of H5N1, the looming threat from Asia.[25] The Spanish Flu virus was a particularly lethal variant of H1N1.[26] Today, less lethal variants of H1N1 are included in seasonal vaccines. There are other candidates for the next flu pandemic "out there," such as H7N1, which is not now as bad as H5N1, though still highly deadly in relation to most other infections.

Even if the currently dominant Asian strain of H5N1 doesn't evolve into THE killer, there are many other potentially devastating flu variants waiting for their turn. One thing we now know is that H5N1 and the original H1N1 are both directly of avian origin. They are not partially "human" flu viruses like those that killed "only" one million each in the Hong Kong and the Asian flu epidemics.

Murphy's Law of Influenza Pandemics assures us of disaster. The only epidemiological question is when, not if. Will we be prepared, or not? My best-guess prediction of 2007 being "the" year may be off somewhat in either direction, but the thrust of my argument remains intact. It's not if, but when. When may be long before science and technology are fully prepared to effectively respond globally.

Another unknown is the killing power of the mutated strain. It could be an "ordinary pandemic," but so far the mutating H5N1 has eerie similarities to the Spanish Flu in how it over stimulates our own defenses, triggering the lethal cytokine storm.[27]

In 1918 it was noticed that some people beyond a certain age were more able to ward off the lethality of the Spanish Flu. That flu, like the one to come, struck with lethal ferocity among otherwise very healthy young adults and children. It killed directly, not indirectly from opportunistic bacterial infections. Younger adults often developed a *cytokine storm*, as the victim's immune system desperately tried to fight the viral invasion, leading to *acute respiratory distress syndrome (ARDS)* and rapid death.

Older people had survived similar, but less virulent, influenza attacks in the 1850s and in 1889. So the older generation may have had some minimal immunity before the Spanish Flu hit, reducing their death rate.

What about H5N1? There is no accidental vaccination history by H5N1 variants for the modern world. There is no history of similar infection for the elderly to take comfort in. We are all like the young people who perished early in the 20th century, totally unprepared for the swift viral attack. Let's hope we don't become even remotely like the Inca infected by Europe's germ warfare. Few of these proud Indians survived, and their empire crumbled.

With the newly developed H5N1 vaccines slow in coming, there could be only a few million vaccinations available. After the rich and powerful seize their supplies, what will be left for the rest of us?

Annual flu kills the elderly disproportionately, but pandemics can strike particularly hard at younger age groups. Only a few months before the global 1918 pandemic struck, a round of as-yet-unidentified flu hit New York City, killing 3,000 children. In the winter of 1977-1978, the so-called **Russian Flu** killed large numbers of children, starting in Russia, but few adults, as it was identical to an earlier strain that adults had encountered in 1950. Since the flu readily mutates, I suspect that preserved virus from Soviet-era germ warfare experiments escaped back into the population.

Another way of saying the above is that seasonal influenza epidemics exhibit a *"U" curve in death rates*, with the very young and the very old experiencing the greatest mortality. Pandemics can exhibit a *"W" curve*, with young and healthy adults perishing at rates equal to or higher than death rates for children and the elderly. This "W" curve was strikingly evident in the Spanish Flu, and also evident to a lesser degree in the first wave of the **Asian flu during 1957**.

In the **Hong Kong Flu of 1968-1969** the very elderly enjoyed some protection from an earlier variant that circulated at the turn of the century. This is one reason why the Hong Kong Flu pandemic was less lethal worldwide than the Asian flu. That pandemic in the late sixties was a relative wimp. By comparison, there have been zero H5 variants in human circulation within the lifetimes of anybody alive today, which seriously increases our vulnerability.

Will health care policy makers this time give preference to the elderly who would need double doses of the current killed-virus vaccine to prepare their less-vigorous immune systems? Or will the precious vaccine go to grandchildren who would otherwise be defenseless outside a few million globally available doses of Tamiflu and Relenza providing short-term protection and relief, leaving the majority of young people still totally unprotected? How about the young parents of the youngest children who could die at a high rate, turning their children into orphans? Even those receiving a timely weeklong course of medicine would only be helped during the time of ingestion. Influenza pandemics can reappear in waves for months.

Triaging among age groups is truly a lose-lose dilemma. America and the world can do much better! But we won't, at least for several years.

Lessons of SARS, Ebola, West Nile, AIDS, and Malaria

SARS, Ebola, West Nile, and AIDS offer us different insights into what the real threat is, and how we might best prepare to defend ourselves. Technically, none of these diseases qualifies as an acute pandemic, even though AIDS/HIV has infected millions of people since the first Cameroon chimp infected a hunter in 1959.[28] AIDS/HIV is not a classical aerosol pandemic, because it is not as easy to catch as an aerosol virus, and is thereby restricted even in areas where it is widespread. Ebola and SARS never have gotten beyond localized terrors. West Nile and malaria, while widespread in warmer climates, require intermediary mosquitoes, restricting their footprints.

SARS came from rural China. **Severe Acute Respiratory Syndrome** was recognized in 2002, and it killed 774 people worldwide before being brought under control by quarantine and restricted travel. SARS is characterized by severe and rapid damage to the alveoli, tiny air sacs in the lungs that directly exchange blood oxygen and carbon dioxide. In this way SARS is similar to the worst effects of killer flu, because both attack the lungs' vital capacity. (In the case of the Spanish Flu lungs often filled with blood, as the victims' skin turned from pink to near black, like in the Black Death. Doctors at the front in WWI sometimes couldn't tell the difference between black and white soldiers at their death. Oh, what a lovely way to go.)

Fortunately, SARS is a *coronavirus* that did not rapidly mutate into even more lethal forms,[29] and a vaccine has recently been invented. Only a few hundred died from this acute respiratory disease that quickly turns young, healthy lungs into a semblance of terminal emphysema lungs. SARS was contained with Herculean effort, but what would such an effort yield with a pandemic flu strain?

The key point to remember is that infection with influenza yields a person who is shedding virus particles only **two days** after exposure. In critical contrast, the deadly SARS coronavirus that emerged from China in 2003 took up to **ten days** before the victim could spread it to others. This gave public health workers more time to identify and isolate their contacts, stopping a SARS pandemic before it could start.[30]

Economically, diseases can affect the economic health of regions or nations. Canada had only about 40 SARS deaths. However, the SARS outbreak caused a 14-week emergency in Toronto, and 30,000 people were quarantined at home or in hospitals. The city lost nine conventions and 12,000 jobs. The economy lost $1 billion, and took two years to fully recover. In strictly public health terms the city's response was a nearly unqualified success, and globally SARS was a bullet dodged.[31]

If the successful SARS containment model is applied when the bird flu breaks bad, the end result will only be to waste the small stocks of Tamiflu and vaccine. SARS contained was the paper tiger preceding the real tiger — uncontained, human-adapted H5N1.[32]

The world's respiratory inhalers and decontamination equipment are primarily made in America. A widespread attack on lungs from a vicious strain of influenza would quickly overwhelm our hospital bed capacity, remembering that "regular" illnesses would continue as before. Supplies of breathing machines and decontamination equipment could not be ramped up fast enough to keep up with spiking demand. Even worse, a pandemic would immediately paralyze world trade, so that many of the components of respiratory therapy equipment would be unavailable to the end-product manufacturers.

Efforts are now underway to develop an injectable form of Relenza. How long will it take for this to appear? And even when it does, how many doctors and nurses will be available to administer such doses? This noble effort to contain the flu virus will yield only marginal benefit worldwide, and only if the pandemic starts years into the future.

Ebola is an African disease, the continent where AIDS also began. Both may be related to the venerable African tradition of eating "bush meat." The latest evidence for Ebola points to fruit bats that harbor evidence of benign Ebola infections; however, other candidate species remain in the bush.[33]

Bush meat is anything you can catch and kill, such as monkeys and chimpanzees, and fruit bats. Africans prefer the taste of bush meat to domestic meat, which I learned from locals during my three months in southern Nigeria. Chimps and humans share about 99% of their genes, so any disease affecting the great apes is a prime candidate for infecting the naked ape.

Ebola hemorrhagic fever is caused by infection with Ebola virus, named after a river in the Democratic Republic of the Congo (formerly Zaire) in Africa, where it was first recognized. The virus is one of two members of a family of RNA viruses called the Filoviridae.[34] Most people with Ebola quickly die from hemorrhaging and other dire symptoms before they can spread the pestilence. Most of those who catch it are exposed to victims' secretions. Even a simple handshake can kill.

Ebola hasn't spread widely in part because it has an extremely high kill rate, and more likely because tasty fruit bats aren't everywhere. Ebola apparently does not exhibit the rapid shape shifting behavior of the influenza virus, which could allow for its mutation into human-to-human variants, making moot the African location of an original host. Ebola also is likely to be contained within a defensive ring over the next decade by vaccines under development.[35]

Ebola's 50% to 90% mortality contrasts with the Spanish Flu, which had an estimated three percent kill rate, but also with death rates approaching ten percent among those 15 to 35. With a much lower kill rate, the Spanish Flu virus was much more deadly to our global species than Ebola could be, primarily because it spread everywhere more rapidly and more easily. If you die quickly, you can't spread it far. If you live longer, you can infect more people. Even people who will die from avian flu live long enough to possibly infect several others.

Those who hopefully anticipate H5N1's weakening after it becomes able to easily transfer from human to human are wrongly optimistic. It will be precisely when the disease has a lower human kill rate than the almost 50 percent it now inflicts that the bird flu will be most dangerous. Lower mortality yields more tolerance of *infective latency*, leading to higher *morbidity* (infection rates), and thus to more deaths in total. Some people may even become infectious carriers. This is a formula for global disaster where both people and their bugs travel far and fast. Let's be grateful that hemorrhagic Ebola has not spread and adapted like the flu bug does.

West Nile disease is another exotic viral import from Africa. It is brought to us by mosquitoes, as are several other highly disagreeable pathogens. Wild birds such as crows and robins seem to be its preferred path of spreading.[36] The disease has now spread all across America, and indeed through much of the world. Most humans who contract West Nile virus recover, and some hardly know they had the infection. However, a substantial and random percent suffer chronic neurological disabilities,

making this a very serious disease, even though it only kills a few Americans each year[37].

The disease does not mutate rapidly like a flu virus, but years after its first appearance no vaccine is available for us humans. Horses have a vaccine! Why not humans? If there is ever a human vaccine for West Nile, it may take a decade or more for it to be available from your doctor. Let's thank our over-protective medical bureaucrats for this delay.

The horse vaccine for West Nile has lessons for us when it comes to understanding why we the ordinary people will not see any bird flu vaccine for years to come.[38] Basically, veterinary medicines are not as strictly regulated as human medicines. Laboratory development of an equine vaccine led to its swift approval to protect valuable property, such as thoroughbred racehorses, which have about thirty percent mortality when symptoms bloom. Human bodies don't have such industrial value, and the FDA is reluctant to approve anything with the remotest possibility of not being both safe and effective.

The chain of loops and hoops to approve a totally novel human vaccine takes years of layered trials to complete. In the case of bird flu, the bureaucrats are now saying that the bird flu vaccine is just like any other flu vaccine in its mode of production. This previously traveled path has reduced the time needed for approved general use from many years to many months. Will that be enough time? Place your bets at your nearest horse track.

I want to mention something about **the time line of H5N1:**
According to the World Health Organization, highly pathogenic H5N1 was isolated on a farm in China in 1996.[39] That's TEN YEARS AGO! In 1997 outbreaks occurred in Hong Kong, with one third of those infected dying. There was little response from the flu vaccine manufacturers, or from President Clinton and other world leaders. At the very least, vaccine production capacity could have been greatly increased globally. The world was given precious time to prepare, but nobody in power responded.

After undocumented outbreaks began through East Asia in 2003, Viet Nam in January of 2004 identified H5N1 as the source of death among several people. By March of 2004 eight out of 12 Thai victims were dead, despite receiving hospital treatment; and 16 out of 23 cases were fatal in Viet Nam. Incredibly, there still was no defensive battle plan from

President Bush, no rush to increase vaccine production capacity. *It was only in late 2005, after the Katrina debacle and a plunge in his poll numbers, that President Bush stepped out front on this issue – nine years after the warning sirens in China first sounded.*

Imagine what we humans could have done to prepare to protect ourselves during that wasted decade, if only wisdom, not politics as usual, had prevailed.

AIDS is a viral disease that may eventually kill more people than the forthcoming bird flu pandemic. Some parts of the world, such as equatorial Africa, are more infected and affected than others.[40] In contrast, the bird flu will impact nearly all parts of the world with equal ferocity. Untreated HIV in a community is not initially fierce among those who host it. The HIV virus can be somewhat controlled inside the bodies of individuals by expensive medication, if you or your government have the money. For most patients in the First World HIV infection is a chronic condition managed by multiple medications, not a death sentence. Flu acts far too fast for this type of pill-popping strategy to work, especially in Third World environments.

Both diseases are transmitted from human to human, involving individuals who don't initially know who is infected. Unlike Ebola, where entire African villages are nearly wiped from the map in a flash, both HIV and influenza hide in bodies long enough for transmission to occur. HIV is notorious for hiding for years before symptoms appear. Both cold and flu viruses render their host infectious for a number of hours before symptoms appear. That's enough time for geometric transmission within our highly social species. Additionally, whereas HIV is generally transmitted by unsafe sexual activity, the flu virus only needs mere proximity by air or casual contact. Virgins are just as likely to be infected by influenza, as are the sexually careless. A strategy that works best against HIV may not work at all against avian flu.

Malaria is a perennial plague for the tropical world. It is the greatest single cause of debilitation and death throughout large areas of the world. Decades ago Malaria was effectively removed from the southern U.S.A. with intensive mosquito eradication. Today, vast areas of the so-called Third World still struggle with it. Malaria is an acute or chronic disease caused by *sporozoan parasites of the genus Plasmodium* in the red blood cells, and is transmitted from an infected to an uninfected individual by the bite of *anopheline mosquitoes*. Those afflicted have periodic attacks of

chills and fever that coincide with mass destruction of blood cells and the release of toxic substances by the parasite at the end of each reproductive cycle. Malaria is not a universal pestilence, as would be a pandemic influenza. For example, when I was in Lagos, Nigeria the locally dominant mosquito did not carry malaria; but other areas to the east suffered greatly from the bite of another species of mosquito.

Today's best hope against malaria comes from an herbal derivative called **artemisinin**. Chinese wormwood, *Artemisia annua*, has long been used by herbalists to treat malaria.[41] The clinically used form has recently been overprescribed as a single remedy – while at the same time it has been under-prescribed in terms of doses needed for a cure! Widespread abuse of this gift from nature has led to the specter of the world losing its lone "magic bullet" against the worst infectious disease. The World Health Organization was alarmed in January 2006, warning drug companies against improper use of this drug as a stand-alone therapy.[42]

Just as humans undergoing basic training at a Marine boot camp can learn to adapt to harsh conditions, so too can the lowest forms of life adapt. Everything tiny "down there," from parasites, to bacteria, to viruses, can adjust to hostile conditions as long as a few survive our best shot. This is microevolution in all its horror and glory. The survivors are stronger for the ordeal, and they pass on that resistance to their offspring. It's part of the natural order of survival of the fittest – "fittest" being defined as any organism that can best reproduce and survive. If we haughty humans continue to disregard microevolution, we do so at our own peril.

The past as future: When we tally diseases that have jumped from animals to humans, we are also pointing to future alien pestilences. Humans always risk being overrun by new microbes that are ever on the look for food sources.

Over the past twenty-five years thirty-eight new illnesses have burst into the human restaurant.[43] *At that sickening rate – which may be increasing as humans crowd into previously pristine ecosystems, and as global warming allows formerly tropical diseases to expand – we are anticipating nearly 150 new diseases attacking us every century. Add to that sickening number all the new variants of existing diseases we must fight off.*

Without heroic scientists and medical professionals, our future paradise could become a pair of dice.

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V.
Will Vaccines Save Us?

In early August of 2005 the world's news media excitedly announced the arrival of an effective bird flu vaccine.[1] This was great news, or was it?

Using established vaccine construction protocols, Dr. Robert Webster of St. Jude Children's Research Hospital (Memphis, TN) and his colleagues combined key components of the incredibly lethal *Z+ variant of the H5N1 virus* with another benign virus that grows well in eggs. Straight H5N1 virus will kill all incubating chicken eggs, just as it kills infected adult chickens. They used reverse genetics to remove the egg-killing aspect of the H5N1 virus, leaving intact enough to stimulate resistance. The newly designed virus vaccine is not a killer for birds or humans.

That's the good news. And now for the really bad news: What's worse than having no vaccine? Having a vaccine you will never get — or one that, if you get it, hardly works. If there were no vaccine in the pipeline more people might take this threat extremely seriously. Having some number of doses available allows everyday people to procrastinate, believing they will receive an effective shot in the nick of time, and that life will proceed as normal. Delusions kill. We are not talking about a bad case of "the stomach flu."

To date there have been eight million doses of vaccine ordered by our government, over two million of which are going to the military.[2] Tests were conducted to determine who can benefit, and how much they need. Unlike regular annual flu vaccines, which are like customized booster shots, the H5N1 vaccine is primary protection for a body with no antibody reference to this very different variant.

Seniors need a double dose of this "killed" type vaccine administered in two separate injections for a robust immune response to follow. Eight million doses are only good for four million seniors receiving a double dose. Logistics of administering two doses in separate sessions to millions of seniors will slow down the response of public health authorities when the viral tidal wave hits. Factor in the nearly instant societal collapse and widespread panic that WILL occur in a worst case scenario to see the real

obstacles involved in protecting even these *four million* people already sitting in death's waiting room, out of a growing worldwide population of more than *six billion*.

Of course, not all of those shots will be reserved for seniors. In addition to the military personnel who will get a quarter of them up front, there is a priority list for first responders, medical professionals, vaccine manufacturers, and others, leaving precious little for the general population in the near term. A couple years from now there might be a lot more vaccine for most Americans and Europeans, especially if immune stimulating adjuvants are included. Even the Australians are gearing up to make influenza vaccine for Americans.[3]

The catch is: By that time the virus makes its fateful mutation it may have changed so much that today's vaccine will be worthless, or virtually worthless. Dr. Webster himself, who has tried to outwit viruses for fifty years, was quoted on CNN as follows: "I think the vaccine would give you partial protection. It would probably protect you from death," Webster speculated. "You would probably get very sick but not die."[4] So, if you are one of the lucky few recipients of the vaccine that our government is gathering in small quantities, you should get VERY sick, but not die. Comforting thought. As they say in Texas, this beats a poke in the eye with a sharp stick.

In March of 2006 the federal government essentially admitted that the original vaccine made from a 2004 strain of H5N1 from Vietnam is sub-optimal, since mutating virus is a moving target. Secretary of HHS Mike Leavitt said the government is ordering a second H5N1 vaccine from a different strain.[5] This news is semi-good, because the next formula might be more effective, if you receive any. The question of timely and adequate supply is still unanswered.

Remember the production farce of 2004 for ordinary flu vaccine? The same companies producing, or not producing, regular flu vaccine were assigned the task of producing bird flu vaccine, starting after they finished producing 2005's batch of regular vaccine. In 2004 Chiron's British plant was shut down for sanitation reasons. In 2005 Chiron's German plant was shut down for sanitation reasons. What will happen in 2006 and 2007? A bad track record points to an uncertain future. Let's not forget that we are literally placing all our eggs into one basket, a basket of chicken eggs. The very producers of eggs for the medium in which we grow our vaccine are themselves killed at a 100% rate by the wild virus that has swept around

the world, and which likely will be brought by wild birds to North America in 2006. Now that's real security.

Assuming civilization has a decade to prepare, it would be possible for enough potent bird flu vaccine to be produced worldwide with new technology to save untold millions of lives. We assume in this happier scenario that the virus doesn't mutate so much that stored vaccine has minimal or no protective effect against a first wave. Even a futuristic production technology couldn't produce enough for a surprise first wave, but it could be ramped up fast enough to help stop a second wave, and prevent a third wave.

If the virus progressively adapts to our species in 2006, there will be virtually no vaccine for anybody outside the key groups identified by government who are unable to pay black market prices. Given enough time, production could be ramped up with current technology over the next three years to check, but not checkmate, the unseen assassin. Regrettably, what is possible is not likely.

Recall how Dr. Fleming serendipitously discovered **penicillin** *in 1928* – but even at the start of WWII drug companies were reluctant to invest heavily in anything they did not patent. It was left to the wartime Rockefeller Foundation to persuade a few drug companies to help discover how to make volume production practical, assisted by a legal blanket of protection from liability given to them by the eager WWII government.[6]

Only in 1943 was a way found to produce cheap and potent penicillin, and not by the drug company laboratories. An obscure research office of the U. S. Dept. of Agriculture, in Peoria, Illinois, did that.[7] Happily, penicillin was there for the D-Day troops. *Only in 1945* was penicillin sufficiently plentiful to be made available to the general public.[8] *Alas, by 1952* ordinary *Staphylococcus* bacteria already were adapting to original penicillin.

Both viruses and bacteria learn to adapt to new challenges from antivirals and antibiotics. Influenza viruses are more nimble, but given enough time even bacteria can do the same disappearing trick through natural selection, making themselves appear invisible or benign to our defenses.

In today's world there is an emerging threat from several species of drug resistant bacteria, most notably a *staph variant known as* **MRSA**. Only the

very strongest antibiotics still work, such as Vancomycin. How much longer even this antibiotic will work is unknown. There is nothing special about any antibiotic, since super bugs will learn to deal with them all. Currently a cocktail of drugs is thrown against super bugs. We are just buying time without a clear future strategy for defeating super pathogens.

There are precious few new antibiotics in the development pipeline because, unlike with highly profitable drugs for chronic diseases, a cure is a cure – and the patient and his money walk away in a matter of days.[9] *If you were a bean counting drug company executive, would you put your investment millions into a miracle antibiotic that would work only a few years, but save countless lives? Or would you invest your millions of dollars into another patented me-too cholesterol-reducing drug for obese seniors with government insurance, resulting in strong and steady cash flow to your stockholders for decades to come?*

The financial logic against antivirals is the same as that against new antibiotics. In 2003 the global market for all vaccines – from polio to measles to hepatitis to influenza – was just $5.4 billion.[10] *That's less than two percent of the 2003 audited global drug market of $466.3 billion. Indeed,* ***Lipitor*** *(atorvastatin), the leading drug for cholesterol and triglyceride reduction among those who live large at the dinner table, by itself had 2003 sales of $10.3 billion.*[11]

Bruce G. Gellin, coordinator for U.S. pandemic planning as head of the National Vaccine Program Office at the U.S. Department of HHS, put it bluntly: "We really don't see the pandemic itself as a market opportunity."[12]

The stage is set for underwhelming action, when massive action is immediately mandated. If the H5N1 virus looked under the microscope like tiny Osama bin Ladens, the Congress and President would both declare a war on this extremist bug, and adequately fund the war. In the post-Katrina world executive politicians don't want to see their popularity plummet, so they are rapidly scurrying about with nice paper plans and international meetings to deal with the threat. That way, when the disaster develops they can bleat out how much they tried to help.

Consider that the DAILY deaths of Americans during the height of a possible super-flu pandemic, going on in waves for many weeks or months, could exceed five or ten times the total death count of 9/11, or of Pearl Harbor. But we can't point a tank or gun at a virus. Besides, a weird

and invisible microscopic ball with spikes doesn't look so bad in a world seemingly dominated by huge humans and their mighty war machines.

The national governments of the world know how to increase capacity for production of avian flu vaccine, even with the old egg technology. Extra production surge capacity, and storage, could partially protect many millions more of us by late 2007, but they won't spend the money. In America our guardians loudly proclaim how much they are doing to protect us from all types of evildoers, when in fact they are not acting on the huge SCALE needed to protect us against the very smallest of evildoers. Our guardians are also still stumbling four years later against the type of threat that the perverted human 9/11 evildoers generated.[13]

Production in 2005 of bird flu vaccine didn't start until September, after the regular seasonal flu vaccine was produced, and it's not very good.[14] The U.S. government is planning on buying eight million doses of dubious potency. Let's see, that's enough for four million people receiving the required double dose. And what's the total population of the U.S.A.? And what's the population of the world? And how many of those precious doses might be foolishly rushed to alpha areas after the fatal human-to-human mutation has begun, leaving precious little for the sitting ducks in this country? Do the ghoulish math.

More "good news": The anti-flu drug sold as **Relenza** probably works against bird flu. So far, it is the ONLY approved prescription drug that attacks this virus without current resistance, perhaps because it has been so rarely used. This expensive drug must be inhaled, and is not easily stockpiled. It is not a realistic option for most of the world's population. If it were, then the H5N1 virus most likely would quickly develop resistance to it too, leaving us with ZERO prescription drugs for our defense. We lose if we don't use it; and we lose if we do use it.

Let's look more closely at vaccinations, past, present and future:

A. Vaccines from the past

Humans are a curious and adaptable lot, fortunately. *We are the only species with a civilized brain that can go against the forces of microevolution.* We can take much of what is given to us, both good and bad, and change it for our future needs. Among the bad is illness, and for millennia healers have pondered causes and treatments. Earliest and

easiest was simply to attribute illness to fate and divine displeasure. In Western medicine a huge advance on this karmic fatalism was the theory of the four humors, advocated by the great *Hippocrates* (ca. 460-377 B.C.). At least these humors were in a dimension that healers could directly deal with.

Another great step toward understanding was taken by the controversial physician, *Paracelsus* (1493-1541), who radically suggested the cause of illness is outside agents attacking the body. It was only in the 19th century that his ideas were proven by *Pasteur* (1822-1985) and *Koch* (18431910). Dr. *Joseph Lister* (1827-1912) was a pioneer in establishing antiseptic conditions for surgery, a key to how we can partially control the threat of avian influenza without an effective vaccine.[15]

In 1796 Dr. *Edward Jenner* found an effective vaccine for **smallpox**. He noticed that milk maidens didn't get smallpox, but they did contract the fairly benign and apparently related cowpox. He decided to try scratching into a boy's skin a small quantity of liquid from cowpox pustules, and it worked to protect him against smallpox itself. "Vaccination" is the word Dr. Jenner used in 1798 to describe his radical treatment (from the Latin, *vacca*,a cow). Pasteur used it while describing his own theory of immunization against any disease.[16]

Dr. Jenner's elegant discovery was initially met with skepticism. Other doctors were using a self-defeating Turkish method of skin inoculation by smallpox itself, a crude method brought to England in 1721. In that era nobody knew what a bacterium was, much less a virus that can only be seen with an electron microscope. Two hundred years passed before viral smallpox was eradicated from the world, two hundred years after the vaccine cure was found.

It helped that smallpox has been found exclusively among humans, so there are no replenishing animal reservoirs such as with avian influenza. It also helps that natural smallpox does not wildly mutate. Nevertheless, it would today be possible for rabidly anarchistic bioterrorists to re-engineer the smallpox virus as something even worse, and then release it back into the world as a new threat. Today's prime psycho candidates don't have the technology to do it; but the world's military-supported scientists do, and maybe already have some on hand. If so, then all it would take is for some of that evil brew to be stolen and released. I have visions of Walt Disney's sorcerer's apprentice; but smallpox is not a Mickey Mouse threat.

Even laboratory accidents happen. The 1997 re-emergence of H1N1, which had been absent from humanity since 1957, caused a worldwide epidemic, but not so much among those who had been alive twenty years earlier. Because only young people were affected, this so-called Russian Flu outbreak is not classified as a pandemic. H1N1 strains collected in 1957 and 1997 were nearly identical, both antigenically and genetically, which is most suspicious for a virus that mutates so often.[17]

B. Swine Flu in 1976, and H5N1 Bird Flu in 2006

In January 1976 an event occurred that politically affects us in 2006. Private David Lewis staggered through a forced march during basic training at Fort Dix. He soon died of swine flu. Although no other soldiers at the fort died, *President Ford* bravely summoned all resources to fight what he and CDC scientists feared was the next Spanish Flu. The secretary of HEW declared: "The projections are that this virus will kill one million Americans in 1976." President Ford went on national TV and said: "I am asking Congress to appropriate $135 million, prior to the April recess, for the production of sufficient vaccine to inoculate every man, woman, and child in the United States."[18]

In 1976 President Ford was determined to look presidential. He had become president only after Nixon was driven from the Oval Office. There were jokes about him playing football without a helmet. He nevertheless acted from bad scientific advice, setting up a chain of events that stains the much more rational defense against H5N1 today.

On March 11, 1918 one private came down with the real Spanish Flu before breakfast. By noon that day the camp's hospital had dealt with over 100 ill soldiers. By week's end the number jumped to five hundred at the camp.[19] Here's how a real pandemic starts, not with one isolated case of a poorly human-adapted virus that does not spread.

President Ford's quick request for money to make vaccine did get action from Congress. There were many more domestic vaccine manufacturers in 1976 than now, with much more surge capability. Eventually large numbers of Americans got vaccinated, but not people around the world. A few recipients later developed the nerve disease *Guillain-Barre syndrome*, most likely from endotoxins in the vaccine itself, and the government ended up paying claimants around $90 million. More significantly, Congress needed to be persuaded to indemnify the several vaccine makers from liability, to get production started without delay. The

head of the CDC was sacked, and President Ford did not boost his popularity with Congress and the nation.

I personally think that *Gerald Ford was a great but tragic hero in that moment*, because he at least acted boldly and without delay, which is more than our timid legislators have been willing to do thereafter. Likewise, I applaud President Bush for his proposed $7.1 billion multi-year program, issued in November 2005 under the Homeland Security Council – even if it is belated, bureaucratic, and likely wasting much money on some ineffective medicines.[20] At least the current president is being guided by better science, and prodded by a much greater and real emerging threat.

Even with a more robust national vaccine production capacity, President Ford's swine flu vaccine arrived too slowly to stop the first phase of a real pandemic, if it had started with that one unlucky soldier. We got lucky as a nation in that sense.

President Bush's $7.1 billion multi-year prescription realizes that the nation cannot be immediately and fully protected, so his plan is multifaceted and looks to the next decade for science to finally catch up with the nimble influenza virus, while doing the best we can in the near term.

C. Adjuvants

Adjuvants are a wild card in the fight against pathogens. They are *substances added to vaccines that potentize them*, allowing more vaccinations to come from a smaller quantity of vaccine serum. As with most things, adjuvants and other vaccine additives are not a black and white issue.

Over eighty years ago an experimenter mixed tapioca with inactivated tetanus toxin, and found that it served as a more effective vaccine than did the toxin itself. Several years later, aluminum salts, or alum, were tried with inactivated tetanus toxin, increasing its potency. Today, alum is still the only approved adjuvant in America, even though there are others of high potency approved in Europe.

Vaccines contain a number of substances that can be divided into the following three groups:[21]

(1) Micro-organisms, either bacteria or viruses. These are whole-cell proteins, or just broken-cell protein envelopes, and are called antigens.

(2) Adjuvants.

(3) Chemical substances which act as preservatives and tissue fixatives, to halt any further chemical reactions and putrefaction (decomposition or multiplication) of the live or attenuated (or killed) biological constituents of the vaccine.

All these constituents of vaccines are toxic, and their toxicity may vary, as a rule, from one batch of vaccine to another.

The chemical nature of adjuvants, their mode of action and their reactions are highly variable. Some of the side effects can be ascribed to an unintentional stimulation of different mechanisms of the immune system, whereas others may reflect general adverse pharmacological reactions.[22]

Old-fashioned vaccines that used weakened pathogens did not generally need adjuvants to stimulate the desired immunity. Newer vaccines that use killed pathogens, or genetic fragments, are much more likely to require an adjuvant to optimize immune response. The Webster vaccine falls into this newer fragmented group.

Only in 2004 was it finally understood how adjuvants work. Alum provokes a previously unrecognized group of immune-system cells to secrete the protein interleukin-4, which primes B cells for a better response to the vaccine.[23] Another idea is that alum salts stick to the vaccine antigens, allowing more opportunity for our targeted antibodies to develop.

Today's challenge is to find a way to stretch the pathetically limited production capabilities of the vaccine industry to better meet the surge in demand from a pandemic. In the near term the goal is not to vaccinate everybody, but at least to vaccinate many more people, including the key people responsible for holding together society's fabric. Alum enhanced influenza vaccine might provide a bonus, but not for a couple of years. H5N1 has shown that large amounts of serum are needed to provide protection; but the purpose for using alum is to use much smaller amounts of serum. Research is ongoing, but this modest extra supply of vaccine won't begin to be ready until late 2006, or later.

A significant summary article in the February 12, 2006 edition of the

Washington Post examined the status of adjuvant research for H5N1.[24] As a baseline, the first study completed of an H5N1 vaccine with an alum adjuvant revealed little benefit. An even more recent report appeared in the May 11, 2006 early online edition of *The Lancet*. As reported in *WebMD,*[25] the human safety study of Sanofi Pasteur's experimental flu vaccine showed that alum, the only adjuvant approved for human use, only slightly improves vaccine efficiency. At high doses, given twice, immune response improved from 52% to 67%. However, the alum did not boost response at lower doses, which is the real hope for adjuvants. More advanced adjuvants exist, including the patented Chiron shark-liver oil MF59. Really advanced adjuvant technology would place antigen elements into microscopic envelopes to act as artificial viruses. Using *whole-killed vaccines* with adjuvants has proved to be better than *fragmented vaccines*; but vaccine manufacturers know that whole-killed vaccines are more painful, and they would need to alter their manufacturing methods.

Even toxic *E. coli* was tried, but pulled from research after subjects got higher rates of Bell's palsy facial paralysis. In the rush to have a super vaccine ready for today's super virus, we need to remember the several hundred victims of Guillain-Barre syndrome that followed the rush to produce a vaccine against the swine flu.[26] Another way of using *E. coli* shows more promise, but has not been tested with influenza viruses. *E. coli* are placed into a skin patch that is applied over a vaccination site, rather than applying the usual bandage. This method could localize the irritating bacteria, activating skin immunity both to the bacteria and to the vaccine, which should benefit the entire body.[27]

Even in an ideal adjuvant scenario, we are looking at two years to identify and start production of a synergistic match that would matter. When I say "matter" I am pointing back at the lower number of people who would be helped without an adjuvant – not pointing forward at the billions who still would never see anything remotely resembling an effective vaccine, even with an adjuvant. It's numbers, pure and simple. In the eternal battle against killer viruses there is still no short cut to a global panacea that is free of potential consequences.

In any adjuvant scenario, there will remain core liability and compensation issues that must be addressed by Congress before the big pharmaceutical companies will do whatever they can, as fast as they can: Do world governments give the manufacturers full immunity, or partial immunity? Do we reimburse the unintended victims of toxins in the

serum? If so, who reimburses victims, and for how much? Will reimbursements come from general taxes, or will they be attached by anticipation to the cost of each vaccination? These and other questions must be clearly resolved before there is any serious increase in vaccine production.[28] The manufacturers are properly terrified of lawyers and angry juries. We the recipients of serum also must feel OK about what's in the shots.

Vaccines with live, but weakened, pathogens work best to stimulate immune response, even without adjuvants. However, here are questions both in production and public acceptance. This looks at first like a good idea; but it won't change the big picture, because of delivery issues, and especially because this new/old technology also uses the same chicken egg production technology.[29]

Another reason for not looking for salvation in weakened live virus vaccines is the perverse possibility that elements of the weakened pandemic strain may be able to combine with another influenza virus from seasonal flu inside a human, leading to the creation of a new monster pandemic strain.

D. Future Vaccines

Twenty-first century biotechnology can compress research that used to take decades, if it could be done at all, into years. Nevertheless, we are still talking about a few more years before everybody in America has timely and affordable access to the latest and greatest, even if exciting ideas and laboratory experiments are already underway.

In today's pre-pandemic world there are a tiny number of antiviral "haves," and a vast number of vulnerable "have nots," including most of us in America. Hopefully, in several years emerging technology will greatly expand the number of "haves" to include even most of the so-called Third World.

In the very near term – meaning from now until the end of 2007 – there is little more that can normally be done on a macro scale than is already being done. At best, more focused energy on the part of governments and giant pharmaceutical companies can save more lives, but not affect the overall impact of a global pandemic.

Whether or not a pandemic occurs within the next few years, research will

proceed independently. Ironically, the early appearance of a pandemic bug would accelerate academic research, because a clear menace will be here to examine in real time. Currently, scientists are examining viral strains from the past to present, especially the 2004 Vietnam killer, which will not be THE pandemic strain. Researchers are also dealing in what-if scenarios with a host of sub-micron-sized candidates, any one of which could shape shift and become the next killer.

The protective response from today's vaccines comes from viral **hemagglutinin (HA)** and **neuraminidase (NA)** antigens. The idea is to grow enough antigens in eleven-week-old fertilized eggs from chickens, and then purify and distribute the serum in a timely fashion. Timely is the key word, because the first and possibly the second waves of an influenza pandemic will have ravaged our species before these old school vaccines are ready even in limited quantity.

The ultimate goal is to find a way to (1) identify the viral target, and (2) produce enough effective serum, (3) soon enough, to (4) stop the pandemic with enough surge capacity for everybody in the world who needs vaccine. Time aside, today's old technology could do all this, if enough additional plants were brought on line, and if egg-laying chickens were isolated from infection.

Regarding the seasonal flu, we have just enough time to guess ahead one year as to what will likely hit us. With the seasonal flu perfection doesn't matter as much, since we are dealing with variants of viruses our species has already experienced. Even if the mix is less than a perfect match, the seasonal flu vaccine usually helps somewhat anyway.

The 2005-2006 seasonal flu vaccine was overall a very good match for the majority of Influenza A infections. That led to a milder than normal flu season. For many Americans it was almost as if the flu took a year off. If we don't even have to worry about seasonal flu, who needs to seriously worry about the hypothetical bird flu? This easy thought is a dangerous thought, tempting one into a dangerous lack of preparation. Dr. Roland Levandowski, of the National Institute of Allergy and Infectious Diseases, said in April 2006: "I hope people would not judge what might be coming in the future based on what's happened this year."[30]

Regarding avian H5N1, success against this fast-moving, fast-morphing mega-killer is all about the speed and quality of our response. We need to fight fire with fire, not fire with slowly rubbing two sticks together.

One of the near-future technologies that could somewhat shorten the time between emerging threat and need involves bypassing chicken eggs completely. **Cell-culture manufacturing technology** is described in the *HHS Pandemic Influenza Plan* as follows:

"In this system, viruses are grown in closed systems such as bioreactors containing a large number of cells in growth media rather than eggs. The surge capacity afforded by cell-based technology is insensitive to seasons and can be adjusted to vaccine demand, as capacity can be increased or decreased by the number of bioreactors or the volume used within a bioreactor."[31]

Both Chiron[32] and Sanofi-Aventis[33] have received contracts from our government to proceed with cell-based research. Sanofi-Aventis' press release referenced herein also says:
"sanofi pasteur will deliver to the HHS a feasibility plan for the construction of a U.S.-based and licensed cell-culture production plant for supplying up to 300 million monovalent influenza vaccine doses annually. This would add substantial capacity in the event of a pandemic. The HHS contract does not encompass the actual construction of the facility."

It's good to crawl before we walk; but how soon do we run after the super-influenza? Both of these leaders in antiviral production are just testing their technology, with no actual production imminent. Even the proposed production plant has not been funded, much less built. There will need to be built about twenty such plants to cover the world. If one hasn't been funded, which governments will fund the others?

Finally, it is true that even cell-based technology won't be that much faster into the field than today's technology, allowing a fast-moving killer time to slay tens of millions ahead of the troops. Nevertheless, this next stage of technology is an advance over what we have in place today, and an opportunity to scale up production worldwide without relying on the very birds this virus can kill.

In the period of time beyond five years a truly radical improvement will be made over what we have now: **plasmid DNA vaccines**. Instead of relying on either weakened or killed whole antigens, the new technology will rely on DNA instructions for our bodies to build antigens. This technology promises custom vaccines quickly and affordably produced for all the world's people.

Gareth Forde, writing in 2005 for *Nature Biotechnology*, summarized the promise:[34]

"In a typical DNA vaccination protocol, an individual is not given the protein antigen, but DNA encoding the antigen. The DNA segment that encodes the protein antigen is incorporated into plasmid DNA that may be administered in the same way as conventional vaccines. The plasmid is taken up by the relevant cell types (usually dendritic cells in skin or muscle), where it is capable of replicating independently of chromosomal DNA and can transcribe the gene encoding the antigen of interest."

It's not all pie-in-the-sky either. More like bird-in-the-sky. Already a plasmid DNA vaccine has been produced that saved the last 200 California condors from extinction by the West Nile Virus.[35] Not one of them has died from West Nile, the immune response has been excellent, and the side effects of this unique treatment have been undetectable.[36] I wonder what protection we'll have ready for these "saved" condors when the bird flu makes its way into America.

The thing that makes DNA vaccines so exciting is their timely production, reducing today's four to nine months lag down to just one month. Also, no living chicken eggs are involved.

Regular vaccines have been around since possibly as early as the 10th century in China. DNA technology was only demonstrated fifteen years ago, and has never been used in a human vaccine. This novelty has put regulators into an extreme caution mode. There are other reasons they are cautious, not wanting to put application ahead of science.

One of the ongoing research areas is the poor translation from mouse models, where DNA vaccines that produce strong immune responses in mice don't do as well in primates. Another concern is the possibility that DNA vaccines could stimulate antibodies not to their encoded antigens, but to the double-stranded DNA molecules themselves, creating autoimmune diseases.

There are even more concerns delaying development, but most concerns are clear, and the way past them seems clear. Still, it will take years – time that we in the here and now may not have.
Bottom line: Survive long enough to enjoy plasmid DNA vaccines after 2010.

Then again, maybe just survive until 2008…

Has the Perfect Vaccine Been Discovered?

In January of 2006, clever scientists at the University of Pittsburg, *not*

researchers in any pharmaceutical company, announced that they had devised a vaccine that stopped H5N1 both in chickens and in mice. Eventual production would not require using chicken eggs. Genetic analysis of the antigen and assembly of the vaccine takes about one month, not the current several months.

Their discovery may be an answer to our prayers! But is it THE answer? If the mutating H5N1 politely holds off until about 2008, then **the Pittsburg vaccine** may be ready to save us. This is two years closer to a viral prophylactic than with unproven DNA vaccines. Nevertheless, if bird flu becomes "too friendly" with us humans late in 2006, or even into 2007, we are all in for big trouble. Right now, the Pittsburg technology is at the Petri-dish stage, and no drug company is lined up to make it.

Let's look first at the abstract of the February 2006 journal article:[37] A version of the common adenovirus was the starting point, then researchers added key elements of H5N1 from the lethal 2004 strain in Vietnam. In their words:

"We expressed different portions of HA from a recombinant replication-incompetent adenoviral vector, achieving vaccine production within 36 days of acquiring the virus sequence. BALB/c mice were immunized with a prime-boost vaccine and exposed to a lethal intranasal dose of VN/1203/04 H5N1 virus 70 days later. Vaccination induced both HA-specific antibodies and cellular immunity likely to provide heterotypic immunity. Mice vaccinated with full-length HA were fully protected from challenge with VN/1203/04."

Helping achieve that perfect score was the perfect match between what the vaccine was made of, and what actually challenged the mice and chickens. I'm excited about the "fully protected" phrase used for the mice, but not too happy with scientists waiting for 70 days after primary and booster vaccination before the mice were challenged. Seventy days is enough time for an entire wave of pandemic to circle the globe. But here we are talking about basic research, not production. The good news is that they were able to start laboratory production within 36 days of acquiring the virus sequence.

The abstract continues:

"A single subcutaneous immunization completely protected chickens from an intranasal challenge 21 days later with VN/1203/04, which proved lethal to all control-vaccinated chickens within 2 days. These data indicate that the rapid production and subsequent administration of recombinant adenovirus-based vaccines to both birds and high-risk individuals in the face of an outbreak may serve to control

the pandemic spread of lethal avian influenza."

Could vaccinating all domestic poultry in the world stop the wild bird link to humans? It could work, except that you need to come up with a $1 vaccine for chickens, not a $10 vaccine – and you need to ensure that all vaccines in the field are genuine and of high quality, a situation that appears not to be the case in China.[38] Vaccinating some chickens, even billions of them, will not necessarily eliminate the multiple variations of H5N1 that are already out there, soon to be nearly everywhere. Just because a chicken is vaccinated, that is no guarantee that an asymptomatic chicken won't pass on viruses anyway.[39] Also, pigs are ideal influenza mixing bowls, and nobody is vaccinating them.

Another and obvious point: After vaccinating hundreds of millions of chickens, most get eaten. This necessitates additional rounds of vaccinations for domestic poultry, because H5N1 will not disappear from wild birds.

At the end of the report on this vaccination discovery is a sobering reality check:[40]

"Dr. David S. Fedson, a former adviser to several international vaccine advisory committees, said that even if the vaccine worked for humans, production would remain a limiting factor.

'These things are fast to do if you are in laboratory and you grow it in a petri dish — but to commercialize is a different story. It takes years,' he said. 'Like so much interesting biology, it will be difficult to get this new technology established in the market place.'"

Market place? *There is no vaccine market place.* The entire vaccine industry is entangled like a plate full of spaghetti with issues of legality, profitability, technology, cultural politics, religion, and a host of other negative intangibles. Global vaccine manufacturing is only half as big as Lipitor alone. Because of the politics of vaccines there is no HIV vaccine, so that 25 million have already perished, and another 40 million so far are waiting to die an early death. Even though a worst-case avian influenza pandemic could quickly slaughter a quarter of a billion people globally, there is no urgency in the "market place."

Here is a slightly more hopeful status report from WebMD:[41] Human safety tests are poised to start in four to six months. However, even though testing will start in 2006, Dr. John Treanor, of the Univ. of Rochester,

cautions:

"This is not going to have as big an effect on the time to make a vaccine as you might think," he says. "It is generating the [ingredients needed to produce vaccine], it is the processing time, it is the putting-things-in-vials time, and all the other steps involved in making a vaccine," he says. "Growing a virus is one thing, but not the only thing. A process like this where you clone the gene into something would be faster. You shave time off the growth of the product, but there are other components that would still pose a time barrier."

If the Pittsburg vaccine technology proves both safe and effective in humans – and if the H5N1 virus politely avoids humans until late 2007, or 2008 – there may indeed be an excellent vaccine for doctors to give to their patients, as long as timid pharmaceutical companies actually make enough of it to save the world.

Taking off the rose-colored glasses, if the new Pittsburg vaccine technology is not made ready and widely soon, then the recent and sober comments of Robert Webster should be taken to heart.[42] He created the first H5N1 vaccine available in America. Doctor Webster was interviewed by *ABC News* in March of 2006.

In that interview he scientifically said there is a 50:50 chance that H5N1 will transform itself into a human strain, but that he personally believes it will happen. He is storing a three-month supply of food and water at his home. "Society just can't accept the idea that 50 percent of the population could die. And I think we have to face that possibility," Webster said. "I'm sorry if I'm making people a little frightened, but I feel it's my role."

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VI.
Will Tamiflu Save Us?

OK, if we can't get a "shot," then the drug store surely has something to carry us over, right? Wrong. There is nothing we will be able to buy over the counter or on the black market that will absolutely stop the bird flu. There also is nothing your doctor can prescribe that will absolutely stop the bird flu. Even the recommendations I make in this book will not absolutely stop the bird flu. The goal is not to "beat" this virus, but to avoid or survive it.

Symptomatic relief is fine for ordinary flu and the common cold. Avian flu has shown it can swiftly overwhelm the entire body, even making its way into vital organs and the brain. If the pattern of 1918 repeats, there can be blood pouring from some victims' eyes, ears, nose, and elsewhere. You could be dead long before your body has time to mount an effective defense. Indeed, your body's defenses might even accelerate your demise with an overreaction, leading to a cytokine storm that fills your lungs. How good is a codeine cough suppressant in that case?

Tamiflu (oseltamivir) has been shown to be effective against both the A and B types of flu. This drug recently was tested on mice injected with H5N1. Laboratory mice are mammals genetically much closer to us than birds, and have long been used as animal models to estimate what would happen among humans. The drug was shown to be effective against bird flu, but *how effective?* Here is what the study's abstract itself says:[1]

"Oseltamivir produced a dose-dependent antiviral effect against VN1203/04 in vivo ($P<.01$). The 5-day regimen at 10 mg/kg/day protected 50% of mice; deaths in this treatment group were delayed and indicated the replication of residual virus after the completion of treatment. Eight-day regimens improved oseltamivir efficacy, and dosages of 1 and 10 mg/kg/day significantly reduced virus titers in organs and provided 60% and 80% survival rates, respectively ($P<.05$). Overall, the efficacy of the 5-and 8-day regimens differed significantly (death hazard ratio, 2.658; $P<.01$). The new H5N1 antigenic variant VN1203/04 was more pathogenic in mice than was A/HK/156/97 virus, and a prolonged and higher-dose oseltamivir regimen may be required for the most beneficial antiviral effect."

In plain English, when mice were given the five-day amount of dose that humans are recommended to take, adjusted for body size, only HALF survived! And that's under controlled laboratory conditions with a viral strain still sensitive to the medicine. Going with eight days of treatment, the survival rate went up to 60% and 80%, meaning twenty to forty percent still perished with careful administration of this hyped-by-the-media wonder drug. It is now assumed that a ten-day regimen might have been better for the rodents.

Among the laboratory mice tested there was no adaptive resistance shown by the infecting H5N1 virus to oseltamivir, something that may already be happening among humans out in the real world.[2] There is an inverse relationship between a virus' adapting to a medicine and that medicine's effectiveness, up to the point where it doesn't even help to administer the drug at all.

In China chickens have received an estimated 2.6 billion doses of the affordable and formerly reliable antiviral drug, **amantadine**. Careless and widespread overuse among poultry has led to significant resistance by several highly pathogenic variants of H5N1 to this drug, robbing humans of a potentially helpful medicine.[3]

There is a similar drug, **rimantadine**,[4] like amantadine a derivative of adamantine, which likewise seems to work against the virus M2 ion channel. We don't know how effective, if at all, it will be against a pandemic virus, or for how long.[5] Indications are that, although it was effective against the early 1997 version of H5N1, it is not effective against the 2004 version, suggesting neither rimantadine nor amantadine will help us at all.[6] Certain newly emerged variants of H5N1, as in Turkey, have somewhat responded to amantadine, but for how long?

Despite evidence that rimantadine may not be effective against H5N1, the U.S. government is including it anyway in the Strategic National Stockpile (SNS). As of October 2005, the SNS contained 2.26 million treatment regimens of oseltamivir, 5 million of rimantadine, and 84,000 treatment regimens of **zanamivir (Relenza)**.[7]

The government's March 13, 2006 update for its pandemic flu plan indicates that state and federal governments may have on hand 81 million antiviral courses for lucky recipients by the end of 2008.[8] Certain

optimistic assumptions are built into this scenario, such as state funding, actual product delivery, and product effectiveness. Given this much time, our national defenses should be slightly better.

More supplies of these few antivirals are continually being added to the stockpile, but the total is still far below what any near term demand would be in a pandemic, assuming any of these antivirals helped much. Until total supplies become very plentiful, you and your healthy family will be out of luck under the government's Antiviral Drug Priority Group Recommendations.[9]

In January 2006 the Centers for Disease Control (CDC) went public with their latest findings on the prevalent seasonal flu, H3N2 afflicting large areas of the nation.[10] The formerly reliable, and cheap, amantadine and rimantadine were found to have become 91 percent ineffective against this seasonal strain. Nobody knows exactly how or when this resistance happened. Doctors are now advised to not prescribe either medicine for this strain. These older drugs were effective against the 1997 variant of H5N1, but no longer effective in 2004. So we are left with the more expensive Tamiflu (oseltamivir), and the less common and harder to administer Relenza (zanamivir). These are the best two drugs that have been stockpiled for pandemic flu – stocks of both now being substantially diminished to treat seasonal flu.

Let's assume that Tamiflu will save some human lives. So, how many? There are some four million "duration doses" of Tamiflu in America, or about enough medicine to help two percent of the population for one week. By 2007 there may be enough Tamiflu to protect as many as five percent of the population for one week during the first wave of a pandemic. These numbers will apply as long as the U.S. government doesn't foolishly rush reserve Tamiflu stock overseas to try to quell the alpha outbreak – or deplete stocks to treat seasonal flu, which they are already doing.

Remember the critical difference between a drug and a vaccine: A drug does not by itself give post-administration protection, unlike a vaccine. If you have any lasting benefit from a drug, it is due to your body's own defenses having had time to build up a firewall against future attacks during an infection that occurs when you are being protected by the drug. Pandemics can appear in waves over one or two years. After the small stocks of antivirals are exhausted in the first wave, what will we have left in the official pharmacy for protection thereafter? It looks like some in the

lucky minority could be out of luck when the next viral waves arrive.

Consider too that the ever-adapting bird flu may find ways to more efficiently "get around" Tamiflu's effects by the time it returns a few months later, assuming there is any of this medicine left. Finally, after hospitals and institutions are supplied, how many doses will be made available for the general public outside the inevitable black market? If we send most of our supplies overseas in a failed effort to quarantine this flu shortly after it mutates, there might not be much genuine Tamiflu left even for the very wealthy and their inevitable black market. My guess is that there will be plenty of counterfeit Tamiflu to buy, providing a placebo effect.

It is logical to ask why there isn't more Tamiflu anyway. After all, production isn't restricted by a 1950s chicken egg technology. One of the world's largest pharmaceutical companies, Roche, makes it. So, what's the bottleneck? Actually, there are several bottlenecks, none of which can be instantly resolved. First, the multi-step process of manufacturing Tamiflu takes almost a year (shades of belated chicken egg vaccines), and involves ten stages, including one stage that uses an explosive. Not just any company can set up shop to make this medicine overnight.[11]

There is a second bottleneck of most interesting origin: The primary source for a starting ingredient in Tamiflu is herbal. The plant of origin is the **Chinese star anise (*Illicium verum*)**. The highly toxic Japanese star anise (*Illicium anisatum*) is never used. The Chinese tree fruit is a bountiful source of **shikimic acid**, which is one of the key starting elements for Tamiflu.[12]

This plant is notoriously difficult and slow to cultivate. It only grows in a few areas of Vietnam and China. It only begins to flower after six years. Most of the world's supply of star anise has already been purchased by Roche. Scientists have estimated it would take ten more years to gather enough to produce a quantity of Tamiflu that could treat for about one week a fifth of the world's population.[13] At that rate it would take fifty years to produce enough Tamiflu to treat today's world numbers just one week.

Although star anise has an anise-like flavor, and has been used for colic and rheumatism, it has not been traditionally used in China for treating influenza. (Anise itself is an annual, aromatic Mediterranean plant,

Pimpinella anisum, in the parsley family.) Within some Tibetan prescriptions the Chinese star anise is used for this purpose.[14] Tamiflu is not just concentrated Chinese star anise, having long lost its natural traits after so many manufacturing steps; but it is interesting and somewhat ironic to note its humble herbal source. Taking Chinese star anise by itself will not protect you from H5N1, nor from any other strain of pandemic flu.

Recently, more available supplies of shikimic acid have been located in the needles of pine, spruce and fir trees. A small Canadian company, Biolyse Pharma Corp., is now processing some discarded trees to retrieve the acid.[15] This new business is fairly good news, if they can produce enough shikimic acid to help globally. The primary bottleneck remains, which is the complexity and long time involved in going from shikimic acid to Tamiflu itself. Still, it's good news finding another source beyond star anise.

Imitation can be a strange form of flattery. If you are an entrepreneur with zero moral scruples lusting for easy profits from the gullible, then you don't care if your imitation is bogus, even possibly harmful. Throw in the law of tight supply with soaring inelastic demand, and it is inevitable that fake "generic" Tamiflu will find its way onto our shores. Already at the end of 2005 the first shipments of placebos have been intercepted by U.S. Customs. The first fake Tamiflu has as its best ingredient vitamin C.[16]

Nature abhors a vacuum. Counterfeit product will continue to fill the growing gap between radically increasing demand for effective bird flu pharmaceuticals, and the scarce supply of what little we do have that works. Ironically, even though authentic Tamiflu is somewhat effective today, sometime in the future it may also become a placebo against pandemic bird flu. At that point it might not matter whether you are taking genuine or fake Tamiflu.

Are you still hoping that Tamiflu will save you, if only you can have some ready for use? When you get sick you could have the regular flu, or some other infection with flu-like symptoms; but you must take your Tamiflu very early in the infection for it to work against the bird flu. Do you risk possibly wasting the scarce medicine on a milder problem, or do you wait to see if more severe complications occur? What do you and your doctor quickly decide when given that puzzle?

Ok, let's assume you are exactly right in your guess, and you even start

your precious Tamiflu therapy at the start of your bird flu infection. Will that set things right?

A highly disturbing report out of Vietnam at the end of 2005 revealed that two girls with bird flu died despite receiving early and aggressive treatment with Tamiflu, and at the recommended doses.[17] Previous reports in October 2005 of resistance involved people who had taken low doses.

Nearly all of the documented victims of H5N1 eventually received intensive hospital care, including Tamiflu. Still, their death rate has been around one in two. What will be the global death rate when all the hospitals are filled, and when medicines and ventilators are not available, with most people left caring for loved ones in their homes?

A Ray of Hope for the Lucky Few

There is a new/old drug that could be rushed into production sometime in 2006 under the government's Emergency Use Authorization (EUA) authority. It is called **peramivir**.[18] Basically, it works against viruses like Tamiflu, but it hasn't been used in the field against viruses, so there is currently no resistance to it. The bad guy bugs will likely find a way to mutate around peramivir too, but not at first.
Peramivir was tested orally in the late 1990s, but found to be poorly bioavailable and expensive. Now a new round of tests is under way, using it in injectable form, bypassing the gut. As long as you can get to a doctor or hospital, and they have some available for you, peramivir might work, and for a great reason: One treatment stays in the system for ten days! (Remember that it takes eight days of continuous Tamiflu treatment to help significantly, if at all.) Again, this medicine has never been tested on H5N1, so we can only guess as to its effectiveness. I suppose that it will work very well initially, at least for those who aren't too sick when treatment begins.

The government hasn't yet ordered any for the national stockpile, but likely will. It can't be worse than some of the dubious pharmaceuticals already ordered. Peramivir's manufacturer, BioCryst Pharmaceuticals, Inc., says they can produce 8 million doses soon, and a half-year later as much as ten million doses per month. That sounds like a great number, but placed against worldwide demand it still isn't that much. Even producing at that rate, we are talking about the end of 2008 before there will be enough to treat a population of ill people on this planet equal to the population of America.

Peramivir will be especially valuable for ill people who cannot take oral medications, and it appears to have a fast onset of action. On the other hand, precisely because peramivir cannot be administered orally this medication is only for some of the lucky "haves" in this world with access to modern parenteral drug administration technology.

The AWOL Life Saving Discovery

There is yet another exciting drug maybe in development, truly awesome in its potential for stopping a gruesome and rapid death. In the 1918 outbreak, and also recently in Vietnam and China, many victims have directly succumbed to the virus as a result of their body's overreaction to the invading army. The resultant "cytokine storm" saw T-cells clogging up the very breathing passages they were trying to defend. Many pandemic influenza victims in 1918 died in one day from bleeding and sheer inability to breathe.

In 2003 British scientists found a modified protein that can stop cytokine storms. A study carried out by researchers from Imperial College London, and published in the *Journal of Experimental Medicine,*[19] developed a way of stopping cytokine storms during infection, by reducing the response of active T white blood cells by one third. *The key thing they did – unlike other drugs that depress the immune system, leaving the body unable to attack the virus – was to inhibit signaling signals called OX40.*

OX40 sends out a survival message telling T cells to remain in the lungs to fight the infection. But too much of a good thing can be a bad thing. The cure becomes worse than the disease. The researchers were able to inhibit, or down-regulate, this signal with a fusion protein called OX40:Ig. This protein, which was supplied by the pharmaceutical company Xenova Research,[20] *allowed T cells to vacate the lungs of test subjects earlier without stopping an adequate immune response. Six days after infection with flu, the subjects treated with OX40:Ig were indistinguishable from uninfected controls!*

Sounds GREAT, right? Wrong. The subjects were mice. Months and possibly years of required testing with other animals and humans would be needed. A patented wonder drug from this discovery could have been in development, and possibly even ready for us humans about now. It is three years later. Where is this drug?

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VII.
Every Disease Has a Context

All of us eventually die. That's a fact nobody sane disputes, at least as far as our physical bodies are concerned. Thus, the real question is not if, but when and how we physically die. Ideally, we would prefer to arrange the exact time and terms of our own passing away. Few do.

Many societies and religions are quite fatalistic. Our lives are in the hands of God, it is believed, and only He knows when and how we will die. If that were really so, then we all could tempt fate every day, knowing that statistically most people live a long life. I am thinking of Bill Murray's odd weatherman character in *Groundhog Day.*[1] Because of his grumpy karma he was sentenced to repeat the past day for many cycles. Murray's character would always wake up the next morning as he did the last morning. So, he tried creative ways to kill himself, all to no avail. As for me, I freely choose to live *as if* I were only generally influenced by "fate," not micro-managed by string-pulling deities, or by Fates with occult motives.

With reference to any microbial infection, we are simply flesh and blood. Robots and regular machines cannot catch the flu. Machines break, but their parts can be replaced. Humans are more wholes than assemblages of parts. When we break, especially from systemic infections, it is not always possible to insert a working part. The human body is a whole system within the greater ecosystem of systems.

Interestingly, *viruses become systems within the systems of our cells. Every system has its feedback logic, the key to its existence and maintenance. The formula for a long and healthy human life includes understanding systems both larger and smaller than our selves. The key to managing viruses involves understanding how their systems relate to our cellular systems.*

We also need to humble ourselves enough to admit that viruses and bacteria have been around for hundreds of millions of years longer than we have. Tiny microbes are really the big winners in evolution. Humans are a single species briefly passing through this biosphere. Microbes hold us no malice. They are just looking for nutrient soups that will provide them with energy to thrive and multiply. We cannot kill them all off. We can at best only manage those microbes intersecting our lives. By intelligently managing our external and internal ecosystems, we can thereby contain or manage most viral threats.

Denial and Diminishment

I am forever fascinated by the power of human **denial**. Denial is not a river in Africa. It is our primary way of not dealing with threats in their proper context. We hope that denying something bad will give it time to go away on its own. Denial can be great strategy when it works, and disastrous when it doesn't.

A close cousin of denial is **diminishment***.* If it's absurd to deny with a straight face something that's in our face, then diminishment works almost as well. Many people diminished in their minds the potential dangers of Hurricane Katrina, to their peril. Some people diminish the real flu by comparing it to so-called stomach flu.

Most potential victims of bird flu will be just as unwilling from denial or ignorance to prepare for weeks and months in advance to fight for their lives. Yes, their unprepared bodies will put up a heroic fight, successful or not, when finally attacked by swarms of pathogens. The outcome of each life-or-death struggle will have less to do with Fate than with our fateful choices, as individuals and societies, months or years in advance.

The greatest clichŽ is, "an ounce of prevention is worth a pound of cure." Few people are willing to proactively invest in that "ounce" now to avoid the "pound" later. Coach Bobby Knight said: "Most people have the will to win, few have the will to prepare to win."[2] Speaking as a licensed life insurance agent who has talked with hundreds of people about their future risk potential, I know the smell of irrational rationalism. Even our nation's federal budget is increasingly built on psychedelic denial and diminishment.

A Gresham's Law of Politics would say, "bad politicians drive out good politicians." Do they really? We good citizens repeatedly vote back into

power the bad politicians who tell us perfumed lies about what they have done to protect us. Where does the buck really stop?

The best attitude we ordinary citizens can have when faced with a bird flu type of threat is a trained military mentality.
(That is not the same as calling in the military. The guns of our military are worthless against a microscopic adversary.) In the military, professional soldiers train well in advance for all expected eventualities. When the battle is on, soldiers rely on their knowledge training, utilizing resources at hand for maximum effectiveness. They do not panic. They think in terms of making it from one individual goal to the next, staying focused on the here and now, and staying rational and objective. This focused strategy helps more soldiers survive. The same trained military mentality is necessary for our civilian society to survive, facing up to several million almost random deaths. Guilty pleasures of denial and procrastination provide no comfort in the heat of battle, and can hasten our demise. Panic can kill our loved ones. It's that simple.

You and I, as long as we enjoy being self-indulgent, are the real reason why the medical profession works inefficiently.
We are unwilling to give up our cigarettes, booze, fatty junk food, stressful workplace activities, and a host of other bad habits. We are unwilling to get enough exercise, sleep enough hours, practice safe sex, drive safely, and show enough kindness to pure strangers. At the same time, we demand expensive, high-tech health care, including the latest drugs – preferably paid for by somebody else.

As long as somebody else (our employer, our government) apparently pays for our expensive medical care today, who cares? Eventually, the medical debt we accumulate today must be paid. Right now, it looks like the survivors among our children and grandchildren will be stuck with our bills. The great investing American economy is morphing into a giant credit card. By 2005 we were spending more than we were investing. This hasn't happened for a full year since 1933.[3]

I can't make a lifestyle choice for you. Whether or not you agree with all the ideas in this book, you still need to decide where you stand. Will you move more toward taking care of your own future, or will you continue to be passive and fatalistic? Time could be of the essence. How much more time do your loved ones have before viral wolves appear?

A CNN/USA Today/Gallup Poll conducted in December of 2005 asked 500 people across America this question: "Which comes closest to your view about the bird flu virus? It will not strike the United States at all. There will be a minor outbreak in the United States. There will be a major outbreak in the United States, but it will not create a crisis. Or, It will strike the United States and create a crisis."[4]
14% said it would not strike the U.S. at all. They are the uninformed ones in blissful denial.
63% said it would be a minor outbreak. They are the under-informed diminishers. They see the currently few numbers of direct bird flu victims, and project likewise when migratory birds bring it to America.
13% said it would be a major outbreak, and 8% said it would be a crisis. They are the scientific realists, or maybe just news junkies.
Only 2% were unsure, an amazingly low percentage for such a complex question.

Time and Opportunity

How many people really believe in germs? Intellectually, most do. Viscerally, most people only believe in what they can see or sense. I once worked as a water pollution control planner. It is known that consumers would choose mildly polluted water that is clear and tasteless, over sanitary hard water with some iron flavor and staining residue.

As previously mentioned, during the ghastly American civil war more soldiers died from wounds that became infected, than directly from the bullets themselves.[5] Surgeons with blood on their hands did not understand the need for sanitation, a concept that Dr. Joseph Lister promoted just after the civil war. Dirty tools, dirty sponges, and dirty hands all were used. Sanitation between surgeries was rinsing bloody instruments in cold water. It was not until the mid-1870s that antiseptic medicine became the norm. That's about thirty-five years after Edward Jenner's idea of vaccination belatedly became the legal norm in England.[6]

Even in the modern era it is easy to imagine disease as being "dis-ease," literally, being not at ease. It is easy to think of evil humors, of astrological tendencies, of divine disfavor, of karma, of voodoo spells, of witches, or any other fanciful reason beyond those unseen viruses. Without disease and death most religions would have less appeal. Without suffering, the release to Heaven we expect is less joyful. It is death itself that allows for the promise of eternal life in the hereafter. Without death

we would live forever, meaning that any day would be an infinitesimal part of the whole, and for practical purposes meaningless. Both birth and death give our days from womb to tomb their meaning.

It will be easy to blame Big Pharma for not producing enough vaccine. They can't/won't even produce enough regular flu vaccine. However, *Big Pharma alone is not ultimately to blame.* Look at the first $253 million jury award against the Merck analgesic, VIOXX.[7] There are many additional lawsuits against Merck for this one drug. Litigation, actual and potential, does not encourage stock investors – nor does it encourage drug manufacturers to experiment and innovate, especially in areas that represent a minority of their activities, and yield a minority of their profits. It's much easier, and much more profitable, to come out with another me-too blood pressure reducer, or something for erectile dysfunction.

Flu vaccines with dead viral particles carry some risk. Flu vaccines with disabled, but live, viruses carry greater risk. Any bird flu vaccine sufficiently potent to nearly protect us may carry a lot more legal risk. No bird flu vaccine can totally protect all of its recipients from such a lethal disease. In the global theater there are risks associated with batch contamination, allergies, storage, transportation, and mass administration of doses. Because there are many potential avenues for losing huge lawsuits, Big Pharma is absolutely unwilling to step forward alone and legally naked in today's climate.

Current vaccine manufacturers with their limited production capabilities will produce what they can. However, this rich country, and indeed the world, needs many more production facilities built within the next twelve months, if the will can produce the way. Yes, after the killer virus has learned how to jump from human to human there will be a great cry for vaccines; but by then it will be much too late. Today's vaccine producing technology will be too slow for the first wave of death, but with sufficient standby surge capacity enough vaccine could be produced to save untold millions around the world during recurring waves after the first six months. Yes, a targeted vaccine will be produced when the real virus steps forward; but few on this planet will benefit.

Time lost is opportunity lost. We have had and wasted a ten-year warning for this killer virus. It is imperative that vaccine manufacturers be protected against lawsuits, and equally imperative to also guarantee production of bird flu vaccine on a massive scale. Vaccine is fairly

perishable. Furthermore, flu viruses can mutate rapidly to weaken the powers of existing vaccine stocks. Manufacturers will also need to be shielded against losing billions of dollars from unused doses, if we get lucky this time around. Let's pray that we get lucky and waste a lot of money manufacturing vaccine that won't be needed. Praying for luck is about all we have left.

Before 9/11 nobody expected THAT to happen. We didn't see it coming. If we had, we would have acted appropriately to prevent the terror. In 2006 science actually knows what is to come, just not exactly when and in what form it will appear. This is the first time in human history that we can see a pandemic unfolding. Given the history of previous pandemics and plagues, we have a good idea of the quasi-nuclear havoc that could ensue. Still, nobody in power is stepping forward to fund the necessary program. The cost of building more production capacity to protect hundreds of millions more people from a horrible death is about what the U.S. spends over a week or two on Iraq and Afghanistan.

The murderous psychopaths who attacked thousands of innocent civilians on 9/11 believed they were acting with the will of God, and that they would go to Heaven and enjoy the favors of 72 virgins. Their seventh-century attitude is at the extreme end of a continuum of consciousness that pervades most of human society. We humans generally believe our actions are somehow sanctioned, if not guided, by divinity.

I hold that any omniscient divinity would want his special creatures to act with his creative spirit, literally acting "in the image of God."[8] *Such enlightened actions would involve rationally responding to every challenge we encounter as creatures of wisdom and compassion. Wisdom means we will approach the threat of bird flu from within our highest capacity as sentient beings in the image of God. We can be inspired in our compassion by the healing ministry of Jesus.*

Even if God were not in the picture, the Platonic ideal of a wise and caring god would still be fully there for us to measure ourselves against. Our values don't all have to come from "up there." We should do our best to embrace the whole picture, not just fragments of the picture. Better vision will lead us to better ways to stay alive and prosper. What's good for our whole community is good for our loved ones.

Wholes and Parts

A recent study of the unintended side effects from taking prescription medicine for heartburn illustrates *the danger of overly compartmentalizing* the symphony of our bodies.[9] Doctors call these effects "iatrogenic". That's a fancy word for the medicine possibly being worse that the disease.

This study of people taking highly advertised, highly profitable, proton pump inhibitors (Prilosec, Prevacid, and Nexium), and H2 blockers (Zantac, Pepcid, and Tagamet), showed greater risk of infection from a potentially dangerous diarrhea bug known as *Clostridium difficile.* Colic from infection is a major problem in nursing homes, where patients are often heavily medicated, and where germs can pass from patient to patient in close proximity.

It is ironic that nature has always had a much more gentle remedy for occasional benign heartburn, and for helping prevent occasional acid reflux. You can even buy it at most grocery store checkouts. However, you will never see it advertised as therapeutic, for legal reasons – nor is it likely that your doctor will prescribe a remedy without millions of dollars of patent-directed research behind it.

That natural aide is none other than herbal **peppermint oil** (*Mentha piperita*) sufficiently present in original peppermint Altoids, which have been in production since 1780. In the nineteenth century these British mints were advertised as relieving intestinal discomfort.[10] You can enjoy Altoids daily for just a few pennies. A bonus from freely eating herbal peppermint is the fresh breath you will enjoy.

My mother's crisis, which I mentioned in this book's preface, did not involve prescription drugs, but she did suffer from a floral imbalance in her intestines. Do the proton pump inhibitors, and to a lesser extent the H2 blockers, help shift the intestinal distribution of species in favor of the "bad" bacteria? My mother's situation involved stomach-tube consumption of sterile food, which means she had no infusion of "good" bacteria to offset the "bad" bacteria we all breathe in and swallow daily. Normalizing her inner environment by adding some "good" bacteria greatly helped, and so should normalizing the inner environment of many suffering from iatrogenic effects of pricy prescription drugs.

There are conditions such as ulcers where these expensive new drugs are indicated, rather than peppermint; so your doctor should be consulted first. It could be cancer, and that's another treatment scenario. After you consult with your doctor, and learn that it's just an ordinary ulcer, why not first give raw cabbage juice a try? That's right, ordinary cabbage in your grocery store just might stop that ulcer in two weeks! It's an old European naturopathic therapy. If it doesn't get rid of your chronic ulcer, you can always go with the high-dollar pills.

Just place into a kitchen blender a chunk of uncooked head cabbage sufficient in size to yield a half glass of raw juice. Strain away the pulp, leaving simple juice. Immediately drink it. Do this three times daily on an empty stomach for a few days. It can't hurt you; it's just ordinary cabbage.

An internist in Santa Fe came to me extremely grateful that I had cured his wife's ulcer with raw cabbage juice after he had for months failed to help her. Alas, that was in the 1980s. With today's advanced medicines, maybe you'll just want to pop some pricy pills instead, especially if somebody else is paying for them.

You may be wondering how antacids are related to the bird flu. Directly, they likely are not related. The important lesson here is that if we insist on compartmentalizing our lives into problem spots and simple therapies, reducing our whole into a machine-like collection of parts, we overlook how we really function as an organic symphony. As we increasingly ignore centuries of naturopathic experience, while lusting for the pill companies' latest, we risk losing the harmonic best of our medical heritage. Like it or not, *we are part of nature, not above nature.*

I believe a *partial* defense against avian influenza can be had from an optimally healthy body. Any time we merely treat local symptoms, generating iatrogenic effects, we leave our whole body less vital, and less able to survive the nearly nuclear attack of a pandemic influenza virus.

The Disease Model

I would like to elaborate on what I mentioned earlier about *the "seed and soil" model of understanding viral disease.*

My essay in early 1981 related to HIV, which produces AIDS. That model

in modified form could also apply to other viruses. I have noticed that parasites of all types look for easy food. Certainly, we see this patterned behavior among the lions of Africa that seek out the old, the sick, and the young in prey herds. I had a late friend who started to attract biting bugs shortly before he was diagnosed with a form of blood cancer. He and I would go for hikes in the forest, and voracious bugs would dive bomb him, while totally ignoring me.

None of this anecdotal evidence proves anything about the flu, but it is coherent and logical. Even influenza viruses need to safely land on "fertile ground" that will give them the energy they need to thrive. A sub-optimal immune system might allow a critical number of viral particles to get past the cellular defenders. Once safely inside our target cells they will multiply, and then burst out in much greater numbers that can overwhelm our defenses. Given enough time, about a week or so, our humoral defenses will start to develop precise antibodies against the viral antigens. The problem with bird flu is that we may be too ill, or dead, before B-cell antibody defenses have had time to save us.

Antivirals such as Tamiflu and even vaccinations do not attempt to totally protect us against infection. *The strategy is to manage the pathogen invasion for long enough to give our own bodies the time we need to precisely identify the pathogen, craft a targeted defense, and produce enough antibodies to survive.* Drugs ideally buy time by interfering with the activities of viruses. Vaccines ideally prepare and accelerate our precise defensive response. With drugs that cannot be taken continuously over a long period of time, the challenge is to time their administration within a very narrow window for immunity to build. With potent vaccines, timing is not an issue, as long as the vaccination is done several weeks ahead of infection.

If we want to create a nice lawn it is always wise to spread around enough extra seed to feed the birds and bugs that eat grass seeds. A sufficient number of seeds will survive to ensure a rich carpet of new grass. Nature often follows this strategy during reproduction, as when seventeen-year locusts emerge and crawl up trees in vast numbers, too many for the hungry birds to eat. Other examples abound, as with octopi, salmon, and many other species that don't care for their offspring as we do.

If we are blessed with a strong immune system, but inhale several billion pandemic viral particles from each nearby cough, we are still in mortal

danger of coming down with the full disease. It's a numbers and time contest. Can our agile T-cells eat enough invading viruses before a critical number of them sneak into our regular cells to shortly multiply into overwhelming numbers?

This *numbers game* is a primary reason for practicing exquisite hygiene, which can sharply reduce the number of ingested or inhaled viral particles. Even a fairly poor soil will grow something if enough seeds are planted in it. Even a fairly rich soil will grow little if few seeds are planted in it. Here is a reason for wearing a sterile and highly efficient mask, preferably an N95 mask, when our lungs are exposed to an environment rich in airborne viral particles. A good mask may not filter all of the viral particles; but it may capture enough to allow for a natural inoculation, not a devastating infection.

This idea of **natural inoculation** by sub-critical numbers of viral particles is my hypothesis for why some people may later show antibodies for pandemic influenza, without having had it clinically. It is also one theory for why pandemics eventually go away, even though not everybody has gotten sick thereby.

I absolutely do NOT recommend that you consciously attempt to "naturally inoculate" yourself, because you likely will end up with the full-powered disease. There is no way to measure in advance your margin of error.

With the HIV virus the "seed and soil" management model includes modifying the "soil" itself, so that a metaphorically moist and fertile soil becomes, as it were, dry and hostile, even to already growing plants. Changing the "soil" is done in various ways, but they all take time. Only a targeted vaccine against stable elements of HIV would allow us to instantly do this.

With an attacking H5N1 virus we don't have time to adjust "soil" receptivity. We could stop influenza seed this way if we had previously received a perfectly targeted vaccine; but in 2006 and 2007 humanity doesn't have anything but a small supply of poorly targeted serum. Full influenza symptoms can appear rapidly, which is why it is critical to ensure that the "soil" of our body's metabolism starts out sufficiently and immediately "poor." Hopefully we will be attacked by a limited number of invading influenza particles.

Another use for this metaphor is to provide a heuristic framework to explain why killed-virus vaccines (including fractions of viruses) can need adjuvants to work efficiently, whereas attenuated live-virus vaccines need less serum. Briefly, killed vaccines are like poor seed; live vaccines are like better seed. You need more of the inferior germinal seeds to grow the same crop that you would get with vital seed. Without an adjuvant you will likely need larger quantities of killed or fractional viral serum, and a booster shot. Adjuvants work like "fertilizer" for marginal seed, in this case the marginal seed of a killed/fractional vaccine.

This metaphor may also help to explain why many people become clinically infected with pandemic flu, and then recover. They simply escaped a big "dose" of infectious particles, either through luck or applied hygiene. It was within the range for their cellular defenses to slow the initial invasion, allowing time to develop a targeted immunity.

The idea of natural inoculation is a concept that cannot be fully tested in advance of a pandemic. The timing and administration of a viral load sufficient to self-inoculate, yet not get sick, or not get seriously sick, should vary greatly among individuals within a population. Therefore, it is ALWAYS wisest to minimize or eliminate exposure at all times. This cautious recommendation applies even if you have on hand plentiful supplies of Tamiflu or any other recommended defense. The ounce of prevention can be worth a ton of cure.

Pandemics are never neat and tidy. There is the Spanish Flu mystery involving pulmonary cytokine storms that quickly killed so many healthy young adults aged 15 to 35. There is evidence, as reported earlier herein, that the current form of bird flu likewise stimulates cytokine storms. Cytokine storms are not exclusively related to influenza, but are also seen in post-operative situations.[11] Unlike the U-shaped death curve associated with seasonal flu, the worst pandemic viruses can generate a W-shaped death curve, with many infants, elderly, and healthy young adults dying. The lowest death rates in the Spanish Flu era were among older preadolescents and pre-senior adults.

If the great *in vivo* discovery of 2003 were not still locked up in private research labs, then hospitals now might have a way to stop cytokine storms. Short of the bullet medicine we tantalizingly cannot have, what can we do? I will try to answer that question with a hygienic strategy and some botanicals that may help lower your risk of a cytokine storm.

There is no panacea for any pandemic, and especially for something as nearly nuclear as the H5N1 virus. A near-term goal will be to reduce the death rate in all ways possible with the tools that we do have. We cannot magically eliminate risk with tools we don't yet have, and may never have. If we keep our eyes on the context of disease, we can optimize the context of our lives.

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VIII.
Annuity Medicine

To understand what motivates the pharmaceutical industry is to understand how our political economy really works, financially, legally, and culturally. No modern drug company exists in a cultural vacuum. They are just like any other enterprise, trying to live up to their highest ideals, while trying to maximize their attractiveness to stockholders. Apparently, when altruism conflicts with these economic imperatives, altruism usually must wait.

What has happened to the great discovery published in 2003 regarding successful down-regulation of the precise aspects of our immune system that overreact, causing rapid death from cytokine storms?

As referenced earlier, researchers at Imperial College, London were able to protect mice from the effects of cytokine storms. They used a fusion protein, OX40:Ig, supplied by Xenova Group plc. In 2002 Xenova sold most of the platform rights for down-regulating this process to the large and famous American firm, Genentech, Inc. Only a few rights relating to autoimmune disease were sold to another firm, Celltech.[1] This developmental relationship is confirmed by Genentech's own press release of July 10, 2002.[2]

Two years later in 2004 Xenova was still trumpeting their legal relationship with Genentech, using these words:[3]

"OX40 is a platform technology capable of producing multiple drug candidates targeting cancer, autoimmune and other diseases where the immune system is involved. In 2003 Imperial College demonstrated that by blocking the OX40-OX40 ligand (OX40L) interaction (down-regulation), symptoms of influenza could be alleviated without affecting the ability to clear the virus. In contrast, the use of agents such as OX40L-IgG that bind to OX40 and up-regulate the immune response, has been shown to be effective at promoting anti-tumour responses in a number of cancer models. Xenova retains all rights for the use of OX40 in up-regulation whilst Genentech Inc and Celltech Group plc have the rights for down-regulation."

Searching the literature, I have been unable to find any reference to anti-influenza research and development of the Imperial College findings either by Genentech or anybody else outside the original London group. I have only found an intriguing 2004 study showing how OX40 down-regulation may help prevent rejection of transplanted cardiac mouse tissue.[4] There is this 2004 recap of research by the same Imperial group:[5]. There is also another 2004 report by the Imperial group:[6]. These scientists are world-class influenza researchers, and their findings cannot be dismissed lightly.

So, what has Genentech effectively done with their golden treasure since 2002? By 2006 we could and should have had one or more phases of human testing, with preliminary development of a targeted medicine that can be massively produced on short notice to save millions of lives from cytokine storms caused by H5N1.

Genentech's own discussion in early 2006 of its product development pipeline makes no mention of this Xenova platform.[7] There is little in their published pipeline against acute flu, even at Phase I development. However, you will find many annuity drugs in development for rheumatoid arthritis, macular degeneration, various cancers, asthma, foot ulcers, adult atopic dermatitis, and other worthy research projects. I applaud Genentech for working to alleviate several chronic diseases, even though some of their patented treatment drugs are astonishingly expensive.[8] What happened to their trying to prevent with inexpensive medicine the pulmonary cytokine storms that may swiftly kill tens of millions of people worldwide in the next pandemic?

Let me more fully explain what it takes to make an **annuity drug***.* We typically think of annuities as tax-favored insurance company savings plans or lump sum payments, yielding thereafter a long-term cash flow from the insurance company to the annuitant. These payments could last for years, or even a lifetime. Medical annuities share in the key aspect of investment annuities, the long-term cash flow.

In the medical profession an otherwise healthy patient who appears at the clinician's door with an infection and is cured, never to appear again, is not an annuity patient. Emergency room physicians can make a living from accident victims, but average doctors' offices depend a lot on annuity patients. These are patients who are under the doctor's care for the long term. They could be senior citizens, or maybe they would be

HIV-positive patients being cared for by infectious disease specialists.

The issue is not confined to antivirals. Resistant staph infections used to be confined to hospitals and nursing homes. Now, communities are fighting drug resistant strains of *Staphylococcus aureus* even among healthy people. There is little in the drug development pipeline. George Talbot, of the Infectious Diseases Society of America's task force on anti-microbial availability, said:[9]

"In a number of these companies, there were active decisions taken that antibiotic research was not going to be profitable enough to meet their obligation to shareholders. "So they decided to go for drugs that would be taken for a lifetime — drugs for diabetes or high blood pressure — rather than drugs to be taken for a week."

A blockbuster annuity drug is the golden grail of all private pharmaceutical research. Pfizer's Lipitor alone is almost two times richer than the entire global vaccine industry. Having several patented annuity drugs in development helps ensure high value for a company's stock. Genentech is a stellar example of success in this field. Their stock price (NYSE: DNA) during the period of October 21, 2004 to October 21, 2005 ranged from $41.00 to $94.99, closing on 10/21/05 at $85.04. The company had a market cap of $90.0 billion.[10]

How should the corporate lawyers and bean counters at Genentech have seen OX40 down-regulation development for acute, non-annuity illnesses in this light?

An ideal annuity drug has five key components:

(1) It is patentable.
(2) It is aimed at long-term treatment, not quick cures.
(3) There will be a large number of well paying patients.
(4) Development costs will not be too high.
(5) Less risk of litigation and judgments.

Any new drug for cytokine storms and acute respiratory distress syndrome (ARDS) would likely fail up to four of these five key criteria, with only the patentability remaining intact. That type of risk profile would not be financially appealing for any entrepreneurial, private drug company seeking to attract investment capital.

Developing the Xenova platform for pandemic influenza would not yield long-term treatments. There could briefly be a large number of critically ill patients; but there would equally be a worldwide clamor for this drug from many areas that cannot afford to pay much, if anything, diluting overall profits. Development costs could be relatively high for such a medicine that may or may not be used soon. Litigation potentially looms large, even for a $90 billion company.

I am not prejudiced against Big Pharma, an industry many of us love to hate until we need their products. They have a critical supply role in our society. I consider Genentech to be among the finest companies, at least for now from an employer-employee perspective. They have pioneered many genetically engineered pharmaceuticals. When *Fortune* magazine came out with its 2006 list of the 100 best companies to work for, Genentech was admirably situated at the #1 spot.[11] Nevertheless, what therapy will Genentech have ready for its own pandemic-stricken employees and families when their lungs are facing a pandemic influenza cytokine storm?

My real criticism is more fundamental, and transcends issues with any one pharmaceutical company. This same critical perspective is shared by Dr. Edmund Tramont, head of the AIDS research division of the National Institutes of Health. Dr. Tramont recently testified in an employment lawsuit, and he remarkably said:[12]

"If we look at the vaccine, HIV vaccine, we're going to have an HIV vaccine. It's not going to be made by a company. They're dropping out like flies because there's no real incentive for them to do it. We have to do it. They will eventually, if it works, they won't have to make that big investment. And they can make it and sell it and make a profit."

The same Associated Press article also reported:

"The International AIDS Vaccines Initiative, a not-for-profit group that is pushing for an AIDS vaccine, said there are more than 30 vaccine candidates being tested mostly on a small scale in 19 counties, but it acknowledges many are pursuing a similar theory of science that may prove futile. 'If the hypothesis is proven incorrect, the pipeline of candidates now in trials will be rendered mostly irrelevant. Strong alternative hypotheses have been largely neglected,' the group said."

So here we have:

a stable system that poisons corporate altruism because of fears of lawsuits;

- a system that values profits from erectile dysfunction drugs over life-saving antibiotics;

a system where poor countries cannot afford some of the best medicines; and

a system where it can take several years and many millions of dollars to launch one patent drug.[13]

Where are the wise political leaders who can guide us out of this ink-black darkness?

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IX.
What to Take

In the near term there will be no effective vaccine for you, and most likely no effective official flu medicine generally available for your family. What should we take?

The primary goal is survival for our loved ones. If we don't die, and are not permanently disabled by the ordeal, we may live a long and grateful life. Immediate goals would include a shortened period of illness, less pain and suffering, less contagion, and so forth. It is not currently realistic to expect any medication to fully protect us against being infected. Even good vaccines don't stop us from being infected; they allow us to survive the infection. It is not realistic to expect any avian flu vaccination for the next few years to find our arms and fully protect us against clinical infection.

Things recommended for your consideration in this chapter are hopefully for prevention and amelioration. Some may have value, properly administered, in a home setting (since hospitals will soon be filled with the first victims). There are several other management medicines that your doctor can help you have on hand for taking care of the sick in your home. These care giving elements will be explained later when I reprint a medical doctor's detailed instructions for home care of pandemic flu victims.

Free Enterprise vs. the FDA

Our federal government has "helped" us decide what not to do, bythreatening several advertisers with legal sanctions for promoting their products as effective against the bird flu.[1] I am of two minds about this. On the one hand, I don't like the heavy hand of Big Brother telling me what to do with my own body. On the other hand, maybe Big Brother knows a thing or two that may help me look elsewhere for something that would really be of benefit.

Truth is, Big Brother is not acting from wisdom about the bird flu, only from legal protocol. Any therapeutic claim for any illness that isn't

formally blessed ahead of time by the FDA will be sanctioned as fraudulent. Currently, those blessings for bird flu treatment medications only extend to Tamiflu and to a very few other drugs of dubious benefit. The usual analgesics and other over-the-counter influenza medications are of course legally available for typical flu symptoms – but nothing over-the-counter is approved to protect us against the viral killer itself. The FDA also stands ready to warn sellers of any otherwise approved drugs to not claim that they are effective against the bird flu itself, only possibly against some flu symptoms.

I totally support this advertising restriction, because there would otherwise be hordes of profiteering fraudsters lined up to sell all sorts of bogus bird flu potions on the Internet and in stores to terrified and panicked families. Even with the FDA, we can expect slick spammers to flood our email in-boxes with bogus panaceas. Web pages for shopping can be designed with sophisticated graphics, and they will be very persuasive for the fearful uninformed. Without the heavy foot of the FDA, ordinary consumers would become totally confused about their choices when looking at a blizzard of products, with maybe a few good products mixed in among many other products of dubious therapeutic value. One of the main purposes of this book is to help you identify the few good products.

During the Spanish Flu era, after available remedies failed to stem the disease, "every patent medicine producer in the land changed labels to claim its snake oil would prevent or cure influenza. A cigarette manufacturer advertised that smoking its brand would do the trick."[2]

Smart manufacturers and retailers on the initial FDA warning list have already revised their promotional literature to remove bird flu therapeutic claims. That is good and proper. Others unwilling to sanitize their claims are simply not selling product to Americans, knowing there is a huge unregulated market for "bird flu cures" outside the U.S.A. But that doesn't stop new herbal hustlers from popping up like mushrooms in an Alabama cow pasture:

Among the more recent and cleverly marketed placebos with patent-drug prices are Avian-Rx[3], and avn36[4]. Avian-Rx is now defensively marketed as Defend-Rx[5] at a web site that touts it as an herbal alternative for Tamiflu. This claim is bolstered by its having some shikimic acid and Star Anise. As we learned earlier, Tamiflu only starts with shikimic acid in a very complicated and lengthy manufacturing process. The real damage

comes when you spend forty to sixty dollars for this placebo, and then believe you don't need to do other things that really might make a difference.

Avn36 is marketed at the outrageously named web site, birdflustopper.com. Its formula is just three cheap herbs and some co-enzyme Q10. This formula has absolutely no curative power against the mighty H5N1. The manufacturer paid pennies for the ingredients in your expensive bottle, whereas you will pay many dollars – and you might even pay with your life if you think these placebo pills will alone protect you. Yes, the site's fine print says they won't protect you, but the web site's overall impression is that avn36 will.

Nevertheless, it is a major error to assume that every officially unproven product would prove to be totally ineffective, simply because the retailer has made unverified claims in advance of the pandemic. In a narrow, legal sense, if you make such an unverified claim, it is a fraudulent claim. The claims issue nevertheless has two sides: On the one side, the FDA says therapeutic proof has not been established for all questioned products. On the other side, therapeutic effect has not been disproved either.

I have examined the ingredients in a number of additional mostly herbal products, usually in capsules. Some formulas have ingredients of minimal value against the main dangers associated with bird flu. Other ingredients may have just enough promise on the margin to help save your life, if their beneficial effects aren't too diluted by placebos inside the capsules. The FDA follows narrow legal rules, as it must. I will share with you my clinical herbalist perspective (backed up with available scientific references), and you can make up your own mind for what to do and take before a panic arrives.

My general recommendations are not designed to diagnose or prescribe for individuals. Consult with your doctor before undertaking any self-medication program, especially if you are already taking medications, have pre-existing conditions, or are pregnant. A product that may be right for one person may not be right for another. A product for an adult may not be right for a small child, or a frail senior. We are all human, but we are all unique.

What follows are *three categories of things to take, or not*. The *first* category are things that I myself would take, or have ready to take. The

second category has things that may or may not be directly beneficial, but seem not to be bad either. The *third* category has things that might do more harm than good for bird flu's main threat, pulmonary cytokine storms, even if they are otherwise good to take.

I am guided by one thought: What effective, abundant, and affordable things can ordinary people around the globe actually get their hands on before the pandemic flu strikes? In this high-stakes treasure hunt there is no moral place for profiteering or elitism.

There are some fine simple herbal tinctures, and even some very interesting Chinese and Ayurvedic formulas, but the average person cannot find them, and probably can't figure out how best to use them without professional guidance. I am also determined to find things that are affordable for the average person, both in America and elsewhere. What good is something if a person can't find it, can't understand it, or can't afford it?

Please note: I am *not* in the business of selling product. I have *no* relationship with any seller of product, and will *not* benefit financially from readers of this book buying anything that I directly or indirectly recommend. My only business is trying to keep you and your loved ones alive.

Category One:
Things I Recommend

(1) *Concentrated green tea.*

Very highly recommended.

Several years ago I was drawn to tea, and especially green tea, by its group of *catechins* that have shown anti-tumor promise through restricting growth of blood cells to cancer tumors, also known as anti-angiogenesis.[6] There are now emerging several patent medicines that do this on their own very well. However, anti-malignant therapeutic action is not why I am recommending tea compounds for avian flu.
When I was looking for things to recommend against cytokine storms, tea catechins did not immediately come to mind. I came to this

recommendation after doing some sleuthing.

One of the more interesting sources I encountered is also one of the nine initial targets of those FDA warning letters. This company is PRB Pharmaceuticals. Their crime was in saying now that their formulas would work against avian influenza, before receiving the official FDA blessing that will never come under the rules of the game. Here is what their web R&D statement says.[7]

"Our research and development focus is on influenza and other emerging viruses. In the United States, our basic research and drug discovery is carried out at PRB Pharmaceuticals biosecurity laboratories in Cypress, California. The early research on our anti-viral fractions was conducted with investigators at the Keck School of Medicine, The University of Southern California.

In recent years, SARS and avian influenza (H5N1) have emerged in Asia to wreck havoc on public health and economic sectors. Since Southern China is postulated as the epicenter of emerging viruses due to its agricultural-based communities and high population density, PRB Pharmaceuticals has positioned itself on the front line of this problem by creating an anti-viral research and development infrastructure in Hong Kong, Taiwan and Vietnam.

This network includes the Prince of Wales Hospital, the Chinese University of Hong Kong, and Lees Pharmaceticals. PRB Pharmaceuticals Asian Research Group is responsible for the development of a broad-spectrum platform technology that has proven to have downstream applications for SARS, influenza, and bird flu (H5N1). Results from our multi-center study showed v38 AMF-1 to be effective in inactivating SARS CoV, Staphylococcus aureus, Streptococcus pneumonia, human influenza (H3N2), and bird flu (H5N1). This platform is the source material for the development of our ethical pharmaceutical drug candidates.

We are currently in process of conducting a large-scale research project in Hanoi with the Vietnam Department of Animal Health. This includes testing of FluStat against H5N1 in the country's poultry farms."

Their development platform looked promising. I wrote them twice, asking for additional information. They never replied. Silence sometimes is very loud. I next looked for and found their secret from the reference to their patent application. I went directly to their U.S. patent application, and there was exactly what I was looking for![8] Their scientific terms involved what the patent application calls "theaflavins." This is a group of chemicals naturally found in *Camellia sinensis,* or what we call tea. *In plain English, the application says they are effectively using concentrated tea against these pathogens.*

I can now understand why PRB is so secretive. They are preparing to research and then market worldwide their Vira38 and other products as patented miracles, and perhaps they may be right.[9] Surely, they could find a way to make millions worldwide beyond the reach of the FDA. As for us ordinary folk in the USA and elsewhere, we don't need to pay a premium for a fancy tea patent.

A sufficient dose of theaflavin catechins may help; but you could still get the highly contagious avian flu with any current medicine, FDA approved or otherwise. However, based on more and other experimental evidence, I feel it is very possible that these natural tea chemicals – in sufficient quantity – may tilt the balance enough to save your life. Here is some of what I found:

Japanese scientists have discovered how tea's components work. *Remember that vaccines and antibodies target the "H" part of a virus used to enter our cells, and that drugs such as Tamiflu target the "N" part of the virus used to help the newly multiplied viruses escape. Tea's components work against the invading "H" part.* Here is one impressive abstract:[10]

"(-)Epigallocatechin gallate (EGCg) and theaflavin digallate (TF3) (1-10 microM) inhibited the infectivity of both influenza A virus and influenza B virus in Madin-Darby canine kidney (MDCK) cells in vitro. Study by electron microscope revealed that EGCg and TF3 (1 mM) agglutinated influenza viruses as well as did antibody, and that they prevented the viruses from adsorbing to MDCK cells. EGCg and TF3 more weakly inhibited adsorption of the viruses to MDCK cells. EGCg and TF3 (1-16 microM) also inhibited haemagglutination by influenza viruses. These findings suggest that tea polyphenols bind to the haemagglutinin of influenza virus, inhibit its adsorption to MDCK cells, and thus block its infectivity."

Here's another Japanese flu-related study:[11]

"The effects of a mixture of tea-seed saponins obtained from the seeds of Camellia sinensis var. sinesis on human influenza viruses types A and B were investigated. At the concentrations of 60, 80, and 100 micrograms/ml, respectively, the mixture inactivated viruses A/Memphis/1/71 (H3N2), B/Lee/40, and A/PR/8/34 (H1N1) almost completely. The mixture also inactivated type A virus A/PR/8/34 after inoculation at concentrations of 1-30 micrograms/ml dose-dependently."

Third is a intriguing Korean study that helps to further explain why humble tea phytochemicals may be such a potent ally:[12]

"Polyphenolic compound catechins ((-)-epigallocatechin gallate (EGCG), (-)-epicatechin gallate (ECG) and (-)-epigallocatechin (EGC)) from green tea were evaluated for their ability to inhibit influenza virus replication in cell culture and for potentially direct virucidal effect. Among the test compounds, the EGCG and ECG were found to be potent inhibitors of influenza virus replication in MDCK cell culture and this effect was observed in all influenza virus subtypes tested, including A/H1N1, A/H3N2 and B virus…. The results, along with the HA type-specific effect, suggest that the antiviral effect of catechins on influenza virus is mediated not only by specific interaction with HA, but altering the physical properties of viral membrane."

Highly recommended: When the avian flu first finds its way into our communities, I suggest taking daily the equivalent of eight or more cups of green tea in concentrated capsule form, spread evenly over the 24 hours of each day. To make things simple, you could take one or two capsules every three hours. Don't wait until people around you start to get sick. If someone in your family comes down with the disease, try increasing your intake somewhat. Drinking several cups of green tea to additionally supplement the multiple capsules is OK too. Black tea is fairly good, if you can't find any green tea left on the shelves.

At the same time, I can't emphasize strongly enough that if you think drinking a couple cups of green or black tea daily will even partially protect you against avian influenza, you are extremely off the mark! The minimal therapeutic level appears to be several times that amount.

(2) *Resveratrol.*

VERY highly recommended.

Resveratrol (3,5,4'-trihydroxystilbene) is a naturally occurring substance in many plants. It is abundantly found in the skins of red wine grapes. It is both anti-inflammatory and antioxidant. Resveratrol is a phytoalexin, a class of antibiotic compounds produced as part of a plant's defense against disease, such as invading fungus.[13] It also has serious potential against certain human diseases. However, you would need to drink at least a gallon of red wine from northern latitudes to get a seriously therapeutic dosage. Obviously, that much wine daily, or on any day, is not a good recommendation! (Fortunately, there are pills with lots of resveratrol in them, and no alcohol. See Appendix C for sources.)

Resveratrol works in a very different way against influenza. That's one of the reasons it comes highly recommended. Manmade one-trick ponies,

such as Tamiflu and other antivirals, can soon be circumvented by cleverly mutating influenza strains. Natural chemical groups that have been protecting their parent plants for millions of years just might be a virus particle's natural antagonists.

Here are the results of two studies showing the power of this natural and abundant chemical:

First is a study showing how resveratrol helps protects patients with chronic obstructive pulmonary disease (COPD) against excessive cytokine. Of all adults that may be stricken with the bird flu, this group would be about the most vulnerable. Here is the conclusion of this abstract:[14]

"Resveratrol inhibits inflammatory cytokine release from alveolar macrophages in COPD. Resveratrol or similar compounds may be effective pharmacotherapy for macrophage pathophysiology in COPD."

The second study focuses more on viruses, and explains why this chemical could be so valuable in the fight against H5N1. Here is what the astonishing abstract says:[15]

"We have previously shown that the life cycles of several viruses are influenced by host-cell redox states. Reports of the antioxidant activities of the plant polyphenol resveratrol (RV) prompted us to investigate its effects on influenza virus replication in vitro and in vivo. We found that RV strongly inhibited the replication of influenza virus in MDCK cells but that this activity was not directly related to glutathione-mediated antioxidant activity. Rather, it involved the blockade of the nuclear-cytoplasmic translocation of viral ribonucleoproteins and reduced expression of late viral proteins seemingly related to the inhibition of protein kinase C activity and its dependent pathways. RV also significantly improved survival and decreased pulmonary viral titers in influenza virus infected mice. No toxic effects were observed in vitro or in vivo. That RV acts by inhibiting a cellular, rather than a viral, function suggests that it could be a particularly valuable anti-influenza drug."

Highly recommended resveratrol is poorly absorbed, and then fairly rapidly metabolized and removed by the liver. Therefore, so that it can be available in the blood for our body's cells, it is recommended when the bird flu is near that this natural chemical be taken every three to six hours in pill form. For simplicity, you could take one resveratrol capsule with one or two green tea capsules every three hours. Yes, and one daily glass of fine red wine just might help us deal with our "flu anxiety."

(3) *Vitamin D3*

Highly Recommended.

Although all the vitamins are by definition vital for continued good health, vitamin D3 may have a special role in helping to prevent cytokine storms.

Cholecalciferol supplementation (the form of vitamin D in pills) has been recommended at fairly high levels, and a case has been made that the amount we have been officially recommended is much less than what we need. The author of this recommendation is an M.D. who has included 104 references with his article on the relationship between vitamin D and mental illness. Read it and decide for yourself.[16]

With reference to the immune system, a very recent German study sheds light on just how the body's immune system is kept from getting out of control. The authors conclude that vitamin D3 is important for controlling the macrophage immune responses, helping to keep our immune system within control:[17]

"In conclusion, our data indicate that the production of 1alpha,25(OH)2D3 by IFN-gamma-stimulated macrophages might be an important negative feedback mechanism to control innate and inflammatory responses of activated macrophages."

A short period of time in the summer sun can see our own skin quickly producing 20,000 units of vitamin D. The current daily recommendation of 400 international units (I.U.s) for adults is a historical projection from the minimal amount needed to avoid rickets in children.

Vitamin D at extreme doses is used as a poison for vermin. The doses used work out to the LD50 for male lab rats (the most sensitive mammal tested) being 42 mg/kg. If much larger humans were twice as sensitive, that would work out to 42,000,000 units, or 42,000 capsules, or 168 bottles each containing 250 capsules of 1,000 IU cholecalciferol.[18] Who can swallow 42,000 vitamin D capsules in one sitting?

For these reasons I conclude that a prudent daily vitamin D supplementation during periods we are not out in the sun could be 2,000 units (one of the above capsules), and more likely about 3,000 units (two capsules) when the pandemic starts to move toward our homes.

(4) *Vitamin C*

Highly recommended.

Since Linus Pauling, the only winner of two individual Nobels, promoted vitamin C as something of a cure-all, there has been controversy around this essential element that our bodies do not make. I won't go nearly as far as Pauling, but I do feel that cheap, widely available vitamin C does belong in our anti-flu toolkit.

A 1999 study regarding vitamin C and viral symptoms revealed significant benefits from taking one-gram (1000 mg) doses of this vitamin. Their protocol was not exotic, since one-gram tablets are available, and half-gram tablets are common. They noted:[19]

"…hourly doses of 1000 mg of Vitamin C [were administered] for the first 6 hours and then 3 times daily thereafter…. RESULTS: Overall, reported flu and cold symptoms in the test group decreased 85% compared with the control group after the administration of megadose Vitamin C."

Another report in 1978 explains how vitamin C may help inhibit neuraminidase (the "N" part of H5N1):[20]

"Several pathogens, both viral and bacterial, employ the enzyme neuraminidase (N-acetylneuraminate glycohydrolase, EC 3.2.1.1.8). The neuraminidase renders ineffective the hemagglutinin inhibitory mucins that confine the pathogens in a coating of host mucins. Sialoresponsin is a receptor "decoy" that inhibits neuraminidase. Several known antiviral agents, including ascorbic acid, inhibit neuraminidase. It is proposed that ascorbic acid may mediate an antiviral effect through the incorporation of ascorbic acid or some derivative of ascorbic acid as a part of the sialoresponsin molecule. Whether ascorbic acid works alone as a pharmacological inhibitor, or is incorporated in sialoresponsin as a physiological inhibitor; it may be useful against pathogens that employ neuraminidase."

I recommend for general health a diet rich in natural vitamin C and associated natural bioflavonoids, supplemented daily with some extra amounts of your choice – such as 250 mg twice daily, ideally in Ester-C form for better availability. I also recommend having on hand significant additional quantities of vitamin C before any flu visits your house. Remember that vitamin C is water-soluble, so you are better off taking moderate amounts every few hours. How about every three hours? If swallowing fairly large pills and tablets would be difficult, you can buy vitamin C in granular form to mix in liquid. Also, this vitamin comes in tasty tablets that dissolve in your mouth.

(5) *Quercetin*

Highly recommended.

Quercetin is a flavonoid, belonging to a class of plant pigments. It has anti-inflammatory and antihistamine properties, and has traditionally been used for several ailments, including benign prostatitis. It is a potent antioxidant. It is often taken with vitamin C. *The optimal dose is unknown, but some choose to take 200mg to 500mg three times per day, especially when stressed.*[21]

Battling a life-threatening influenza attack is close to the ultimate stressful event. I cannot establish that quercetin has any effect on cytokine storms. However, such viral infections generate oxidative stress. This type of stress is just one more problem that our lung cells must deal with while dealing directly with the pathogens. Because bad things can yield more bad things, it is good to minimize this oxidative stress. That's where quercetin may help.

Scientists at the University of Delhi, in India, have repeatedly examined the benefits of quercetin in this light. Here is part of the abstract of one of their studies:[22]

"Influenza virus infection, induced experimentally in mice, was associated with marked changes in lung morphology viz. epithelial damage with focal areas of reactive papillary hyperplasia, infiltration of leukocytes and development of oxidative stress, as evidenced by increased superoxide radical production and lipid peroxidation (LPO) products by alveolar macrophages. These effects were observed on the 5th day after virus instillation…. Supplementation of intranasal viral instillation with the anti-oxidant, Quercetin, given orally, resulted in a significant decrease in the levels of both superoxide radicals and LPO products. There was also a significant decrease in the number of infiltrating cells. A mild to moderate protective effect was observed in lung morphology. Thus, Quercetin may be useful as a drug in reducing the oxidative stress induced by influenza virus infection in the lung, and protect it from the toxic effects of the free radicals."

When white blood cells envelope antigenic viruses they kill them with a respiratory burst of oxygen. However, each burst causes the production of free radicals. In a heavy infestation of pathogens the cellular defense system could be polluted by its initial success in killing antigens. In this light, it is helpful to note that quercetin, as well as the Chinese herb *schizandrin*, has been shown to offset some of the side effects of our own virucidal activities, by scavenging oxygen radicals produced in the respiratory burst. These two natural substances also had other

documented benefits for our fighting cells.[23]

(6) *Vitamin E*

Highly recommended.

Vitamin E is an antioxidant with a checkered reputation. It may however have a sterling role in saving lives threatened by cytokine storms.

Here is part of the abstract of what a major study revealed about Vitamin E:[24]

"This study compared the effect of vitamin E on the course of influenza infection with that of other antioxidants. (In a previous study we showed that short-term vitamin E supplementation significantly decreased pulmonary viral titer in influenza-infected old mice)…. After influenza virus challenge, mice fed vitamin E-supplemented diet had significantly lower pulmonary viral titers compared to those fed the control diet … and were able to maintain their body weight after infection…. Other antioxidants did not have a significant effect on viral titer or weight loss. There was a significant inverse correlation of weight loss with food intake…, indicating that the observed weight changes were mainly due to decreased food intake.

Pulmonary interleukin (IL)-6, IL-1beta, and tumor necrosis factor (TNF)-alpha levels increased significantly postinfection. The vitamin E group had lower lung IL-6 and TNF-alpha levels following infection compared to the control group. In addition, there was a significant positive correlation between weight loss and lung … levels. Because IL-6 and TNF-alpha have been shown to contribute to the anorexic effect of infectious agents, the prevention of weight loss by vitamin E might be due to its reduced production of IL-6 and TNF-alpha following infection.

Thus, among the antioxidants tested, only vitamin E was effective in reducing pulmonary viral titers and preventing an influenza-mediated decrease in food intake and weight loss. Other dietary antioxidant supplementations that reduced one or more measures of oxidative stress (4-hydroxynonenal, malondialdehyde, and hydrogen peroxide) did not have an effect on viral titer, which suggests that, in addition to its antioxidant activity, other mechanisms might be involved in vitamin E's beneficial effect on lowering viral titer and preventing weight loss."

In light of this significant study, it would be prudent to ensure a moderate level of Vitamin E in one's diet, such as 400 IUs daily, both through food and supplementation. Even though Vitamin E can help with short-term use just before infection, this study indicates that long-term Vitamin E is also very beneficial. As with vitamin D, vitamin E is fat soluble, so it doesn't need to be taken every three hours; once daily

should be OK. Twice daily, for a total of 800 IUs, is reasonable when the flu reaches your community.

(7) *Selenium*

Highly recommended.

Based on multi-year research at the University of North Carolina, Chapel Hill, selenium is an interesting story. It points to the dangers of viral mutation inside bodies that are antioxidant-deficient. It also gives us one more tool to fight against cytokine storms. You will recall from the earlier discussion that selenium adequacy doesn't stop pulmonary infection once influenza viruses mutate elsewhere inside selenium-deficient mouse bodies. It is likely that the same mammalian mechanisms would apply inside humans. Large populations are not receiving sufficient dietary selenium, which would allow RNA-based influenza viruses enhanced opportunities to become more virulent. (Recall how Spanish Flu became more virulent before it stopped killing us.)

Here is part of one UNC study that indicates how selenium in adequate quantities may help reduce the likelihood of cytokine storms:[25]

"What influence does the deficiency in Se have on the immune response of the host? Infection with myocarditic strains of coxsackievirus induces an inflammatory response in the cardiac tissue. It is this immune response that induces the heart damage, rather than direct viral effects on the heart tissue. Chemokines are chemoattractant molecules that are secreted during an infection in order to attract immune cells to the site of the injury, and have been found to be important for the development of coxsackievirus-induced myocarditis. We found that a deficiency in Se influences the expression of mRNA for the chemokine monocyte chemo-attractant protein-1, which may have implications for the development of myocarditis in the Se-deficient host. Expression of mRNA for interferon-gamma was also greatly decreased in the Se-deficient animal. Thus, a deficiency in Se can have profound effects on the host as well as on the virus itself."

Another study conducted in England backs up the value of selenium in adequate quantities, though not specifically pointing to chemokines. Here is part of what they found.[26]

"Selenium supplements augmented the cellular immune response through an increased production of interferon gamma and other cytokines, an earlier peak T cell proliferation, and an increase in T helper cells. Humoral immune responses were unaffected. Selenium-supplemented subjects also showed more rapid clearance of the

poliovirus, and the poliovirus reverse transcriptase-polymerase chain reaction products recovered from the feces of the supplemented subjects contained a lower number of mutations. CONCLUSIONS: The data indicate that these subjects had a functional selenium deficit with suboptimal immune status and a deficit in viral handling. They also suggest that the additional 100 microg Se/d may be insufficient to support optimal function."

In light of the research, and in light of what is commonly available in pharmacies, I recommend that 200 micrograms (mcg, or microg) daily of nutritional selenium be part of our diets. You may find this amount is already in your multivitamin and mineral capsule, or you may want to add some more to reach the maximum of 200 mcg. Selenium in excessive quantities is not recommended.

(8) *St. John's Wort*

Recommended.

St. John's Wort (*Hypericum perforatum*) has achieved wide favor for mild to moderate depression. However, relief of depression is not why this commonly available botanical from America's northwest is on my A-list. It is also an antiviral, and may help directly to stop a cytokine storm.

One of the body's own cytokines stimulated by H5N1 is cytokine interleukin-6 (IL-6).[27] One study, while exploring its anti-depressive effects, discovered the ability of this "wort" (weed) to help control IL-6. The authors observed: "A massive suppression of the interleukin-6 release was found for PHA-stimulated hypericum extract."[28]

It's easy to locate this herb in capsule or tincture form.
I recommend keeping some tincture bottles with built-in droppers handy, whether you are depressed or not. You can put it into any juice, or simply squirt one or two droppers into your mouth at the first sign of flu. Use another dropper every few hours.

Note: If you are on other medications, it is advised that you check with your doctor and/or pharmacist to see if St. Johns Wort will interfere with any of them. Remember, you don't need to do all of my recommendations in this chapter for benefit, just enough of the ones you can gather together. You can safely do without this recommended herb.

(9) *Cranberry juice*

Very highly recommended.

There are several juices, such as *apple juice*, that have some modest anti-flu activity.[29] However, cranberry juice seems to be the best of all. It is cheap and available, and we need to drink lots of liquid anyway to avoid dehydration when ill with flu. Also, it is sold in grocery stores mixed with apple or grape juice.

Cranberry juice is widely used, especially by women, for mild bacterial infections of the bladder. Unwelcome bacteria seem to have more difficulty adhering to the bladder wall following consumption of cranberry juice. A scientific study of cranberry juice in 2005 revealed more about cranberry juice's powers. Here is a portion of this study's abstract:[30]

"Cranberry juice contains high molecular weight materials (NDM) that inhibit bacterial adhesion to host cells as well as the co-aggregation of many oral bacteria. Because of its broad-spectrum activity, we investigated NDM's potential for inhibiting influenza virus adhesion to cells, and subsequent infectivity. Hemagglutination (HA) of red blood cells (RBC) caused by representatives of both influenza virus A subtypes (H1N1) and H3N2) and the B type was inhibited by NDM at concentrations of 125 microg/ml or lower, which is at least 20-fold lower than that usually found in cranberry juice. A dose-response effect of NDM on HA was demonstrated. The effect was most pronounced when NDM was added several times to the infected MDCK cells. Our cumulative findings indicate that the inhibitory effect of NDM on influenza virus adhesion and infectivity may have a therapeutic potential."

I recommend drinking cranberry juice whenever you want a change of pace during ordinary times. <u>When the avian flu is on its way I recommend that you stock up on cranberry juice and drink it often</u>. You get more benefit from equal volumes of straight cranberry juice than from diluted variants. Any of the store-bought combinations can't hurt, and may make a difference. Consider cranberry juice concentrate, which you can buy at most health food stores. You can make your own drink from concentrate according to taste.

(10) *Curcumin (Tumeric)*

Recommended.

Curcumin is the yellow pigment in Tumeric (*Curcuma longa)*, a widely

used spice in South Asian cooking. Curcumin gives curry its color and flavor. It is reputed to have multiple therapeutic benefits.[31] It is usually sold in capsules as Tumeric, containing curcumin.

This substance has curried modest favor with me because of its ability to help down-regulate some cytokines. Whether or not this effect would be sufficient to stop a cytokine storm, alone or in conjunction with other substances, is an open question. Lacking definitive studies, I personally would not rely on curcumin or any other substance alone.

An exceptionally detailed analysis of the biochemistry of these interactions is found in a recent study.[32] It mentions that *curry is neither highly toxic, nor mutagenic. However, it needs to be used with piperine (black pepper) to increase its bioavailability. It is best to take curcumin-and-pepper with food, to avoid intestinal irritation. Health food stores commonly carry this combination. Do not exceed the recommended doses. Here is a tiny portion of that study:*

"NF-{kappa}B plays a critical role in the transcriptional regulation of proinflammatory gene expression in various cells…. We conclude that curcumin potently inhibits cytokine-mediated NF-{kappa}B activation by blocking a signal leading to IKK activity."

Do not imagine that if you eat a lot of food with curry you will escape the worst of pandemic flu. In the Spanish Flu era more people died in India than anywhere else. The amount of curcumin in a dish of curried food is probably well below what is needed for any therapeutic effect. There were several unrelated reasons for the high death toll last century in India, but here is another example where less is truly less beneficial.

(11) *Tea tree oil (and Eucalyptus oil)*

Highly recommended.

For thousands of years tea trees have been used by Australian aboriginals, and the modern name is associated with Capt. John Cook. Only one species of the genus has the medicinal oils, namely, *Melaleuca alternifolia*. This plant's essential oil has several components, some of which are water-soluble.

There are a number of scientific studies regarding this versatile and inexpensive botanical, and a list of them is at this reference:[33] . Two of

these studies focus on immune regulation. One of them is especially relevant to our quest for a shield against cytokine storms. The Hart study suggests water-soluble components of tea tree oil may help control inflammation. Here is part of the abstract:[34]

"Objective and Design: To evaluate potential antiinflammatory properties of tea tree oil, the essential oil steam distilled from the Australian native plant, Melaleuca alternifolia. Material and Methods: The ability of tea tree oil to reduce the production in vitro of tumour necrosis factor-alpha (TNF alpha), interleukin (IL)-1 beta, IL-8, IL-10 and prostaglandin E-2 (PGE(2)) by lipopolysaccharide (LPS)-activated human peripheral blood monocytes was examined…. When these components were examined individually, only terpinen-4-ol suppressed the production after 40 h of TNF alpha, IL-1 beta, IL-8, IL-10 and PGE, by LPS-activated monocytes. Conclusion: The water-soluble components of tea tree oil can suppress pro-inflammatory mediator production by activated human monocytes."

An important point: Many people don't understand the differences between infusions (such as a tea bag in a tea cup), decoctions (boiling herbs), tinctures, spirits, and oils. Of all these ways to use herbal medications, oils are by far the most potent. **It is NEVER advised to drink any essential oil.** A tincture is much less potent. A spirit can be even less potent than a tincture.

Some constituents are oil-soluble, and will not extract without the help of alcohol, the usual base for tinctures. Water-soluble constituents can be extracted by water or steam. In this case, we are fortunate that the constituents of tea tree oil shown to be most active against inflammation are water-soluble. What we want from the oil can be extracted through steam.

Because the bird flu favors deep infections of the lungs, more so than seasonal flu, it is necessary to keep the tiny alveoli deep in our lungs from filling up with congesting fluids. Mucous-thinning medications, such as guaifenesin,[35] are available over the counter at your drug store. (On the other hand, a recent statement by the American College of Chest Physicians advises people not to waste their money on OTC cough syrups or drops.[36]) There are additionally several natural substances that may benefit distressed lungs.[37]

Consider adding two (2) DROPS of tea tree oil to a bowl of hot steaming water. Cover your head with a towel to trap the rising fumes. Inhale for five minutes or so. Do this as needed. It should both help to relieve congestion and fight infection. It could also help to protect against a cytokine storm,

but I am not sure of it.

You may also add (1) DROP of eucalyptus oil to the same bowl of hot water.[38] This is an extremely popular herb known to most people as a key ingredient of many cough drops. The active constituent is known as eucalyptol, or cineole, and is steam extracted from leaves and branch tips. It helps to ease coughs, and facilitates expectoration of mucous.

When doing steam inhalation with volatile oils, it is best to close your eyes, as these oils could irritate them. It is best to close your mouth and breathe through your nostrils, if possible. A commercial steam inhaler may be much easier to use than the steaming-bowl-of-water technique. Buy your inhaler now, because they will vanish from stores early in a pandemic. Another option for dealing with excessive mucous is to drink daily two cups of eucalyptus leaf tea.

Vicks makes two types of personal inhalers, available either at your pharmacy or online.[39] These devices should be easier to operate than placing your covered head over a bowl. Also, Vicks inhalers could more easily be employed by the sick who do not have constant attention from care givers. Scent pads are available with the classical menthol and eucalyptus formula used during the Spanish Flu era.

(12) *Ginger*

Recommended.

Ginger[40] (*Zingiber officinale*) is the aromatic ingredient in ginger bread cookies. Ginger is native to Asia, and is cultivated in the West Indies. We use the rhizome of this plant. It is found in many Chinese formulas, and should be among your weapons against bird flu. Ginger may have both direct and indirect benefits against H5N1:

Indirectly, it is an expectorant, carminative, demulcent, and diaphoretic. It is indicated for arthritis, impaired circulation, colic, fever, dyspepsia, flatulence, and nausea. Some of these problems, such as colic and nausea, can be part of a serious influenza attack.

It may have direct benefit in preventing a cytokine storm if its anti-inflammatory effects against chemokine expression in arthritis can be transferred to a pulmonary environment.[41]

A closer link directly involving rat lungs was seen in a 2004 study in China involving ginger in several formulas. The authors concluded:[42]

"The effects might be related to inhibiting the increase of cytokines as TNF-alpha, IL-1beta, and IL-8 to suppress the activation, infiltration and wandering of leucocytes."

Daily doses of dry herb can range from 0.75 to 3.0 grams. Tincture extract doses should not exceed 20 mL per week. Fresh ginger from the grocery store also makes a marvelous tea with a piece of the rhizome the size of your thumb's last joint. Slice it into slivers, and then simmer for several minutes in several ounces of near-boiling water (decoction) in a stainless steel pot, with a tight lid to keep the volatile oils inside.

(13) *Probiotics.*

Very highly recommended.

Probiotics is a fancy word for all the beneficial bacteria that inhabit, or should inhabit, our intestines.[43] Also called flora, these bacteria have their own ecological universe inside our guts. They can do some amazing things, as I learned when dealing with my mother's life-threatening constipation.[44]

When viral particles initially enter our alimentary canal they soon encounter our mini-universe of bacteria. The H5N1 prefers to set up shop inside our intestines just as easily as it can in our lungs – at least inside some people. Is this choice of primary infection a random preference, a product of putting viral-laden fingers in our mouths, or is some bacterial mediation going on? Again, nobody has done the studies we need, and only after the pandemic has passed might we know for sure. Nevertheless, it is reasonable to hypothesize that the right mix of probiotics from yogurt could help maintain our defenses. You may supplement probiotic food with a many-species probiotic supplement taken daily.

An environmental hypothesis is supported by a very interesting Japanese study from 1999. Here is the abstract:[45]

"Using mice, we found that oral administration of Bifidobacterium breve YIT4064 (B. breve) activated the humoral immune system, augmented anti-rotavirus IgA production or anti-influenza virus (IFV) IgG production and protected against

rotavirus infection or influenza infection, respectively. Furthermore, when the B. breve was given to infants from an infant home, there was a significant reduction of the frequency of rotavirus shedding in stool samples during the administration of the bacteria. It was also found, again using mice, that oral administration of Lactobacillus casei strain Shirota (LcS) stimulated type 1 helper T (Th1) cells, activated the cellular immune system and inhibited incidence of tumors and IgE production. These results demonstrated that these two strains of lactic acid bacteria modulated the different immune systems each in its own way and prevented against various diseases."

The study's reference to helping infants defend against intestinal viruses is extremely valuable, because very little is available to help such young children fight off pandemic flu.

A caution is in order regarding mixing two good things, and coming up with a bad result. Unwanted effects can be had with many self-administered substances. That is why there are warning labels on most over the counter medications. Specifically regarding probiotics, we must be aware that certain otherwise very good substances can interfere with the ability of these good bacteria to thrive. Some natural substances, such as recommended garlic oil, seem to be relatively harsher on the unwanted bacteria than on the probiotics. Other substances, such as antibiotics, seem to slaughter good and bad bacteria equally. If we are relying on probiotics to help defeat H5N1, then we need to exercise caution with what else we take.

A strong example would be *oregano oil*.[46] This substance works well against fungi and bacteria. Taken externally, it would have no effect on intestinal flora. When we consume this substance we can endanger what we are trying to accomplish against the flu with probiotics. Oregano oil at high concentrations does directly kill influenza viruses – but I would rather have the probiotics intelligently working for me without any side effects, especially since these friendly microbes also stimulate the body to produce antibodies against the virus, which is ultimately our best defense. Don't shy away from the flavor of culinary oregano in your Italian food. There is a big difference between the potency of herb and oil.

We are familiar with what often happens after taking strong antibiotics for several days. Indigestion. The recommended corrective is to wait until after the prescribed bacteria-killing antibiotics are no longer being taken, then supplement the diet with yogurt or other probiotics. It would be tempting to try virucidal oregano oil one day, then probiotics another day. I wouldn't advise this tactic, because flu viruses could weather alternating

one-day attacks. I prefer developing a healthy and complex probiotic environment to "greet" invading viruses, and that takes many days to develop.

(14) *Garlic.*

Highly recommended.

Probiotics, or garlic? That is the question. Both good, but large amounts of garlic can diminish your probiotics, while slaying all sorts of pathogens. My advice is to either go with one or the other – or go with garlic, supplementing your diet with two or three times as many probiotics. Conversely, probiotics will not diminish the effect of garlic. You cannot easily overdose on the helpful bacteria, as they will multiply inside your intestines anyway.

Garlic (*Allium sativum*) is a potent botanical. The bulb is used, broken into cloves. It is consumed either raw or cooked. Garlic was once known as Russian penicillin. During the First World War many European soldiers survived wounds thanks to garlic. Garlic has more than one hundred active chemical constituents, some of which have never been adequately researched. It is commonly thought that the intermediary chemical, allicin, is the key healing component. However, allicin exists only to defend the garlic when it is attacked. It normally does not exist in garlic, and it does not remain in the human body beyond a few minutes. Garlic's healing powers are probably the result of a complex interplay of its many chemical constituents.[47]

Garlic is in the onion family (*Allium*). Garlic has multiple beneficial effects on the body. It has been investigated for its protective effects against stomach and colon cancer, plaque in the arteries, blood clots, hypertension, nasal congestion and sinusitis. Whether or not all of this proves true, garlic is a most intriguing natural substance. It is rich in selenium, potassium, zinc, and vitamins A and C.[48]
Here is some recent laboratory research that may be very important for pandemic influenza infections:

One 2005 study established that garlic oil suppresses many cytokines in stimulated macrophages.[49] This may be excellent news for helping prevent cytokine storms. The effect is dose dependent, meaning you can't take one garlic oil capsule and expect miracles.

Another study in 2004 points to allicin as a way to stop intestinal inflammation. Pandemic flu can attack more than our lungs. If entry is through the mouth, it can easily hit hard in the intestines early on, or spread there later. Diarrhea and other life-threatening symptoms will ensue. Significant doses of garlic might help reduce swelling, and may be one way we can survive. The 2004 study concluded:[50] "These observations indicate that *allicin exerts an inhibitory immunomodulatory effect on intestinal epithelial cells and suggest that allicin may have the potential to attenuate intestinal inflammation*."

(15) *Angiotensin-II receptor blocker (ARB)*

Very highly recommended.

The *Alternative Health News Online* is an excellent source of options you may try. This newsletter is one of precious few sources that appreciates the cytokine storm, and how we may possibly manage it. The one item on my recommended list that *will require a prescription* looks good, and below is what they had to say in December of 2005:[51]

"A BLOOD-PRESSURE DRUG, known as an angiotensin-II receptor antagonist (blocker), may hold the key to preventing the inflammation that causes the acute respiratory distress syndrome (ARDS) in avian flu patients. Research in Vienna, Toronto and Beijing on the SARS virus, which broke out in China a few years ago, indicates that the virus kills people by boosting levels of a chemical called angiotensin II in the lungs. When excessive angiotensin is released in the lungs, the immune system overreacts and the lungs fail.

The researchers suggest that avian flu may cause the same reaction. Also, the researchers were able to prevent acute lung failure in mice whose lungs were damaged by treating them with extra doses of an enzyme, ACE2, that reduces angiotensin II. For the complete story from the Austrian Institute of Molecular Biotechnology: [52]. For a medical abstract: [53].

Addendum: Dr. Malik Peiris, a member of the team that discovered the SARS virus, was quoted in *New Scientist* magazine as saying that angiotensin-blocking drugs as well as "an even older class of blood pressure drugs that prevent angiotensin from being made in the first place might save many lives" in a future flu pandemic."

The ARB category[54] is closely related to the angiotensin converting enzyme (ACE) inhibitor category[55] of blood pressure medications. Recent news about the danger of ACE inhibitors during pregnancy[56] suggests that ARBs should also be avoided to protect the developing embryo or fetus.

If blood pressure medication is right for you, ask your doctor about writing an angiotensin-II (ARB) prescription. Otherwise, if your blood pressure is normal or low, there are more than a dozen other things here to take and do.

(16) *Gamma-Linolenic Acid*

Very highly recommended.

The same *Alternative Health News Online* article has this to say about GLA, or gamma-linolenic acid:[57]

"GLA (Gamma-Linolenic Acid) has been shown to cut down on the damage cytokines can cause in the lungs of humans. Although little is available in the diet, it can be obtained from both evening primrose oil and borage oil, both available over the counter.[58] Note: We were unable to obtain the potencies used in the human study, but in human studies for other inflammatory conditions, as much as 1.5 grams (1,500 milligrams) of GLA a day was given. We suspect the dosage for the avian flu might be even higher. A capsule of evening primrose oil generally contains from 125-130 milligrams of GLA. However, capsules of borage oil contain as much as 300 milligrams.

Also, a study in rats found that cytokine levels were significantly decreased when GLA was administered.[59]"

Doing the math, this works out to either a dozen evening primrose oil capsules daily, or five borage oil capsules. I would not recommend this much GLA on a daily basis before you are at risk for exposure to this virus. I also would not rely on GLA as your sole protection.

(17) Statins

Statins, such as Lipitor, come highly recommended, because studies after 2006 have indicated that survival for inflammatory infections may be helped by statins. This is NOT an endorsement for statins, because they have their own side effects. Nevertheless, if you are taking statins already before a pandemic arrives, your chances might be a bit better. These are prescription drugs, so consult your doctor.

(18) SPECIAL NOTE:

Chicago's David Miller, M.D., FAAP, L.Ac., Dipl. OM[60] has graciously shared the following observations regarding the list of herbs above. Please incorporate his wise comments into your survival strategy, as your individual needs apply:

* *Concentrated Green Tea*: Explain how to make at home and what type of tea to purchase. (People should know that Lipton is relatively useless, as are many grocery available products.) Also, would white tea be as good or better? I understood that it has more antioxidant activity than green, though I don't know anything else about its immunomodulating characteristics. (I suspect they are also significant.) I know you are recommending the pills, but I wonder if making a concentrated decoction might also be effective and more cost efficient.

* *St. John's Wort*: I would not recommend this, since it affects the metabolism of too many other substances. If a patient is on other prescribed medications (such as HIV meds), it could dangerously change their blood levels and lead to compromise. Since many of the people who would be looking to these remedies may already be sick, on Western meds, and seeking alternatives – I'd avoid this one without significant caveats.

* *Tea Tree Oil:* Emphasize again at the beginning of the section that this should not be taken by mouth, but rather by steam. (I could see some individual taking a teaspoon of the oil, which could be toxic.)

* *Turmeric, garlic, and ginger:* These are all very warm herbs. Ginger in general is safe. Garlic and Turmeric particularly affect the blood, and garlic may cause excessive bleeding. I'd use these cautiously. In Traditional Chinese Medicine (TCM) these would likely be contraindicated in the presence of fever. Turmeric in TCM is contraindicated in pregnancy, and high dose garlic would also be a bad idea for pregnancy.

Category Two:
Things That May Help,
And Probably Won't Hurt

(1) *Natural Antioxidants.*

There are numerous natural food sources for antioxidants, and some in capsules. Some are recommended above. There is research to back up the value of antioxidants in fighting viral disease. Here, for example, is one:[61]. If free radicals are minimized, and if the capillaries and venules are working at peak efficiency, then maybe the body can better resist starting a cytokine storm, as suggested by research cited above for selenium. Natural antioxidants fall into a generally-good-for-you category,

which is part of being as healthy as possible before you enter into any life and death struggle with the killer virus.

Among the many excellent sources of antioxidants are blueberries, bilberries, strawberries, and fresh colorful vegetables in general. All of the above are part of my diet, with *bilberry* taken as 1000 mg extract daily in capsule form. I have a special fondness for frozen *blueberries* added almost daily to my natural cereal. Wild blueberries have even more antioxidants than cultured blueberries. I have noticed over the past decade that my mouth and gum capillaries seem healthier since I have added various sources of antioxidants to my daily diet; and I almost never bruise anywhere on my body. Supplements of this type are many, but I especially like *coenzyme Q-10, and alpha lipoic acid*.

One liquid that should be in plentiful supply around your house is the old standby, *Welch's Grape Juice.* Get the purple Concord grape variety, with 100% juice. House brands at grocery stores with the same dark grape formula should work as well.

Again, all of these items are available and affordable at your local grocery store and your local pharmacy. Hopefully you have access to a natural foods store with a supplements section. Some excellent suppliers are on the web. Use a Google search to find the best for your needs. Also see my appendix regarding sources.

An interesting and almost funny point: Multi-vitamin pills sometimes tout the latest ingredient in large print on their labels. It's commonly lutein or lycopene. These natural substances are on their own merits highly recommended; but the actual quantities you will get in such pills are a marketing joke. Typically, when the dose should be in milligrams, you will find the dose in micrograms.

Don't let the marketing fluff stop you from buying a generally potent and broad-spectrum formula.[62] You are free to buy separate lutein and lycopene capsules, for example, even if your "multi" has a token amount of each hyped substance among its long list of ingredients. (On the other hand, some substances, such as selenium, are taken in microgram quantities, not in milligrams.)

(2) *Good health habits.*

Talking about good health habits fits into our "do as I say, not as I do"

culture. We all talk a good line. Far fewer of us walk that good line. Maybe we should just start by walking for a half-hour daily. *Regular aerobic walking* reduces stress, which reduces stress hormones, which leads to a better immune system. *Getting enough relaxing sleep* every night in this stressful 21st century culture is also imperative for maximum immune efficiency.

I personally believe in *the Confucian golden mean*. We are best getting a steady amount of moderate exercise over the long run. That's been the pattern for our species as we evolved. Exercise fanaticism is fine, but extreme levels can degrade our immune system. Not exercising equally goes against our evolution path. There is no way that becoming a professional couch potato is best for one's overall health.

Moderate exercise can also include vigorous exercise, as long as it does not overtax our bodies. Indeed, there may be extra benefits from a sensibly serious exercise program. Dr. Marian Kohut at Iowa State University found while testing those 62 and older that "adults who exercised regularly and vigorously produced higher levels of anti-influenza IgG and IgM antibodies (key influenza fighters) following flu immunization than those who exercised moderately or who were inactive."[63]

Part of the mystery of the Spanish Flu pandemic is why so many young adults were stricken, when the older adults fared better. Even pre-teens and early teens did statistically better. The idea is that older adults had some modest protection (whether they exercised or not) from previous epidemics – and that pre-teens do not have a fully developed immune system. I wonder.
Perhaps a cytokine storm is the last resort of anybody's immune system when it senses it cannot otherwise defeat the intruders. I am reminded of that infamous quote from the Vietnam War: "In order to save the village, we had to destroy it."[64]

In the Z-variant of H5N1, Vietnamese victims were often younger children, or teens. The first deaths outside Asia involved children in a Turkish family.[65] The H5N1 virus is an absolutely bad actor, and it doesn't care how old or young you are. Therefore, it doesn't hurt your survival odds to be as healthy and physically fit as possible whatever your age, because this bug can attack your entire body. Maybe a little more overall resilience will pull you through – if we can tone down the cytokine storm's potential with some of the things to take herein.

You may have wondered why I have included "good health habits" in my "what to take" chapter, and not exclusively in my "what to do" chapter. Adding fresh oil to a rusty car with bad tires won't make it run like a new car. Likewise, adding quality supplements to a self-abused body can only help so much.

Sometimes not doing something is just as important as doing something. When it comes to "not doing," the top thing is to quit smoking. According to the Centers for Disease Control and Prevention (CDC):[66]

"* There is a higher mortality rate for smokers than nonsmokers from influenza.
* Smoking is related to chronic coughing and wheezing among adults and children and chronic bronchitis and emphysema among adults.
* Smokers are more likely than nonsmokers to have upper and lower respiratory tract infections, perhaps because smoking suppresses immune function.
* Smoking harms nearly every organ of the body, causing many diseases and reducing the health of smokers. Quitting smoking has immediate, as well as long-term health benefits."

The one mystery surrounding Spanish Flu and the current H5N1 flu which is more confounding than the cytokine storm is the simple numbers game involving who gets exposed, but does not develop a life-threatening illness; and who gets exposed, and does develop it. Is membership in either class a random process, or are there undiscovered reasons?

No reliable statistics involving these two groups are available for the 1918-1919 pandemic era, or for the current evil. Even the most highly monitored country, Vietnam, does not have reliable population statistics. According to a recent WHO report: "The frequencies of human infection have not been determined, and seroprevalence studies are urgently needed."[67]

Even monitoring seasonal flu is not mandated here in America. The CDC does not require states to report influenza cases, or even influenza deaths. Only voluntary reports are now submitted.[68] Here is a critical gap in our scientific knowledge. I suppose that the next pandemic will yield some ghoulish answers.

Before then, it is reasonable to hypothesize that certain people might be better able to deal with the threat because their cellular immune systems are up to the task of handling a very minimal invasion of viral particles, and also are enabled to not overreact.

Keeping the immune system in balance involves what to take, and also what not to take. Keeping the viral invasion of our bodies at a minimum involves what to do.

Category Three:
Things That May Help Elsewhere

(1) *Black Elderberry and Sambucol.*

I'm starting off this odd list with one of the very strongest helpers in our fight against seasonal flu and other viruses. Hippocrates used black elderberry (*Sambucus nigra*). Itis widely used in Europe and elsewhere. In the form of the Israeli product, Sambucol, this herb has a permanent place in my own medicine cabinet. Why then would I NOT clearly recommend such a fine antiviral weapon?

Simply, *it might help stimulate a pulmonary cytokine storm in the presence of H5N1*.

Two studies by Israeli scientists demonstrate the very strong cytokine-stimulating powers of elderberry, and the less powerful effects of Echinacea and bee propolis, two other ingredients in Sambucol Immune System Syrup. Here is part of the 2001 abstract:[69]

"Sambucol was shown to be effective in vitro against 10 strains of influenza virus. In a double-blind, placebo-controlled, randomized study, Sambucol reduced the duration of flu symptoms to 3-4 days…. The production of inflammatory cytokines was tested using blood derived monocytes from 12 healthy human donors. Adherent monocytes were separated from PBL and incubated with different Sambucol preparations i.e., Sambucol Elderberry Extract, Sambucol Black Elderberry Syrup, Sambucol Immune System and Sambucol for Kids. Production of inflammatory cytokines (IL-1 beta, TNF-alpha, IL6, IL-8) was significantly increased, mostly by the Sambucol Black Elderberry Extract (2-45 fold), as compared to LPS, a known monocyte activator (3.6-10.7 fold). The most striking increase was noted in TNF-alpha production (44.9 fold). We conclude from this study that, in addition to its antiviral properties, Sambucol Elderberry Extract and its formulations activate the healthy immune system by increasing inflammatory cytokine production."

(2) *Echinacea and Bee Propolis.*

Pure elderberry extract in the above study had a stronger cytokine effect than mixtures. A 2002 study by the same laboratory included specific reference to Echinacea and bee propolis, part of the formula for

Sambucol Immune System Syrup, but tested in the herbal formulas Protec and Chizukit N. Here is part of what they found:[70]

"Protec induced only a moderate production of IL-8 (1.6 fold) and IL10 (2.3 fold) while Chizukit N caused only a moderate increase in IL10 production (1.4 fold). Both Protec and Chizukit N caused moderate decreases in IL-1 beta, TNF alpha and IL-6 production."

What this means for Echinacea and propolis is unclear. Their effects are minimal on cytokines, and generally offset each other. As an herbalist, I have harvested Echinacea in the wild, and processed into tinctures both of these fine substances; but their use is best directed for other purposes. (For example, propolis capsules ameliorate ulcers, but do not cure them.) Echinacea and propolis are not star players in the anti-H5N1 drama, so why spend money on them?

Nevertheless, I do recommend Sambucol formulas for seasonal viral infections of the upper respiratory system. Indeed, the ethical makers of Sambucol only recommend it for upper respiratory conditions.

(3) *Polypharmacy herbal formulas.*

Part of the "fun" of being a professional herbalist is dazzling others with your knowledge of large numbers of weird and exotic substances that find their way into formulas. The Chinese are especially adept at this polypharmacy game. Popular formulas often combine centuries of good clinical practice with superstition regarding such things as rhino horns, bones of extinct animals, and other weird ingredients too gruesome to mention. Sales are good, and everybody is happy with the placebo effect.

In contrast, many professional formulas are quite excellent, if you know what to buy, and you have a reliable source. In the hands of a trained Chinese healer who understands "chi" you can get help for many different ailments, with unique formulas individually prepared for your ailments. Holistic treatment, including ingredients with medicinal value, can go beyond placebos. However, usually this requires a skilled therapist, someone not available everywhere to everyone.

The opposite approach is using single tinctures, called simples, targeted toward specific ailments. This classical approach is more common in western herbal tradition, where we try to be more scientific. The problem

with this approach is that it properly takes an ongoing intervention from an experienced practitioner. On a cottage industry level this is fine, but it is totally out of place for billions of people facing a global pandemic. The people need easy and affordable access to a few simple things that just might give them an edge in this fight.

Another manifestation of polypharmacy is where seniors, most commonly, are taking more medications than they need.[71] Sometimes they are taking medications prescribed by different doctors who haven't been fully informed about what has previously been prescribed. Medications are often prescribed to offset iatrogenic effects from other patent medications. This type of polypharmacy is a pre-existing and separate challenge from the bird flu challenge.

The main reason I am hesitant to recommend generic herbal polypharmacy for bird flu is because you are spending a lot of money for many ingredients of general value. Even if some of them could work against avian influenza, their beneficial activity is compromised when other substances inside the formula's pills or capsules take up space.

Mixing targeted botanicals with placebos means you will be paying a lot of money for diluted therapeutic effect – and that could be fatal when up against the take-no-prisoners H5N1.

(4) *Herbal immunostimulants.*

Here is a list of immunostimulants, as presented by the clinical herbal research site, *Phytotherapies.org.* Some or all may be great for specific problems unrelated to potential cytokine storms. However, I would consume most of these with caution when fighting bird flu.[72]

Action: immunostimulant Stimulates one or more aspects of the immune reaction, also calledimmuno-modulating, or immune enhancing.

Monographs:
Andrographis paniculata (andrographis)
Angelica sinensis (dong quai)
Astragalus membranaceus (astragalus)
Baptisia tinctoria (wild indigo)
Codonopsis pilosula (codonopsis)
Echinacea spp. (echinacea)
Eleutherococcus senticosus (Siberian ginseng)

Ligusticum wallichii (Szechuan lovage root)
Paeonia lactiflora (peony)
Panax ginseng (Korean ginseng)
Phytolacca decandra (poke root)
Picrorrhiza kurroa (picrorrhiza)
Propolis (propolis)
Tabebuia avellanedae (pau d'arco)
Thuja occidentalis (thuja)
Uncaria tomentosa (cat's claw)

* The following information for this book was given to me by Chicago's David W. Miller, M.D., FAAP, L.Ac., Dipl. OM. He is highly trained both in American and Chinese medicine:

"Action: immunostimulant Stimulates one or more aspects of the immune reaction, also called immuno-modulating, or immune enhancing. Monographs: Andrographis paniculata (andrographis) chuan xin lian Angelica sinensis (dong quai) dang gui Astragalus membranaceus (astragalus) huang qi Baptisia tinctoria (wild indigo) da qing ye (?) Codonopsis pilosula (codonopsis) dang shen Eleutherococcus senticosus (Siberian ginseng) ren shen Ligusticum wallichii (Szechuan lovage root) chuan xiong Paeonia lactiflora (peony) bai shao Panax ginseng (Korean ginseng) ren shen Picrorrhiza kurroa (picrorrhiza) hu huang lian Thuja occidentalis (thuja) ce bai ye

These all have different properties in TCM (Traditional Chinese Medicine), and would in general not be recommended as singles, and are not recommended for general use. Some of these may have opposing actions as well, or may increase the risk of bleeding when combined with other substances. I would not put them out there (from a TCM perspective) as general immunostimulants, even if constituents of them have those properties."

(5) *Oscillococcinum.*

Oscillococcinum is among the French an extremely popular homeopathic flu and colds prevention/treatment formula. This Boiron formula is here not because it harms, but purely because it only has a documented placebo effect.[73] People facing a critical choice among medications may go this way and think they are OK with this alone, only to pay a fatal price. There is no guarantee that any medication, artificial or natural, now available will adequately protect us from H5N1 at its worst fury. However, it is prudent to go with things that at least show some documented evidence of chemical activity. If you will spend money anyway on this popular French product, please take other recommended things listed above.

Boiron does make another homeopathic product that could belong in the second group, then again maybe not.[74] Called *Influenzinum 9c,* it comes in a tube with eighty beadlets. This product is different from *Oscillococcinum* because it is made differently every year from strains of influenza that the WHO is predicting. When a pandemic is immanent there will be zero production of standard seasonal flu vaccine.

Two years ago, when regular seasonal flu vaccine was not available, I took the homeopathic version produced by the company Boiron has since bought, Dolisos, called *Dolivaxil.* I never got the flu that season. Whether I just "got lucky," or whether that formulation actually worked, I cannot say. At the very least it was a nice placebo. Such could be the pharmacological case with *Influenzinum 9c*. You will be out about $20. That's not too bad for an exotic placebo. On the other hand, $20 is a super bargain if it actually works as advertised.

If you choose to try this approach, still do everything else recommended in this chapter and book to protect yourself. Remember, even if a future formulation works somewhat as advertised, it may not be targeted at your variant of H5N1, but at the seasonal variants or an earlier variant of H5N1. Caution is always in order where one mistake could lead to your personal extinction.

A Word About Mind and Body

The mind and body are not separate, but one. We easily acknowledge the physical brain as part of the body, but we are tempted to imagine that the mind is not of our body. Actually, the mind is an emergent from our body's physical properties, and as such the mind and body are one. This is the integrated, holistic perspective.

A study in the May 10, 2006 issue of *JAMA* compared the health of Americans and Britons 55 to 64. Despite spending twice as much as Britons on medical care, American health across the board is much worse, so much that wealthy Americans with access to the very finest medical care have worse health than poor British. This study accounted for all sorts of variables, such as drinking habits, obesity, and smoking. No one reason was clearly found for this strong divergence.

Dr. Michael Marmot, an author of the report, said, "I'm arguing that it's due to the differences in the circumstances in which people live. Work, job insecurity, the nature of communities, residential communities, *et*

cetera — I think that's the place we should try to look."[75]

Dr. Marmot intuitively is onto something very important. America is an increasingly competitive society. Competition stresses the body's immune system. Humans did not evolve in a modern American society. Britain isn't prehistoric, but their culture is less harsh on the psyche. While visiting England, I quickly felt the harmonic difference. *Chronic stress exacts a toll on our overall health*.

What we take into our bodies is not independent of the state of our bodies. Medicines and foods do not act independently of our immune systems. Our ability to recognize and defeat pathogens is partially dependent on the health of our immune system, with or without medicines. This applies both to acute attacks, like influenza, and to all the chronic degenerative diseases that increasingly afflict Americans in disproportionate numbers.[76]

The mind is the highway between ideas, emotions, and chemicals. It is for this reason that placebos can also be helpful in an otherwise positive context. Placebo is from the Latin, "I shall please." Part of the power of the white coat and the ritual of handing out prescriptions is the placebo effect. Indeed, taking anything, even self administered, that we believe will help, usually will help.

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X.
What to Do

From the Past to the Present

The advent of penicillin and all the other antibiotics just over a half-century ago was hailed as the greatest public health advancement ever. Sometimes overlooked are other do-it-yourself public health advances with profound effects. The basic screen has protected untold millions of people from flies and mosquitoes bearing multiple lethal diseases.

For every action there is a reaction. With lowered mortality the Earth's population has swollen to where our global ecosystem is stressed. Global warming enhanced by released carbon dioxide is unprecedented within the last several thousand years. What was good in previous centuries may have become too much of a good thing for this century, as the world's population expands toward seven billion over a global surface biosphere that does not expand. Humans are unique, because we can understand these complex causal chains, and we have the ability to make necessary corrections. Yes, we have the ability; but do we have the wisdom?

Antibiotics and screens won't help at all when it comes to avoiding the bird flu. Unlike with diseases such as malaria and West Nile, human-adapted bird flu will skip from human to human without any insect intermediaries. Other basic precautions of the right type will be much more effective.

First and foremost, if you avoid sources and avenues of infection, you stay healthy. In our interconnected modern world *any avoidance strategy is easier to articulate than activate*. Extremely few of us can live remotely, avoiding for months all human contact, and sustaining ourselves entirely with our own efforts. Short of that, we need to focus on avoiding avenues of viral transmission. Fortunately, even a killer flu is "just" another flu when it comes to contagion, so that hygiene lessons learned for other influenzas can help us avoid the pandemic bug at its worst.

Basic hygiene is critical for prevention. You could, for example, go to the neighborhood grocery store for basics, and find yourself dead from the trip a few days later. How does this happen? All you need to do is touch the grocery cart push rail after it has been used by another person who is infectious, but still asymptomatic, or still well enough to go shopping for food. Next step is touching (without consciously thinking) your mouth, eyes, or nose with an infected finger. Or you can simply be standing in line next to somebody coughing out viruses. It's all too easy.

Recently I was in full "do as I say, not as I do" mode while shopping at my grocery store during a peak of seasonal flu and colds. I did not sanitize the push rail of my cart with an antiviral spray or sanitizing wipe such as Lysol,[1] and then thoughtlessly put my fingers to my face while still inside the store. Two days later a nasty head cold made my life more interesting. I easily survived this too-human mistake during a pre-pandemic era. During a killer pandemic, just one mindless mistake like this could be fatal for yourself, and for those you subsequently infect. Think, think, think…and then act wisely.

My basic advice is to stock up ahead of time on various canned vegetables, dried milk, multiple large containers of drinking water, dried and canned soups, canned meat, brown rice, beans, whole grain cereals, and candy, along with multiple substances you choose from the "what to take" chapter, or anything else your family will need for at least two months.

If you must go shopping during the pandemic, sanitize the cart's entire push rail with strong antiviral spray, and that includes the bottom side. Money that has recently touched other hands can carry viruses, so use a credit or debit card. Wear a clean N95 mask in public during the pandemic.

I do not recommend filling a large freezer or refrigerator with perishable food, since the power grid may be temporarily at risk if many of its maintenance workers are infected. Stock up your pantry with basics – if only because there may be a concurrent run on edible goods, and a subsequent shortage of replenishing merchandise, should the food distribution system become seriously disrupted for more than a few days. Consider what happens when the mere hint of a big snow propels frenzied crowds to the grocery store. (Here's another short list for preparation:[2].)

The first tidal wave of pandemic death will sweep over your community during that cocooning period. This is not to say that the bird flu will "fly away" thereafter. It only means that there will be fewer opportunities to become infected, at least until the next killing wave arrives possibly a month or a season later.

Stock up again when the danger has receded, in preparation for the next wave. Stay vigilant even when cases in your community are few. Extreme vigilance is necessary until all community cases are gone, possibly one or two years later. The Spanish Flu stuck around from early 1918 until well into 1919 – with the worst period being the second wave, in late summer and early fall of 1918.

There is no established theory to explain waves as opposed to mere sustained presence. Seasonal influenza often exhibits both characteristics; and avian flu should do likewise, just persist much longer. My guess is that people who cocoon for a short time, then run out of food, are going to help stimulate the second wave, even if they don't precipitate it. Schools that let out for a few weeks until "the worst is over" might amplify the truly worst in the form of a more deadly second wave. Something to think about!

One of the best learning tools for establishing effective hygiene defenses against the bird flu is seeing what happened inside past epidemics. The best model for today's threat is not the medieval Black Death, likely involving fleas and bacteria, and its much longer period of killing in a preindustrial society. The best model is last century's global Spanish Flu epidemic that played out inside a fairly modern society similar to ours.

We know about the people during that viral siege buried in mass graves, or dumped off troop ships heading to Europe. Less advertised are all the people who did not develop the clinical disease. Indeed, this earlier pandemic didn't even strike parts of Iceland and Samoa, because both isolated communities banned everybody from visiting their domains. Nations can't hide like that today.

The early 21st century is much more linked than was the early 20th century. Transportation is by jet, not by steam ship. Cars zip around in all directions, whereas previous passengers rode a train or bus. The key differences are speed and ubiquity. Today's alpha traveler from Asia can get infected with human-transmissible avian flu today, and bring it by jet to America tomorrow before any symptoms are felt. During and after his

trip he (or she) will have the opportunity to infect several others, starting a nuclear-like chain reaction that will devastate a continent.

Part of our planned national defense is establishing monitors at airports to look for sick arrivals. This contagious alpha person will pass right by them. Meanwhile, the ever-vigilant bug cops will be stopping people with stomach flu, head colds, allergies, seasonal flu, and a host of other irrelevant ailments. Even if somebody sick with early pandemic flu is stopped, they will not be quarantined, just referred to a hospital, where they probably will be released into the community if not already too sick. Samples may be taken, but it will be many hours before our alpha traveler is identified with the pandemic strain – and long gone – giving him or her plenty of additional time to start the nuclear chain reaction.

Even though it took weeks for WWI troop ships and civilian trains in America to spread the pestilence, the Spanish Flu still managed to ravage the world over the space of several months. Therefore, I don't see what advantage temporary delay at the airport has over getting zapped sooner. Last minute and hasty defensive preparations will at best be haphazard. What we do in a meaningful way during the months before a pandemic is much more important.

Even the 2006 federal pandemic action plan recognizes that vigilance at the border could only slow down the inevitable by a couple weeks. There is no way the world's largest economy can quarantine itself from the world for months.

Today we have instant media feedback regarding the emerging threat, making this is the first time humans may be witnessing the unfolding of a new global influenza pandemic. Our very new ability to electronically monitor on the Internet almost everything everywhere allows for additional time to panic, or prepare. In 1918 the Wilson administration tried to downplay the threat for patriotic reasons, by controlling the flow of information, but there were riots anyway. The American people then were a lot less stupid than their national leaders thought they were.

Today's people around the world learn through the Internet just as fast as their "leaders." Multiple data sources empower us with more opportunities to learn, and more options to defend ourselves. *Panic only occurs when we are faced with an acute danger, and feel totally defenseless.* A major purpose of this book is to encourage an informed military mindset, rather than panic.

In the "what to do" category are really the most important defenses you will have against the pandemic virus. Yes, it is great to have some powerful chemicals on your side, lacking a fully effective vaccine. Even with excellent chemicals, your body could fight a major battle. If you win, you will have battle wounds both physical and emotional. Also, you may survive only to help bury some of your loved ones. Not good. *Classical hygiene – done right – is our number one defense.*

The rest of this chapter will touch on what our world and national leaders are doing; what our state and local leaders will be doing; what our employers should be doing; and what we ourselves should be doing. Please also read the appendix to this book discussing the May 2006 federal pandemic influenza action plan.

It's nice to see what others are doing for us, but the virus attacks us directly, not through the United Nations or Washington. Neither the United Nations, nor any other official entity will save us. *Bottom line is the buck for now stops with us. We must shake off our complacency and learn to wisely defend our loved ones, working with our doctors. Nobody else, not even the blue coats and the white coats, will fully relieve us of this burden.*

What Our Global and National Leadership is Doing

Shortly after Katrinagate hit Washington the top feds were quick before news cameras with detailed bird flu defense plans. Did you wonder how they suddenly came up with such a detailed pandemic program so fast? The federal government has many good people working anonymously. Some of these fine invisible bureaucrats were already at work on a pandemic scenario months before. When the sweaty politicians called, out came the wonderful plans modified with current dates.

Of course, there is a huge gap between wonderful plans and actually carrying out those plans. On paper these highly detailed action plans look bureaucratically impressive. If nothing else, they will give the sweaty politicians some cover when the pandemic is in full force and little seems to work.

Throughout 2005 the seriously under-funded World Health Organization's medical doctors were repeatedly warning a blissful world about the emerging grave danger. For example, in February of 2005 Dr. Shigeru Omi, WHO's western Pacific regional director, urged health

agencies around the world to better coordinate their fight against the virus. "We at WHO believe that the world is now in the gravest possible danger of a pandemic," Omi said.[3]

In August of 2005 – two weeks before Katrina – President Bush signed a bloated $286.4 billion highway bill, called the Transportation Equity Act.[4] Inside it are 6,371 "earmarked" pet projects. Rep. Don Young, R-Alaska, the House Transportation Committee Chairman, included $231 million taxpayer dollars for a giant bridge nearly as long as the Golden Gate, and higher than the Brooklyn Bridge, linking the booming metropolis of Ketchikan (pop. 8,000) to the bustling Gravina Island (population less than 50). Local ferry operators were not amused.[5]

While all of these wasteful games with our taxpayer dollars are playing out in the giant world of greedy humans, down in the Lilliputian world of electron-microscopic viruses a Darwinian "struggle for supremacy" continues, with variants of H5N1 seeking to numerically dominate each other. Numerical domination is achieved, either intentionally or accidentally, by evolving and simply spreading faster than the old competition. That's why human-adapted pandemic strains supersede the less-efficient variants in our bodies. That's why every infection of a human with non-human H5N1 further threatens to bring forth the human-adapted evil that we fear. Each human or pig hosting both human and avian strains of Influenza A is a mixing bowl for viruses.

The news early in 2006 about a cluster of lethal H5N1 cases in rural Turkey points to the lack of timely monitoring of potential alpha cases in many parts of the world.[6] Part of the world's containment strategy for incipient human-adapted pandemic flu is to get to the alpha community in time to stop viral spread. Turkey is a fairly modern country seeking to fully join the European community, and even there we don't have universal monitoring of rural areas.

What sort of timely monitoring do you think will occur now that the virus has flown down to African villages? What too about rural villages in Indonesia, Cambodia, India, and China? What about South American villages next year when the virus wings its way to the New World? More human infections will follow, with more chances for the virus to better adapt for efficient human-to-human transmission.

Good hygiene soldiers all, the World Health Organization continues to publish extensive updates on this emerging crisis.[7] They also have

provided nations and communities with a road map for action, recommending what to do and what not to do.

Here is their November 2005 action strategy for non-pharmaceutical interventions:[8]

"At the start of a pandemic and for many months thereafter, all countries will face inadequate supplies of vaccines and antiviral drugs. WHO has therefore organized several expert consultations to explore the role of classic public health measures in reducing transmission and delaying spread. Evaluation of these measures has been based on limited experience during past pandemics and on what is known about the behaviour of normal influenza viruses.

The effectiveness of several measures will depend on the characteristics of the pandemic virus (attack rate, virulence, principal age groups affected, modes of spread within and between countries), and these cannot be known in advance. After a pandemic is declared, WHO will monitor its evolution in real time. Recommendations about the most effective measures will therefore become more precise as the epidemiological potential of the virus unfolds. For all these reasons, the recommendations below should be taken as general guidance, and not as formal WHO advice. Recommended measures are specific to the phase of alert in the WHO six-phase scale.

Phase three (current phase). The present situation is categorized as phase three: human infections with a novel virus subtype (H5) are occurring, but there is no evidence that the virus is spreading efficiently and sustainably among humans. Although the virus has demonstrated some ability to infect humans, H5N1 avian influenza remains principally a disease of birds, and not of humans. Human cases at present are isolated and rare, indicating a significant species barrier. To date, fewer than 130 human cases have been officially confirmed, despite the infection of tens of millions of birds over a wide geographical area for almost two years, in a situation with abundant opportunities for human exposure. At this phase, WHO recommends vigilance for human cases in areas experiencing outbreaks in birds. Unaffected areas should undertake measures to prevent entry of the virus via poultry or wild birds, especially as this virus, once established in birds, has proved to be especially tenacious. For humans, no travel restrictions or screening measures at borders are recommended, as the risk that the virus will be carried by international travellers is considered negligible.

Phases four and five. Phases four and five are characterized by evidence that the virus is progressively improving its transmissibility among humans, but is not yet spreading efficiently and sustainably. An increase in the number of clusters, closely related in time and place, is considered the likely epidemiological signal of improved transmissibility. During these phases, when instances of human-tohuman transmission remain localized, WHO may recommend, depending on the circumstances, some of the measures below. These measures aim to reduce transmission and prevent, or at least delay, further spread.

Rapid detection and isolation of persons infected with H5N1.
Tracing of close contacts during the patient's first two weeks of illness and voluntary quarantine of symptomatic persons for one week.
Use of antiviral drugs for treatment of cases and prophylaxis of others in the initially affected area. The WHO rapid-response stockpile of antiviral drugs will be used for this purpose.
Restriction on the movement of persons in and out of the initially affected area.

- Screening of travellers departing from areas where clusters of human cases are occurring.

Phase six: pandemic declared (not all countries affected). At the start of a pandemic, when not all countries or areas within a country are likely to have cases, WHO may recommend, depending on the circumstances, some of the measures below.
Health care workers and first responders should be equipped with N95 respiratory masks; these should be fit-tested and training in their use should be provided. If respiratory masks are not available, standard well-fitted surgical masks should be used.
Patients and persons seeking care in areas with cases should wear surgical masks.
Persons with fever and respiratory symptoms and their contacts should be asked to undergo voluntary home confinement.
Populations in countries with cases should be asked to defer nonessential domestic travel to affected parts of the country.
Countries with cases should provide incoming travellers with health alert notices describing symptoms and where to report should these symptoms develop.
Countries with cases may introduce exit screening measures for departing travellers. However, such measures are disruptive and costly and will not be fully efficient, as influenza viruses can be carried by asymptomatic persons, who will escape detection during screening.
For persons known to have been exposed in an aircraft or aboard a large cruise ship, consideration can be given to recommended daily fever checks among passengers and crew and prophylactic treatment with antiviral drugs, when available.

Phase six: pandemic spread (all countries affected). Because influenza viruses are contagious and spread easily via coughing or sneezing, pandemics have historically encircled the globe quickly. After a new pandemic virus has spread widely within countries and internationally, WHO may recommend, depending on the circumstances, some of the measures below for all countries:

Patient isolation and tracing and quarantine of contacts should cease, as such measures will no longer be feasible or useful.
Health care workers and first responders should wear N95 respiratory masks or well-fitting surgical masks; patients should wear surgical masks.
Should a large surge in cases occur, health care facilities should be arranged in ways that help reduce transmission (for example, by keeping a distance between patient beds or placing adjacent beds face to foot).
"Social distancing" measures, such as the closing of schools or cancellation of large gatherings, may be recommended if evidence indicates an association of certain settings or events with amplified transmission or dispersion into the wider community.
Populations should be repeatedly informed of the need for frequent hand washing with soap and water.

Populations should be repeatedly informed of the need for "respiratory hygiene" (covering mouth when coughing or sneezing, careful disposal of soiled tissues or other materials)
Mask wearing by the general population is not expected to have an appreciable impact on transmission, but should be permitted, as this is likely to occur spontaneously.

WHO does not recommend, at any phase, that individual countries be quarantined or that international borders be closed."

In the real world one of the first things that will happen when the human pandemic initially breaks out is the closing or sharp monitoring of some borders, leading to de-facto quarantining of individual countries.[9] Whereas scientists try to look at the picture as rationally as possible, national politicians and local officials will respond to panicky pressures from their media and citizens.

After multiple borders are closed for weeks from a real outbreak, massive economic disruptions and depressions will ensue in parts of the world. Some politicians will at first be tempted to have their military surround a town or two, trying to stop the unstoppable. Soon the virus will do an end run around such ineffective barriers, and the Grim Reaper will be busier than Santa Claus on Christmas Eve.

What Our States Will Be Doing

President Bush's pandemic flu plan involves the states and localities. States are now polishing up their pandemic flu plans, so that governors and their top administrators can claim they are getting all their dead ducks in a row.

Seriously, if you are up for some "fun" reading, just check out your own state's official pandemic flu plan.[10] It will discuss in great detail how they will try to distribute the scarce vaccine that probably won't be much good. It will discuss how they will be distributing a limited supply of antivirals, including medicines already known to be virtually worthless against H5N1. It will discuss all sorts of often meaningless bureaucratic testing and reporting, little of which will be done anyway during the heat of the pandemic. It may project mortality toward the lower end of what could happen. It will look very tidy on paper, the exact opposite of what may happen in a worst-case scenario.

If you would like an objective report on how your state's health stacks up against others, and even how your state is preparing for emergencies,

one of the best sources is the web site hosted by the Trust for America's Health (TFAH).[11] They are a non-profit, non-partisan organization dedicated to saving lives by protecting the health of every community, and working to make disease prevention a national priority.

Another excellent overview of the status of our states and localities was printed in *The New York Times* in February of 2006.[12] Among the highlights of this article:

- Of the $7.1 billion President Bush requested for avian flu, only $3.3 billion has been appropriated so far. The bulk is for vaccine and drug research, with only $350 million for local health departments. That works out to about $70,000 as an average for each of the nation's 5,000 health departments.

Dr. Harvey Fineberg, president of the Institute of Medicine of the National Academy of Sciences, said that if an epidemic stuck in the next year the quarantine-based strategy called social distancing "is likely to be all we're going to have as a strategy."

Few local stockpiles exist of precautionary items like masks and sanitizers, and no stockpiles of expensive, but critically needed, $30,000 ventilators. Dr. Roger Baxter, head of flu preparedness for Kaiser Permanente in California, said in the *Times* article that his hospital network was "probably better off than 90 percent of health systems out there, and we have no surge capacity." He added: "We're a business, and we operate on a thin margin. We don't have extra ventilators. Even in normal flu seasons we tend to divert patients to other hospitals. There's no way we can realistically plan for this."

There is deep concern that critically needed supplies from the federal government will not get distributed by all states during a crisis. Most cities and states lack plans to distribute drugs and respirators, even though the federal stockpile is growing. "You can have all the Tamiflu and respirators in the world, but if you can't get them to the people who need them, they're not much good," said Kim Elliott of the nonprofit Trust for America's Health.[13]

Meanwhile, the proposed federal budget for FY2007 is $2.77 TRILLION, with hefty increases for the politically popular war on terrorism.[14] From the numbers, it seems that a few human terrorists threaten politicians more than trillions of microscopic terrorists with the power to fill mass graves.

What Our Localities Will Be Doing

Just like state and federal governments, *local officials* cannot be too far ahead of their constituents. They may be closer to the voters, but the voters are even closer to their TV sets, watching the latest *American Idol.* Speaking at the January 2006 meeting of The United States Conference of Mayors, Richard Ward of Hurst, Texas said: "I don't think our constituents think it's real. As with so many things, it seems to be so blown out of proportion. And frankly, this generation has not witnessed anything like this."[15]

Local governments are both closest to the people, and most removed from the federal money and policy power. Local leaders will try to do an excellent job in a pandemic. Police chiefs will focus on law and order in the face of potential panic. What happens within their communities will have less to do with the police, and more to do with the pandemic itself.[16] We are talking about a potentially near-nuclear force much greater than any city hall. Nevertheless, many localities are preparing now, but not all equally.[17]

There is an element in society that is barely controlled by social norms in the best of times. Given any arena to exhibit greed and rage, they will. I believe this element is in the minority. If the police and good citizens can manage the loonies, then maybe the rest of us can go about our survival in peace. However, if critical elements of society, such as basic utilities, melt down for more than a few days, then the beast in all of us may stir.

Local governments should be interfacing with *the medical community* to find additional space for treating the sick, once the community's hospital beds and hallways are full. Local governments should provide necessary municipal support for those extra emergency treatment locations. There is anecdotal evidence that temporary elimination of large gatherings helps to reduce influenza morbidity, and thereby mortality.[18] In this light, it would be wise to cancel sports events, public concerts, and other mass gatherings. Churches should also re-evaluate their services in this regard. Canceling mass gatherings reduces mass graves.

What Our Schools Will Be Doing

A huge part of local government is *the local school system.* Here's where things could get interesting: In areas where snow is expected there are a number of scheduled snow days. In a normal year, when there's any measurable snow such a school system will shut down for a day. After a big snow they will shut down for several days. It's all been planned for and budgeted in the ordinary school year.

Schools don't normally shut down when the flu is in town, and in fact several state departments of health have recommended against it for seasonal flu (Rhode Island, Minnesota, and others) – but a pandemic strain is totally different. They might all shut down for a while, but for how long? What will be the trigger, and the timing? What will be the consequences of their shutting down for weeks at a time? What will be the community health consequences if they don't shut down that long, or soon enough? After shutting down for several weeks during the first wave, will they do likewise during the second and third waves? (The second wave in 1918 was the most deadly.)

An *ABC News* report in March of 2006 explained the dilemmas facing families and communities:[19]

In a best-case scenario, schools will shut down for extended periods of time, saving the lives of many children, teachers and staff who could be infected in close quarters. In a worst-case scenario, schools stay open, parents who must work send their children to school, hastening the spread of infection.
Experts said it is very likely that schools and day care centers will be shut down as soon as a pandemic begins. They're incubators for infection. However, a few weeks closed is not enough for a pandemic that may appear, retreat, and return to kill over a few months.

If you don't send your kids to school, what are you going to do with them? Most parents can't stay home to take care of kids, and if they do, they can't go to work. Day care is worse. There are no easy options.

Merely shutting down school systems in time will not fully ensure that children will not spread the illness. Very small children are more easily cocooned, achieving real social distance. Older children are much more independent and mobile. If they are allowed to roam around town at all with their friends, the benefits of separation will be minimized. The social

activity of older children is one reason why some school systems don't bother shutting down in seasonal influenza epidemics. If you have several children in your home, and just one of them roams, everybody in your cozy cocoon will be at heightened risk.

Nevertheless, there is evidence from the 1957 pandemic and from other sources that shutting down schools does have a beneficial effect. A recent report from the WHO confirms the wisdom of such defensive action.[20]

I recommend that you work now with your local school system to plan for what they will do, and when. Don't delay pandemic planning until the event happens. Administrators may not act soon enough or wisely enough without serious pandemic guidelines. Among the best ways to ameliorate the pandemic's effect on your community is to disperse and separate people, thus minimizing chances for spreading the very infectious virus. Schools are notorious bug factories, with young children bringing home their latest maladies. If your school system doesn't act soon enough, take your child out of school in time to save his or her life, and yours too. Keep your child out until the danger is past, not when bureaucrats order everybody back after "holiday and snow days" are exhausted. Even if a child loses an entire year of school, that's better than losing his or her life.

What Our Neighborhoods Should Be Doing

Neighborhoods are both geographical and virtual. There are some neighborhoods where almost nobody talks to their neighbors, with families living their lives in front of television sets, and then away at school, church, or work. There are still some neighborhoods with old-fashioned neighborliness. There are some community groups, religious and secular, that infuse certain areas, forming virtual neighborhoods. All of these local units should and could be organized for mutual welfare during the several months of assault.

The federal government has written a *checklist for faith-based and community groups*.[21] It was recently prepared by the CDC to provide guidance for these organizations that hopefully will collaborate with public health agencies for the greater good. There are six main checklist sections, each with from two to eight action steps. Here are the sections:

"(1) Plan for the impact of a pandemic on your organization and its mission;

(2) Communicate with and educate your staff, members, and persons in the communities that you serve;

(3) Plan for the impact of a pandemic on your staff, members, and the

communities that you serve;

(4) Set up policies to follow during a pandemic;

(5) Allocate resources to protect your staff, members, and persons in the communities that you serve during a pandemic;

(6) Coordinate with external organizations and help your community."

More recommendations are in FluWiki. Even though some recommendations are odd, they represent defensive action versus total freezing before the microscopic predator.[22]

"* Organize neighborhood around avian flu contingency.

* Archive information about each neighbor, emergency contact information, required medicines, pets, location of critical items on property such as medicines, special skills each can bring to bear in emergencies.

* CERT training; first aid/CPR training.

* Neighborhood education and news updates via newsletter, websites, email lists or phone trees.

* Establish liaison with local hospital, healthcare professionals or city health services office.

* Set up communications node (if communications are still up and running) or point persons and runners; maintain contact with neighbors.

* Ham radio -have one licensed operator.

* Keep track of all cases; transport afflicted when necessary (using personal protective equipment).

* Stockpile goods and move resources to where needed to prevent waste or shortage.

* Establish staging areas for deliveries.

* Immunized (via vaccination or flu survival) persons hopefully volunteer to run errands and help with nursing.

* Consolidate errands to minimize contact in public places.

* Purchase portable ventilator to share.

* Elect a neighborhood "sheriff"; consider an armed guard if there is civil disorder".

For additional community recommendations, see my "Don't plan on leaving town" comments below.

What Our Employers Should Be Doing

School subjects can be learned later, as long as you are alive to study. In contrast, there are *essential businesses* that cannot simply shut down, even in a pandemic – police, fire, water and sewer, electricity, gas, fuel oil, gasoline, electronic media, phones, food, health care, and in some areas public transportation. It takes a minimum number of workers on the job to carry out these critical aspects of modern society. Some of these critical components are partially automated, such as the

electric power grid. Some are highly human-intensive, such as health care. All will suffer a significant drop-off in attendance. The key is having enough workers to maintain adequately minimal service.

Any business or public utility that does not both inform and involve all of its workers is not being socially responsible. I believe that front-line workers who are both informed and involved will try to do the right thing for their fellow citizens, rather than simply panic and vanish. Needless to say, it is of supreme importance to keep critical utilities, such as the power grid, functioning at all times. We cannot allow the failure of one component like this to cause a domino effect on other critical components.

Ordinary businesses that are not critical to the very glue of society would include such things as regular retail, bars and restaurants, any repairs that can be put off, tourism, and so forth. These businesses have owners with bills to pay, so there will be a tension between trying to keep up cash flow, and watching your business suffer when both workers and customers stay away. If you work at such a business, it is best to ask your employer what their contingency plans are. If you are not happy with what you hear, then proceed with your own contingency plans.

There already are some businesses that have prepared pandemic contingency plans.[23] Businesses with action plans tend to be large and global. Even though most corporations have not done the preliminary work, there is still time to plan for the unspeakable. Even small businesses can plan now for how they will manage this challenge. It is much better to act now, than to react later. Any good general will tell you that a battle is won before the battle is fought.

So far, many businesses are just modifying existing contingency plans. Will that be enough? Even in the heart of China's bird flu zone half of businesses there don't have viable pandemic flu plans. Some actions are plain silly, such as having bowls of bleach around the workplace, to make the air smell clean. What effect could all this procrastination have on a global economy that heavily depends on just-intime supply chains?[24]

The federal government, through the CDC and HHS, has prepared a two-page Business Pandemic Influenza Planning Checklist. It is a good place to start.[25]

Prudent Personal Preparations

There are several actions a person may choose to prepare for negative eventualities. The suggestions herein are only a guide, as you may have your own quite different list. The key point is to *start rationally thinking and planning now.*

We have all heard the cliche: "An ounce of prevention is worth a pound of cure." Many of us have heard the Boy Scout motto: "Be prepared." The reason these sayings persist is because they point to serious truth. As an Eagle Scout, I would also point you to the Boy Scout slogan: "Do a good turn daily." We need to think of strangers in need as much as ourselves when we make our preparations. After all, any one of us could become that stranger in need.

Update your will.

You may not be able to smoothly pass on your assets if you don't have a will. Even if you are married in a state where husband and wife share the wealth, what guarantee is there that both of you will survive? Your spouse needs to have a will too. If there are others who should benefit, put them in line explicitly. Don't overlook this basic preparation that we need to make anyway, pandemic or not. You don't want a big chunk of your estate going toward buying a lawyer his next luxury vehicle.

Write your obituary.

This may sound creepy, but you know one will be written for you anyway. Why have a funeral home employee do it from no knowledge of the real you? Who is better to provide the essence of your biography than yourself? All that will be required is filling in the time and place of departure. More importantly, by writing your obituary today you transcend willful denial, and force yourself into understanding your limits. Also, you are justifying your life to yourself, if not to others. Are you happy with what you will write? There is always time to set things morally right. As the old saying goes, no man has ever been on his death bead and cried out, "I wish I had spent more time at the office!"

Check your insurance.

I have been for years a licensed life and health insurance agent, among my other activities. I don't believe in folks becoming "insurance poor," but

there is a level of insurance that each person needs. Perhaps you are single, and all you want is a decent burial. If your local funeral home knows in advance of the money, and they are beneficiary of an amount sufficient for a decent burial, then your burial policy may keep you from being dumped into a mass burial pit.

I do not recommend loading up on cheap term insurance from companies that specialize in term plans. Some term coverage is OK, but don't expect your surviving beneficiaries to collect the full amount. Such policies are cheap because historically only about one in fifty ever pays out, which is the "big unspoken" among term salesmen.[26] When the highly leveraged math turns against specialty companies during an intense pandemic, with so many of their young insured dying, some of these companies may be unable to fully perform, even with the help of your state's insurance pool. In that case, your small premiums could yield small payouts to your beneficiaries.

I would recommend buying a children's burial policy. They are very inexpensive for now, because children past infancy have a very low death rate. I would also recommend adding a spousal rider to your term policy, which should be very cost-effective. Just don't become insurance poor.

Most policy applications simply supply space for a primary beneficiary and a contingent beneficiary. However, you can have more. I recommend that you submit an attached, notarized sheet listing more than these two, just in case. Keep your family's money away from the estate lawyers.

*Get a **Pneumovax 23 vaccination**.*[27]

This vaccination protects influenza victims against most strains of opportunistic Streptococcus pneumoniae bacteria. It won't prevent all cases of bacterial pneumonia, but it will prevent most. Medicare pays for it, and so do many insurance plans. If you don't have insurance, it's still a wise cash investment. If you don't get a cytokine storm you will still be sick for at least two weeks. Your pulmonary cells will be severely damaged, inviting bacteria where the virus has attacked. Many people die during seasonal flu epidemics, not directly from the influenza virus, but from subsequent opportunistic bacterial pneumonias. Many people also died from influenza-bacterial interactions in 1918.[28]

*Get your **regular flu shot**.*

If they are still making it and have some available, stick out your arm. The last thing you want is to get the seasonal flu in one season, and shortly thereafter have your weakened body face the pandemic strain. You also don't want to survive the pandemic strain, and then have your weakened body face a regular flu virus.

***Don't plan on leaving town**.*

Do you recall what happened during the Katrina disaster? People of means did follow instructions and left town, but not the poor stuck inside the flooded city. This storm was meteorologically for New Orleans a one-day event. What do you think the landscape will look like when a viral "Katrina" is invisibly everywhere in America for a year?

During the Spanish Flu era many towns tried to isolate themselves, but only a very few succeeded.[29] All it took was one infection source, a person or an object, and the walls of isolation crumbled for that community.

My advice is to prepare in advance to stay in your local community, if at all possible. Even if you have relatives elsewhere, consider the burden your long-term presence will be on them. Your home is where you can store sufficient supplies to remain out of circulation during the multiple waves. Staying in your own home and community – not "on the road" – is where you should be able to best care for your sick.

There is a sizeable element in this society that is lusting for a social Armageddon. I am not among them. One religious group moved from California to Montana and built elaborate bomb shelters. There is a big industry selling guns, survivalist gear, camping and backpacking equipment, and much more – all with the romantic cowboy image of a man defending his family by taking them out into the Great Wilderness. Don't fall for this trap. There is precious little Great Wilderness left in a land of 300 million people.

Even if you found a nice spot in the boonies, how long could you survive, and would you really be socially isolated with all the other survivalists about? What would you do day after day? What would your children do? What about bad weather, chiggers, mosquitoes, flies, ticks, rats, snakes, spiders, and so forth? Many "survivalists" out there will be carrying a pistol or other weapon. Think of the possibilities for gun battles. Even if you have a cabin stocked with goods, it will become a besieged fortress,

and no police around to protect you.

By staying in your community, you and your neighbors can get together well in advance of the pandemic to discuss what all can do as a sub-community to support each other. Not everybody will have a household with healthy people to care for them. Your neighborhood needs to collectively look out for the food, security, utility, and other needs of all its various members. Defensively organizing for the common welfare will sharply reduce the chances of panic on the street outside your house, and somewhat increase the odds of more people surviving.

In more rural and sparsely settled areas, neighborhoods manifest themselves as school districts, local church congregations, volunteer fire departments, fraternal groups, etc. The moral ideal is to take care of your own group's families, and also to look out for vulnerable non-affiliated neighbors who don't have a viable support system. Start with the CDC guidelines, and customize them for your own local situation.

Do not underestimate the power of defensive community action. My own neighborhood was able a few years ago to stop the state highway department from bulldozing many of our historic houses, thereby opening the way for a $2 billion pork highway designed to enrich land speculators around a large nearby lake. We were told by powerful people that we couldn't stop "progress." We did. Now we are preparing to defend ourselves against another invader. You can too.

Hygiene, Hygiene, Hygiene

When the bad bugs are just over the horizon, cable news media will switch to "all pandemic, all the time" mode. Much of their coverage will deal with ways to be hyper-hygienic. For that reason I won't spend too much space in this book on details. *What I want to stress is the difference between doing it, and doing it right.* The purpose of all this hygiene is not to try to banish the bird flu from our communities, which will be impossible. The purpose of hygiene will be to minimize its effects within the limits of our powers.

Common sense needs to rule over rote behavior. Consider the simple example of a public toilet: We good citizens wash our hands after doing our business, but not everybody does. Even if we vigorously wash our hands for thirty seconds with soap, including washing the handles on the sink, which almost nobody does, we still could leave the area ready to

fatally inoculate ourselves. How can this be? Simply, the door we touch coming in and going out is likely to have infectious viruses ready to stick to our fingers, which could then find their way into our eyes, nose, or mouth. A simple fix would be to have lavatory entrance doors blocked open, or converted to swinging doors that can be opened with our body. When you exit the building, don't overlook doors lacking automatic openers.

Masks will be a big item. There is both good and bad in them. The good part is that, yes, the right mask (N95) fitted and worn properly may help protect your lungs against inhaled viruses.[30] The bad part is that *even the right mask improperly used is of little benefit.* For example, after use around the sick most masks need to be disposed of, since they may be virally contaminated. If supplies of disposable masks are limited, how likely will this one-use precaution be followed every time? There are also less effective masks that, even if worn according to instructions, will not be able to filter sub-micron viral particles.

In 1918 many people wore ineffective masks with little benefit. We cannot blame them, because people back then didn't even know that the problem was viral. Furthermore, advanced filter technology was unavailable. A good antibacterial mask of that era was useless against much smaller viruses. The offenders were way ahead of the defenders.

Shaking hands when greeting is part of our American culture. Other cultures in Europe and Asia have people kissing each other on the cheeks when greeting. Both practices could be suicidal during a pandemic! We need to decide how to alternatively greet each other. I personally like the Indian way of placing the hands in a prayerful position, then bowing briefly to the person we greet. That's totally hygienic and very respectful. Others may go with something like a V-for-victory-against-the-bird-flu greeting. Done with *Star Trek* skill, it has a Vulcan appeal. A simple two-fingered V would be just as hygienic, and respectful.

Hand hygiene is more than watching out for other hands you touch. It also involves touching places where infectious others have touched. Germs linger for hours or even days. There are excellent gels widely available with alcohol that will kill viruses. However, they don't work well on soiled hands, so wash off the dirt with soap first. Also, they don't work at all when their alcohol percentage is below 60%. Finally, C.D.C. guidelines say you should still have a moist hand after fifteen seconds of vigorous rubbing; if not, apply more hand sanitizer.[31]

Laundry hygiene is easy to overlook. Viruses attach to anything, including our clothes. If we are in an area where we need to be wearing an N95 mask, then our clothes could become contaminated. Traditional washing with warm water and detergent will not kill germs. Hot water and regular bleach, along with your detergent, will kill more germs. The laundry water temperature should be more than 50 degrees centigrade, or over 122 degrees Fahrenheit, to deactivate Influenza A, H5N1 included. The bleach will have its own effect. If your clothes will be ruined by regular bleach, try buying some white clothes. You too can be a white coat! If you must wear bleach-sensitive clothing in a contaminated environment, be sure your laundry water is very hot.

Precautions for Travelers

When pandemic flu is circulating, the last place you want to be is in a confined cabin with many travelers for several hours. Circulating air can bring pandemic influenza to you from just one other person who is seated several rows away. Therefore, the best option is to travel by car, or don't travel. If you have a business meeting, see if it can be done by teleconference, saving both money and lives.

Travelers who are perhaps a bit too phobic of all germs are nevertheless on the right track when they are seeking out ways to avoid other people's germs. Ordinary bacteria will forever be around; the pandemic killer will not. Precautions that work against routine bacterial threats may or may not work against a viral killer.

USA Today ran an analysis of various strategies for travelers to protect themselves.[32] Most turned out to be ineffective, or unnecessary. A few, such as classical frequent hand washing and N95 masks, may help reduce infection. Also recommended are hand-sanitizing alcohol gels.

Sanitation and Sterilization

Sterilization, not just sanitation, is the ideal for all eating utensils when H5N1 could be in the household. Sanitation is a big concern among home brewers who face ruined batches when too many microorganisms escape imperfect cleaning. A *treatise for home brewers* offers help for what to do, and not do, for sterilizing utensils. Palmer's essay, with multiple references, has some very relevant points. I will excerpt a few for you:[33]

One official definition states that a sanitizer must kill 99.999 percent of the specific

test microorganism in 30 seconds. It is generally acknowledged that 90 percent of the sanitizing process is the physical cleaning of surfaces, and the other 10 percent involves the use of a sanitizing agent.

• Alcohol's mechanism of action is still unconfirmed, but theories for how alcohol might kill cells include denaturing of cell proteins, interfering with cellular metabolism and destroying cell membranes. In the absence of water, proteins are not denatured as readily by alcohol, and this explains why a solution of 70 percent alcohol and 30 percent water is a better sanitizer than 100 percent alcohol. Alcohol will kill most bacterial organisms in less than five minutes, but because some organisms may take longer, it is best to let items soak at least 10 minutes to kill the majority present. Alcohol does not kill bacterial spores, and viruses are only killed after exposure of an hour or more, but these microorganisms are not a concern to brewers.

As with all sanitizers, the degree of effectiveness is dependent on the initial cleanliness of the surface.

Dry heat is less effective than wet or moist heat in killing microorganisms, but it can still be used. The best place to do dry heat sterilization is, of course, in your oven. For an item to be sterilized by dry heat it needs to be heated at a given temperature for a given time as shown below:

Dry Heat Sterilization Time/Temperature Table

338iF (110iC) 60 minutes 320iF (160iC) 120 minutes 302iF (150iC) 150 minutes 284iF (140iC) 180 minutes 250iF (121iC) 12 hours (Overnight)

The times indicated begin when the item has reached the indicated temperature. One note of caution: bottles made of soda lime glass are much more susceptible to thermal shock and breakage than those made of borosilicate glass and should be heated and cooled slowly. You can assume all beer bottles are made of soda lime glass, and that any glassware that says Pyrex™ or Kimax™' is made of borosilicate.

Chlorine is by far the least expensive and most widely available chemical disinfectant and sanitizer a home brewer can use. It is available in the form of household bleach, which is a 5.25 percent solution of sodium hypochlorite (NaOCI). This economical form of chlorine has the advantages of being a powerful germicide, colorless and non-staining (except to clothes) nonpoisonous when diluted properly and a deodorizer. Because of the widespread use of bleach, it is the standard to which other sanitizers are compared. For sanitizing purposes, a concentration of 100 to 200 ppm available chlorine is needed to kill most microorganisms with an exposure time of 10 minutes. It is the available chlorine that does the killing. Use one-half ounce (one tablespoon) of bleach in one gallon of water to get 200 ppm of available chlorine, according to the Clorox Co. in Oakland, Calif., assuming you have household bleach containing 5.25 percent sodium hypochlorite, as indicated on the label. The items to be sanitized should be allowed to soak for 10 minutes and then drip dried or rinsed to eliminate the majority of residual chlorine. When sodium hypochlorite is dissolved in cold water it reacts to form hypochlorous acid, which is a very strong oxidizing agent. It is this compound that actually does the sanitizing in solution.

Hydrogen peroxide is considered a safe and effective sanitizer. It kills microorganisms by oxidizing them, which can be best described as a controlled burning process. When hydrogen peroxide reacts with organic material it breaks down into oxygen and water.

This inactivation can occur when hydrogen peroxide reacts with microorganisms, proteins or other organic residues. Hydrogen peroxide is active against a wide range of microorganisms, provided it is used full strength right from the bottle. It is active at lower concentrations but exposure times on the order of 30 to 60 minutes are required. The 3 percent solution sold in most drugstores is adequate to kill bacteria of most types in about 10 minutes. If you need to rinse after using other sanitizers, then hydrogen peroxide is a good choice for a rinsing substance. As with other chemical sanitizers, hydrogen peroxide is inactivated when used on dirty surfaces, so make sure you use it on clean equipment.

What We May Be Called to Do

When the pandemic comes, unless you are an isolated and totally self-sufficient hermit, you will be inside a social unit. If you are a parent with a sick child or spouse, what will you do? If the sick family member is among the very first in your community to become ill, that person probably will receive top-level care in the hospital. Within days demand for care will far exceed the very limited supply of resources. Even basic supplies, such as ventilators, will be unavailable. Still, you have a loved one in your home facing a likely death sentence without help. What to do?

Many doctors are deeply and privately considering how they will face this pandemic with almost no patent medicines available to cure the afflicted. One of these clinicians is truly exceptional, because he has transformed his private concerns into a self-help document for everyday people.

Dr. Grattan Woodson, M.D., FACP,[34] is a Georgia physician who has written a guide entitled *Preparing for the Coming Influenza Pandemic.*[35] His self-published 2005 monograph states: "This document may be copied and shared freely…. to provide some common sense medical guidance for providing care to very sick patients in the home setting."

You are welcome to download his entire monograph. I am herein reprinting the core of his essential medical guidelines for home care:

The Flu Survival Kit

Under the circumstances, having a supply of over-the-counter products and select prescription drugs on hand useful for the home treatment of cases of severe influenza is prudent. For instance, simple household items that will be very useful include ibuprofen, acetaminophen, table sugar, and table salt. It will also be helpful to have on hand, and know how to use a thermometer, an automatic blood pressure and pulse monitor. In the following discussion I will provide you with advice on how these simple items can be used very effectively for the home care of flu sufferers. In order to obtain

the prescription drugs needed for the home care of the flu, please call the office at 404.298.9951 and for us to mail you a "**Flu Survival Kit**". The kit includes a list of useful items included in this monograph and a prescription in your name with medication for treatment of one person.

Simple Medical Skills Required

Caregivers need to learn how to obtain vital signs like pulse, blood pressure, temperature and respiratory rate. It will also be very useful to be able to use an automated blood pressure monitor to measure blood pressure. If you need help learning how to do these, my staff will be happy to help you develop these simple skills. All you need to do is ask.

OTC products to have on hand for home treatment of one person with severe influenza

Table salt: 1 lb
Table sugar: 10 lbs
Baking soda: 6 oz
Tums Ex: 500 tablets
Acetaminophen 500mg #100 tablets
Ibuprofen 200mg # 100 tablets
Caffeinated tea, dry loose: 1 lb
*
Electronic thermometer: #2
*
Automatic blood pressure monitor
Notebook for recording vital signs and fluid intake and output
Kitchen measuring cup with 500 cc (two cup) capacity

Diphenhydramine (Benadryl) 25mg capsules # 60: 1 tablet every 4 hours as needed for nasal congestion, allergy, or itching.

Prescription products for home treatment of one person with severe influenza

Tamiflu 75mg # 20: take two tablets daily for 5 (or 10) days for flu* Promethazine (Phenergan) 25mg tablets # 60: take 1/2 to 1 tablet every 4 hrs as needed for nausea Hydrocodone with acetaminophen (Lortab-5) # 60 (5mg/325mg): 1/2 to 1 tablet every 4 hrs as needed for cough or pain

Diazepam (Valium) 5mg # 60: 1/2 to 1 tablet twice daily as needed for anxiety, muscle aches, or insomnia

* Thermometers break so have more than one on hand.
* I recommend the hand pumped automatic BP monitor rather than ones with electric pumps.
* Tamiflu is expensive costing about $200 for 20 tablets. If you have insurance, you will still pay stiff co-pay. All the other prescription drugs are generic and not expensive.

Symptoms of Influenza

The influenza virus usually enters the body through the respiratory tract but can also gain access through the intestinal tract. The virus causes a variety of symptoms with fever, sore throat, cough, runny nose and general aches and pains as the leading ones. In addition to these principal symptoms many also experience headache, nausea, abdominal cramps and diarrhea.

These symptoms could be due to some other infectious agent or even the influenza virus but not the pandemic strain since it is possible that both endemic (routine seasonal flu varieties) and pandemic strains could both be circulating in the community at the same time if the pandemic flu appeared during the November-March flu season. In fact, this scenario is what looks to be the most likely time for the pandemic to begin. The best guess for the start of the pandemic at this point is between December 2005 and April 2006.

There are several ways to tell the difference between the flu and less severe illnesses. First of all, unless the flu is circulating in the community, then your illness is probably not flu because it tends to occur in epidemics that are easy to spot epidemiologically. If the world is in the mists of a major pandemic, you will have no problem knowing about it. Just tune into CNN, as it is likely to be wall-to-wall pandemic coverage 24/7. Another clue to whether or not someone has flu is that flu is much worse than simple cold viruses or most other causes of respiratory or gastrointestinal infections (GI). The fever and body aches are really quite remarkable and often associated with strong shivering.

When flu affects the GI tract it presents with nausea, vomiting and diarrhea. Patients with flu are really sick and often are so weak they have a hard time getting up out of bed without help. So, one way to tell the difference between the flu and other infections is that the flu is really severe and tends to affect the respiratory track most often but can also cause severe gastroenteritis (nausea, vomiting, and diarrhea).

Patient prognosis during pandemic influenza

One thing that is different about a major pandemic is just how hard it hits patients and how rapidly it kills. Patients affected by the flu can be broadly categorized into 3 prognostic types. The first type has a poor prognosis no matter what is done for them. The second might survive if there was full access to high technology medical care and resources. The third type is highly likely to recover from the flu as long as they are provided with consistent low-technology supportive measures that can be administered in home settings.

Type 1 patients have the poorest prognosis and almost all will die within 2 or 3 days of the development of their first symptoms. The cause of death in these patients during the 1918 flu was massive respiratory failure from overwhelming lung destroying viral pneumonia. There was no effective treatment for this in 1918 and there is none today despite all the advances in medicine that has occurred over the last 90 years. Signs and symptoms of type 1 patients include rapid onset of severe shortness of breath, cyanosis (bluish discoloration of the skin of the hands, feet, and around the mouth and spreading centrally), or bleeding from the lungs, stomach and rectum.

Type 2 patients are similar to type 1 patients except they do not die after 3 days. Some but not many of these patients would survive if they had access to an ICU, ventilators and expert medical care; but if we have a severe pandemic, those resources will not be widely available. Even if they had access to these services, many of them would die anyway. Remember, no matter what you do, they are likely to pass away in a week to 10 days after becoming ill.

Type 3 patients make up the majority of those that become ill with influenza. Fortunately, these patients have a good prognosis if they receive timely and diligent supportive care that can be provided well in a non-medical setting such as the home. Most of these pandemic flu victims will be severely ill and weakened by the infection such that they will be too ill to get out of bed. Many type 3 patients will be completely dependent on others for care. Without simple care, some of these patients will die from preventable causes like dehydration but with simple care, most of these patients will recover.

No matter how good the care provided, some type 3 patients will die. This is not your fault. This happens usually because they develop a serious secondary condition that actually becomes the cause of death.
Examples of these secondary conditions include bacterial pneumonia, stroke, and heart attack. There is nothing you can do but keep doing the best you can and let nature take its course.

In my opinion, as a general rule, provide everyone with the same level of supportive care. This is a rationale course because it is not always possible to predict who will survive and who will not especially early in the course of the flu.

Using scarce resources wisely

Patients in extremis, which means they are near death at the time they are encountered, should not be disturbed unless there is something that you can do to make them more comfortable. Fortunately, patients in extremis are usually already unconscious and beyond suffering.

If medical supplies are in short supply, especially like the anti-influenza antibiotic Tamiflu, the decision on how to ration these resources is best made by health professionals if they are available. If not, my suggestion is to concentrate your efforts and precious supplies on those with the best chance of survival, i.e., type 3 patients. In a severe pandemic it is unwise to use limited medical resources on critically ill type 1 or 2 patients, as they are unlikely to survive. So my advice is to focus your greatest efforts on type 3 patients where the prognosis is good for a complete recovery.

Supportive Treatment of Influenza

Home Flu Treatment Advice for the Laymen

Caring for severely ill flu patients is something that everyone is capable of doing. You can do this. No medical skill is required. The skills needed are the same parents use to

care for their young children or adult children use to care for their elderly parents. The basic principals are to keep the patient clean, dry, and warm. They need a soft place to lie down and they need to be comforted and told that they are going to be OK and reassured that you will be there for them. The most important medical treatment is to make sure they have plenty of fluids. Dehydration must be prevented, as this can be fatal in a patient who would otherwise survive.

Fever, body aches, chills, sore throat, and headache: Ibuprofen and/or acetaminophen are used to lower fever and help the patient feel better. The above symptoms respond well to these drugs. Use these products for above symptoms of flu according to my instructions, not the bottle label. Don't under dose the patient. Many people take doses that are ineffective for fear of taking too much. Remember that acetaminophen can be used at the same time and in full doses as ibuprofen because they are in different drug classes and have different drug side effects. Combination treatment with both has an additive effect of benefit without increasing risk. The dose of ibuprofen I recommend you use is 2 to 4 tablets (400mg to 800mg) every four hours. For acetaminophen, the dose is two 500mg tablets 4 times daily. Do not exceed these doses for either drug. This is the maximum for both.

For the purposes of this guide, ibuprofen means aspirin, Advil, Aleve, ibuprofen, or Nuprin since they are all alike. Acetaminophen (Tylenol) is not an aspirin.

A very high fever (> 104 F) can cause seizures and brain damage and must be avoided. Using tepid water sponge baths works well for a high fever. Ibuprofen and acetaminophen are very good at lowering temperature. Studies show that the body's natural defenses are better able to fight infection with some fever (say up to 101 F), so maybe we shouldn't try to completely suppress the temperature to normal (98.5 F).

Gargling with hot salt water is a good treatment for sore throat. Hot caffeinated tea is also very helpful for headache, sore throat, and cough. We are taking advantage of the pharmacologic effect of caffeine, long recognized as an excellent herbal therapy for these problems. Hot or cold tea is also a mild stimulant that improves the sense of the patient's wellbeing. Sore throats also respond well to ibuprofen or acetaminophen.

Food: Eating is not really important because the patient will be breaking down their own muscle and fat for energy. The flu takes your appetite away so the patient probably won't be hungry. If the patient is hungry and asks for food, this is great as it is a real sign of improvement. By all means feed the patient at that point but your food selection needs to be appropriate. Specific directions on how to feed patients recovering from severe flu are provided below.

Identifying Dehydration: Preventing dehydration in flu victims will save more lives than all the other treatments combined. When patients have a fever or diarrhea, they loose much more water from the body than is commonly appreciated. Symptoms of dehydration include weakness, headache, and fainting. Signs of dehydration include dryness of the mouth, decreased saliva, lack or very decreased urine that is dark and highly concentrated, sunken eyes, loss of skin tugor (the elasticity of the skin), low

blood pressure especially upon sitting up or rising from the sitting to the standing position and tachycardia (fast pulse) when laying or sitting up.

Fever is an especially easy way to become dehydrated with no one even noticing. That is because the loss of body fluid occurs through the skin and quickly evaporates. This is called insensible loss and great quantities of fluid can escape a patient this way quickly. The smaller the body size and the higher the temperature, the faster this can happen. Water in the form of vapor is also lost through the breath. So when the patient is short of breath leading and breathing rapidly, this is another source of hidden fluid loss.

If you detect or suspect that dehydration is developing, administer fluids by mouth. If the patient is too ill to drink, someone should sit with the patient giving him or her fluids drop by drop if needed. Work up to using a teaspoon if possible. Don't stop until the patient has been able to keep down at least quart of fluids. This could take several hours so be patient. It will have a dramatic effect on sick patient's wellbeing and will be very rewarding to those of you who persist because you just saved a life. After the first quart, the patient should begin to urinate again. This is a good prognostic sign and when this happens you can assume you have restored their fluid level back to a safer level. "Safer" should not be confused with safe. Don't stop there. With sick patients like these, you really need to "push the fluids" so don't let your guard down.

Fluids: What will be much appreciated by a sick patient, especially if they are dehydrated, is a simple **Basic Fluid Solution** (BFS) made from water, sugar and salt. This will be very refreshing for the patient and will quickly revive them. Fluids can be served cool or hot depending on the climate, patient symptoms, and fever status. A patient with a high fever should probably not be given hot fluids because it will raise the temperature further. A patient with a sore throat will get relief from a hot beverage. A patient hot with fever might prefer cool or even cold beverage. If it is cold outside especially if the patient is cold, use hot fluids.
You can drink the BFS plain or flavor it with just about anything like citrus, mint, or herbs.

The BFS Formula

BFS is simply homemade IV fluids for oral use. The formula is:

4 cups of clean water
3 tablespoons of sugar or honey
1/4 tsp table salt

The above BFS formula is excellent for treatment of dehydration due to all causes. If the patient has become dehydrated because of diarrhea, you can substitute the salt in the formula with 1/2 tsp of baking soda (if available) because diarrhea leads to loss of alkali.

Don't use more salt or baking soda in the BFS formula. I am already recommending

the maximum dose of these.

If juice is available, you can substitute 1 cup of it for 1 cup of the water and cut the sweetener in half. Boil the solution to purify it if needed. Administering fluids to the sick in your charge will be one of the main activities day in and day out until the crisis passes. Try and get 2 to 3 quarts of fluids down the patient every day at a minimum.

Keep a record on every patient

It will be very useful for you to write down certain information of the patient or patients you are taking care of at home. Devote a section of the notebook to each patient you are taking care of. Keep the record in chronological order day by day. Keep as accurate and careful records as you can. Don't worry about keeping a perfect record; just keep one that is good enough.

By recognizing the symptoms a patient has or the signs of the disease in the body, you can use the chart below to guide your treatment. Here's how.

Symptom or Sign	**Likely Assessment**	**Remedy**
Low urine output	Dehydration	Push fluids
High pulse rate (>80 but especially > 90)	Dehydration or fever	Push fluids
Shortness of breath	Pneumonia	Push fluids
Shaking chills and shivers	Viremia (virus in the blood) or pneumonia	Keep warm
Cyanosis (skin turns blue)	Respiratory failure, death likely	Keep as comfortable as possible. Give hydrocodone with promethazine for comfort, give diazepam for anxiety
Bleeding from mouth, coughing up blood, passing red blood per rectum. Severe bruising.	A severe blood clotting abnormality has occurred due to the virus (DIC). Death is likely	Keep as comfortable as possible. Give hydrocodone with promethazine for comfort, give diazepam for anxiety
Vomiting	Virus affecting GI tract	Use promethazine for vomiting, push fluids

Diarrhea	Virus affecting GI tract	Push fluids, clear liquid diet
Severe stomach cramps	Virus affecting GI tract	Use hydrocodone and promethazine for comfort
Headache		Ibuprofen and/or acetaminophen or hydrocodone if very severe
Fever		Ibuprofen, acetaminophen, push fluids, keep warm or cool, consider tepid water baths if > 102 F. OK if <101 as this may help kill virus.
Sore throat		Gargle with hot salt water, drink hot tea or hot water, ibuprofen and or acetaminophen.

Cough Push fluids, drink hot tea for affect on breathing tubes, use hydrocodone 1/2 tablet with or without 1/2 promethazine to suppress cough if needed

Are these the right treatments for this symptom in every case? Of course not! I am providing you with my best guess of how to manage the average very sick flu patient but not every very sick flu patient. I recognize that for some like those with ADRS for instance, these suggestions will not be helpful and would be considered harmful under usual circumstances. You will not be able to tell when you are dealing with one of these rare patients. So, what should you do? For most patients, following the advice will do a lot of good and makes the most sense under these unique circumstances. All you can do is the best you can do. So do that with a satisfied mind.

Each day start with the patient's vital signs. Include their temperature, pulse rate, breathing rate, and blood pressure. Repeat the vital signs routinely 4 times daily (for instance at 0800, 1200, 1600, and 2000). These **vital signs** should be measured more often in very sick patients. You can get a really clear picture of how the patient is doing using these simple measurements.

It is very important to keep up with the patient's fluid intake and their output so record the fluid they are taking in and passing out in a notebook. Intake is pretty easy since you are giving them the fluids but output can be difficult to accurately record. Have the patients to save all their urine by urinating in a bucket, pot, or basin instead of the toilet. Measure the urine output using the kitchen-measuring cup. The amount taken in is always more than the amount passed out because of the insensible losses described above (loss through he skin and in the breath). If the patient is incontinent of urine, just indicate in the record that the patient was incontinent of a small, medium or large amount of urine. For our purposes, large is good, small is bad.

Diet Recommendations

The Clear Liquid Diet: A clear liquid diet is used to treat certain intestinal diseases, especially infectious diarrhea. Patients suffering from diarrheal illnesses often experience abdominal cramping and frequent, loose stools if they eat solid foods. In addition, a great deal of water and minerals (sodium, chloride, and potassium) are lost in the watery portion of the diarrheal stool; if you are not careful this can lead to dehydration. Patients with diarrhea have to drink considerably more fluid than usual to prevent the dehydration. This is especially important if the patient also has a fever, which in itself leads to increased loss of body water through the skin as perspiration.

In most cases, patients with diarrhea can tolerate a clear liquid diet without cramping or diarrhea. This is because the small intestine can absorb water, minerals, and sugars pretty well even when infected. The diet starts off with clear liquids only. As symptoms abate, the diet slowly adds simple-to-digest, low-residue foods, one step at a time. Don't advance to the next step until the patient is completely symptom-free in the present step. As the patient progresses through each step, if the cramps and diarrhea return, drop back to the previous step they tolerated.

This same Clear Liquid Diet approach is the one to use for patients who have been ill with the flu and have been too ill to eat. They will have been on Step one already so when they become hungry, begin them on Step 2 and advance them through the steps as above.

Step 1: Basic Fluid Solution (BFS), Water, fruit juice, Jell-O, Gatorade or PowerAid, ginger ale, Sprite, tea.

[*Additional advice from Dr. David Miller:* This should be pedialyte for children. Water should not be used in abundance for kids under two years when trying to rehydrate. May lead to hyponatremia.]

Step 2: Add white toast (no butter or margarine), white rice, and cream of wheat, soda crackers, and potatoes without the skin

Step 3: To Steps 1 and 2 add canned fruit and chicken noodle soup

Step 4: To Steps 1 through 3 add poached eggs and baked chicken breast without skin, canned fish or meat.

Step 5: To Steps 1 through 4 add milk and other dairy products, margarine or butter, raw fruits and vegetables and high-fiber whole grain products.

[*Additional advice from Dr. David Miller:* Milk and dairy worsens phlegm in many individuals; may be bad for pulmonary congestion.]

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XI.
Winners and Losers

What I am about to explain may at times seem cold and cruel, because that's the white color of this black truth. Romantic illusions aside, there will be winners and losers from a global pandemic. Everybody wants to be a winner, but that's not reality. Who becomes a winner, and who becomes a loser, is not always totally random. It is sometimes possible to alter the deadly odds. So, take these comments in the spirit of trying to improve your odds of becoming a winner, or at least not being a total loser.

Wall Street is busy looking ahead at bird flu scenarios. There are several win-lose dimensions, based on the severity of the pandemic. There is even a near term scenario based on no pandemic at all.[1] One man's disaster is another man's opportunity.

A macroeconomic estimate of the global effects of an avian influenza pandemic early in this century, similar to the one almost ninety years ago – with the added reality of today's senior population not being partially protected by similar exposure years earlier – was published in February 2006. The Lowry Institute's restrained death projection of up to 142 million was contained in a report focusing more on the economic impacts. Here are some of its highlights:[2]

Four main sets of economic "shocks": shocks to the labor force (deaths and dislocation); supply shocks from increased costs; demand shocks; and risk premium shocks, involving financial flows.

- Their worst scenario (still fairly conservative) reveals the death toll could reach 28.4 million in China, 24 million in India, 11.4 million in Indonesia, 4.1 million in the Philippines, 2.1 million in Japan, 2.0 million in the United States, and 5.6 million in Europe. In the world's least developed countries, the toll could top 33 million.

East Asian economies would be proportionately more affected than the United States or Europe. In their worst-case model, Hong Kong's economy would shrink by more than 53 percent.

Countries that tend to focus on preventing exchange rate changes are countries that will experience the largest epidemiological shocks. "This is particularly true of Hong Kong, which receives the largest shocks and has the most rigid exchange rate regime," they observe.

On an individual, microeconomic level, determining who wins and who loses becomes much more complex. International macroeconomic data statistically smooth events. Human lives are not smooth statistics.

Losers

(1) Those who die from the flu. That's easy to understand, but every death has its own ripple effects.

(2) Those who sicken from the flu, and fall back in life thereafter. This falling back may be due to health complications from the illness, from financial effects, and from living in a changed personal and emotional environment.

(3) Communities and their social and cultural institutions hit hard by the flu's many effects.

(4) National governments who are asked to pay for the mess, when they are already over burdened with structured commitments to planned and unplanned expenditures. Before deficit spending from borrowed money became the bogus conservative way to "have our cake and eat it too," our government had lots of fiscal elasticity. It could go into temporary debt if necessary, and not excessively burden future generations. Elasticity within our federal budget is

stretched to the point where, post-pandemic, some of those fat-cat tax breaks may have to be curtailed. Oh, the horror!

(5) Term insurance specialty companies. These businesses have made a mint off affordable policies that hardly ever pay a death benefit. These policies are mostly sold to young and just-past-young customers, a group that was particularly devastated by the Spanish Flu. Move the death benefit demand up to something like ten percent, and instantly the leveraged term insurance corporate profit formula implodes. Other insurance companies will be forced to take up the slack, and state insurance guarantees will kick in. Briefly, there will be many huge term policy death claims backed up by very few cash flow dollars. The last domino to be hit will be the ultimate insurer. Will state and federal governments be able to ensure the insurance contracts?

(6) National economies not equipped for radical, short-term dislocations in their work forces and infrastructures. Also, national economies floating on inflated natural resource prices that won't be restored for years after the pandemic.

(7) Hospitals and health care systems burdened in the short term by a flood of non-paying patients, and by the loss of many of their expert staff.

(8) Companies and national industries not positioned ahead of time to weather the storm. They are risking their long-term profits while seeking to maximize immediate profits. Some may lose significant market share to competitors that think strategically, not just tactically.

(9) The poultry industry. This one is too easy! Seriously, by the time WE get it, the avian virus won't be strictly avian. It will have become somewhat human. The poultry industry, from farm to fast food, will quickly suffer as everything with feathers is shunned. After the pandemic has passed, and after our government certifies that American chickens grown

indoors in controlled factory conditions are H5N1-free, then we will see a return to America's favorite white meat.

Speaking of white meat, consumers of "the other white meat" are also at risk, since pork can catch both avian and human influenza. Already, international pork prices are becoming depressed as demand for poultry exports wanes, leading to poultry prices dropping and competing even more against pork. The economic world is an interlaced system of systems, just like our bodies.

Winners

(1) Individuals who become infected, but not seriously ill, or not ill at all. Survivors are long-term winners, at least for this variant of the flu and its close derivatives.

(2) Those who do not initially become infected. They however remain vulnerable for a second round of infection, which could be even more lethal if the virus continues to mutate like it did in 1918. These people are possibly short-term winners only. Lucky people who were exposed, but did not die, in the first round will be available to care for, and bury, those who die in the second round.

(3) Those holding key items in short supply, such as the very few vaccine doses. I see a robust black market for bird flu vaccine doses that will be available to the general public. Similar inelastic economics will affect availability of Tamiflu. We can expect to see avian flu vaccinations going for over a thousand dollars each to those with cash. The rest of us will have to resort to crime to get at scarce drug supplies, if they are available at all. Scam artists with bogus remedies will also be winners. Check your email in-box for placebo pandemic panaceas.

(4) Companies that are pre-positioned to take advantage of their competitors' weaknesses. I recently interfaced with a high-tech company

that is already developing a backup plan to have many of its routine technical service consultations routed to agents in their homes. That strategy will enable their America-based call centers to stay running with sharply reduced staff. This resilient strategy could give them an advantage over their competition, helping with market share. (Interestingly, some outsourcing bastions in India and elsewhere may temporarily implode when the pandemic decimates their call center staff in densely populated cities.) A wise company prepares strategically for multiple competitive scenarios. Individuals should think likewise, because we are all competing in many ways.

(5) Companies that specialize in automation, because machines don't get sick from any type of flu. Automated products will come too late to make a difference in 2007. Automation is not an industrial panacea, because even the most highly automated factories still use a smaller number of employees to maintain and monitor the machinery. Excessively lean companies without skills flexibility and manpower redundancy risk reduced operations.

(6) Smart stock and commodity investors who short sell vulnerable companies and resources just as the bird flu first achieves its fateful human-to-human mutation. Timing is everything, because options on futures are wasting assets. [As part of my learning tour of the job world, I was a licensed commodities broker.]

(7) Natural ecosystems — at least until populations of greedy humans rebound, and the pillaging of our natural heritage resumes.

(8) People with cash who are in the market to buy or rent, as lots of housing inventory will accumulate after the cold bodies are removed. Real estate speculators will be shocked by this bursting of their bubble, if it hasn't previously burst.

(9) Religious snake oil salesmen around the world. But this may be a zero-gain situation, as many of their previous converts will be dead. It's interesting how pestilences kill the holy and the unholy alike. Moses isn't around this time to protect our firstborn.

(10) Wise people who utilize the natural pharmacopoeia to increase their resistance to influenzas and other diseases.

(11) Corporations that prosper from people either dying very quickly, or very late in life without much illness. A winning example would be the long-term-care insurance industry. On the other hand, custodial institutions will not fare as well, because many seniors will perish, creating a doughnut hole in demand relative to capacity for decades.

(12) Food industries unrelated to birds, and possibly pork. The H5N1 doesn't infect everything! There are alternative protein choices for concerned consumers, especially beef, fish, and vegetarian options such

as soy products.

How can "losers" become "winners"?

Another way of sorting out who wins and who loses is to think in terms of supply and demand. When there are fewer buyers, through death or financial weakening, the sellers must drop their prices. When there are fewer people making less money to pay back previous debt during the pandering "tax cutting" years, there is a risk that major defaults will occur. Differential effects will depend on changing elasticities. We may see a restructuring of existing government debt to reduce current payments, possibly at the expense of structuring larger total payments.

Some people you might expect to prosper, such as funeral homes, will not necessarily prosper. They will be swamped with deadbeat customers. They have no way to ramp up their surge capacity to accommodate a short-term spike in demand. Funeral workers will die like everybody else. It is given that we will see a return to mass graves in a worst-case scenario, symbolizing the Black Death of centuries past, but also a gruesome reality during the Spanish Flu pandemic. There is a mass grave for Spanish Flu victims in my ordinary hometown in America. There is plenty more land for mass graves when the Grim Reaper next swings wide his harvest scythe.

Many times in America's history, and most recently during the Katrina debacle, short-term expediency has trumped long-term preparation. We have almost run out of grace time for the governments on this planet to prepare for a great bird flu epidemic. Nevertheless, there are still many things that can be done to ameliorate what follows.

First, governments should put vaccination surge capacity at the top of their immediate to-do list. Time is of the essence. Private industry alone will not step up and supply us with enough additional doses. Current global vaccine production could only protect less than five percent of the world's population, unrealistically assuming all vaccines were highly effective bird flu vaccines.

I urgently recommend that governments around the world exercise their vast legal and financial resources to radically ramp up flu manufacturing capacity, ideally of the Pittsburg vaccine technology. In the short run, before the Pittsburg technology is perfected, we need many more factories with the old egg technology in place. Currently, the vaccine

industry is struggling to make enough vaccine to protect affluent societies against ordinary seasonal influenza.

The President's proposed seven billion dollars over several years is an imperfect start, but a start. Sadly, not much of this belated money can help us in the next couple of years.
I cynically believe that bureaucratic inertia, simplistic "free enterprise" theories, denial, diminishment, and anything else stupid you can think up will likely freeze rational response until it is much too late, and people are panicking in the street. Then, of course, the sweaty politicians will be busy doing photo ops to prove their concern and compassion.

On the other hand, the world is truly overpopulated, so getting rid of what Scrooge called "the surplus population"[3] would have a positive ecological effect – except that everybody considers themselves essential, while the other unrelated guy is surplus, especially somebody in an "alien" culture speaking a "foreign" language. The not-me-aspect of denial can become the me-aspect of death. Killer viruses aren't picky as to whom they terminate.

Hurricane Katrina and the Bird Flu

As the summer of 2005 was winding down, a terrible hurricane was winding up in the Gulf of Mexico. Evacuations were ordered, and expensive SUVs headed inland. Then the high winds and 25-foot storm surge swept into unprepared southern Louisiana and Mississippi. When the storm left, America was looking at its most expensive natural disaster of all time – with hundreds who could not leave perishing, entire coastal towns virtually erased from the map, a great metropolis in ruin, and a quarter-trillion-dollars recovery bill.

Was this great natural disaster purely a *natural* disaster? Hurricanes happen; and perhaps it could be argued that human-enhanced global warming had something to do with Katrina's fury. Fury or not, a sufficiently prepared coastline could have withstood this disaster with far fewer effects. Prudent money spent on the weakest levies and exposed property could have saved more than a hundred billion dollars. But then, hindsight is always 20-20. Whom shall we blame for the human component in this messy equation?

As the howling winds were leaving, the blame game started. FEMA's director was set up by nearly everybody to be the scapegoat. Only six

months later was it revealed in released videos that he and a group of disaster experts gave the president clear and dire warning four days in advance by teleconference. President Bush chose not to ask any questions, likely assuming that preparations were adequate. The Louisiana governor asked Washington for help when the storm hit, but she did not specifically ask for troops to stop anarchy at the Superdome. Local officials in New Orleans were screaming racism, with an eye to the following spring's elections, which they won.

Weasel politicians in Washington and everywhere affected were passing the blame, as they would continue to do months later in Congressional testimony. That blame coalesced in the May 2006 Senate report, *Hurricane Katrina: A Nation Still Unprepared*.[4] Nobody initially took charge. FEMA looked like it was AWOL. Even several hundred New Orleans police went AWOL, and two killed themselves. Meanwhile, gangs tried to take over New Orleans while it was undefended by troops. Only several horrible days later did significant numbers of troops arrive. By then many hundreds (mostly poor blacks) were dead from various causes, or exposed to the toxic waters. This disaster was not Homeland Security's finest hour. Nor was it America's finest hour.

We can look at specifics, and then we can look at the real reasons for why this one natural storm did so much damage. Let's first briefly deal with specifics. There is a state board in New Orleans in charge of the levees. However, the Orleans Levee Board has existed within a historically corrupt political environment. Instead of building and maintaining higher levees, they were mostly investing in casinos, Mardi Gras water fountains, and other fluff. The blame goes far beyond the locals. Federal construction money has recently been shrinking, as more money has been diverted toward pork "homeland security" and the great adventure in Iraq. Federally maintained levees would also fail.

Simply put, stronger/taller levees didn't have a very loud constituency; they just weren't sexy enough. New Orleans has been there since the colonial French, so what's the big concern in the Big Easy? New Orleans has also been sinking for over a century, while the river and lake waters adjacent have risen to an average of several feet above the city's lower areas. Not to worry, Mardi Gras comes every year, and the Dixie land jazz is lively.

Six months after the disaster, it was revealed that the Army Corps of Engineers knew in 1985 that the levees were in danger of failure. That's

twenty-one years before the disaster! Nothing was ever done to address the structural problem.[5] President Reagan was in office then, but I doubt that anybody told him about this danger.

Local, state, and federal governments saved a few hundred million from not properly elevating and reinforcing the levees. Institutional incompetence stuck private and public America with a few hundred billion more in disaster debt.

The math of this disaster is psychedelic like a bad acid trip, but parts of real human nature in the modern world are equally so. Remember that we human beings are essentially Stone Age creatures living in a hyper-speed modern world. Our primal primate psychology is primed for immediate gratification, not long-range planning. All successful sales people know this. Successful politicians claw their way to the top not with honesty, but by pandering to our vanity and pleasure centers.

Professional politicians lie, and we know they are lying; but we vote for weasel "tax cutters" anyway – and up goes our huge national debt load while we enjoy the illusory free ride. Somebody else will pay it off, right? Or maybe all that interest-laden debt will just go away, right? Tell that to our grandchildren when they wonder what happened to their future retirement security.

And now for the little matter of mass death and mayhem brought about by a global flu pandemic. The parallels with Katrina are eerie. The divergences are not that significant.

Let's look first at <u>where things are DIFFERENT</u>:

(1) Katrina was mostly local. Yes, it strongly impacted an area equal to that of Great Britain. But how big is Great Britain's land in relation to the global land mass?

(2) Katrina affected local ecosystems and structures, then people.

(3) Katrina produced locally dangerous areas and safety zones.

(4) Katrina was something that most of us saw on TV, not something invisible we feared coming into our homes and slaying us.

(5) Katrina affected more people's property than their lives.

(6) Hurricanes come and go quickly; but pandemics last for months.

Now, let's look at <u>how Katrina's "natural" disaster was SIMILAR to the disaster of a global flu pandemic</u>:

(1) Both are partially natural, and partially enhanced by modern life.

(2) Both will shock their social and political systems, but a flu pandemic will do it intensively on a worldwide basis.

(3) The danger of both in retrospect will be clearly foreseen, but mostly ignored or diminished.

(4) Both will cost hundreds of billions, and a worst-case pandemic could cost trillions globally. Prevention or amelioration of each disaster would involve pennies on the dollar wisely spent, but pennies never to be spent.

(5) There will be winners and losers. If you see yourself coming out on the winning side, perhaps you will root for the scenario of your choice; but will your choice be under your control?

(6) Whereas a hurricane primarily affects property, both hurricanes and pandemics affect all sorts of soft assets.

(7) People everywhere will initially blame other people and institutions for all their problems, never themselves. The winners will often blame the losers for their misfortunes.

(8) Debt, personal and public, will be massively used to paper over the costs. However, who will buy all that debt, and at what interest rate? America's federal debt – not counting state, local, and private debt – totals over NINE TRILLION dollars, or about $30,000 with compounding interest for every man, woman, and child.[6] How much debt can we bear before our national standard of living tanks?

Predicting Disaster

Sometimes a problem can be predicted decades, even centuries in advance. Sometimes we have little or no advance warning. The less warning time, the more easily excuses can be honestly made for our inattention. However, modern science has reduced our uncertainties, and extended our advance warnings for global disaster scenarios. Our ready-made excuses are drying up.

September 11, 2001 goes down in history as a zero-warning event, but was it really? After all, just a few years earlier a bunch of crazed Muslim extremists set off a bomb in the parking area below the same, highly symbolical World Trade Center. Al Qaeda extremists had just recently attacked in East Africa, and so forth. Still, NORAD was only looking outward for threats from the last century. No jet fighters intercepted the hijacked planes as they flew into Manhattan and Washington. So, was 9/11 really a zero-warning event?

The winds and water of Katrina were only seen as a clear and present danger after it moved into the Gulf from south Florida as a category one storm. Once it became a Category 5 monster in the middle of the Gulf it was essentially too late to do anything other than escape northward to minimize deaths. If you had an SUV and money to flee, you did. If you were poor and black with no public transportation beyond the local bus lines, you stayed in town. If you owned a floating Mississippi casino loosely moored just feet "offshore" because of hypocritical state laws, you watched in horror as the storm destroyed your property and washed away thousands of good jobs. The list of cruel absurdities goes on and on.

The threat of this particular storm was not precisely known until a few days before it hit. However, this storm as a statistical near-certainty had been known about for decades. Katrina when it finally reached land wasn't even the very worst-case scenario, a storm surge that even the recently rebuilt levees will not survive.

Back to human nature, we can always put off until "tomorrow" unpleasantries we don't have to face today. There will always be other imagined higher priorities than preparing for highly probable disasters that are unpleasant to think about on a sunny day. The smiling politician who borrows and wastes our money today bets he won't be around to pay the bills when they come due.
Katrina represents a fast-forward scenario for what will increasingly happen along low-lying coastal areas around the world. With global warming and the resultant melting of massive ice fields, the sea level will rise at least as much as it has around the sinking New Orleans. New Orleans occupies a tiny scrap of land compared to the land area occupied by people around the world living in similar zones. It is suggested that much of lower Florida and vast areas of the Gulf and east coasts will progressively vanish below the sea during the next two or three centuries, leaving only urban islands protected like the Dutch do with dykes, dams, and levees. The area that was lower Louisiana will be returned to the fishes. Levees can only do so much to offset human folly aggravating the forces of Nature. If one city cannot be protected, how can we forever protect thousands of miles of coastline?

In contrast, the great "Spanish" flu epidemic of 1918-1919 was truly NOT foreseen. There were few people in that era to blame. It wasn't until 1933 that human influenza viruses were first identified, and there were of course no effective clinical treatments in the form of vaccines or antivirals. There was the advertised War to End Wars to be won,

meaning a few more deaths in the nasty battlefield trenches from diseases were not surprising. Thereafter, when the mysterious infection raced through civilian America the federal government tried to downplay its effect, not wanting to undermine the war effort. One of the reasons this influenza that probably started in rural America was called the Spanish Flu was the relatively free press in Spain. Unlike media in censored France and Germany, Spanish papers extensively reported on the rampaging infection.

Human flu infections have been anecdotally recorded for thousands of years, so it is proper to trace cause and effect back to when different, but related, viruses first had the opportunity to exchange genes. That time is when humans domesticated fowl and pork. Wild flu variants abound in today's feathered dinosaurs. Most viral strains are contained within a virtually immune population. When avian influenza genes mutate into new and lethal variants, they ordinarily flare up and die down within the bird community. Enter humans on family farms living in close and daily proximity to domestic birds and pigs. Pigs are great "mixing bowls" for flu genes. It is suggested that flu variants can become more transmissible to humans by way of mediating mammals, ultimately becoming easily transmissible directly from human to human.

We have learned that influenza viruses can either "shift" or "drift." A shifting virus rapidly changes its characteristics, for better or worse from our perspective. A drifting virus can sneak up on us incrementally. Because pigs can host both avian and human viruses, progressive drifting can occur even within pigs. Because the recently reconstituted 1918 virus has been shown to be classically avian, and because the first known victim was a pig handler, it is reasonable to hypothesize that the Spanish Flu virus began its devilish transformation through genetic drifting or shifting within pigs, and continued this process among humans after it broke out into a human pandemic. In this context, think of what could happen if giant flocks of domestic birds are slaughtered, but domestic pigs are not.

There are many bird species in the wild. There is only one human species. Birds are related to and descended from feathered dinosaurs. Was it possible that Jurassic influenza epidemics weakened some of the huge species, leaving the global effects of the asteroid impact to finish the job? If so, that one-two punch would help explain why no great dinosaurs survive, but many smaller dinosaur-birds still do.

The dead dino scenario is a caution for our future as prideful humans. We have been self-admiring kings on this planet for much less than a hundred thousand years; but the great dinosaurs prospered for more than a hundred million years. Their flying descendants are with us today. The next time we accuse somebody of being an "old dinosaur," we should be careful we aren't looking in the mirror at ourselves.

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[3] Dickens, Charles. *A Christmas Carol*. Chapter 1 – Marley's Ghost. (http://www.literature.org/authors/dickens-charles/christmascarol/chapter-01.html)

[4] Senate Committee on Homeland Security and Governmental Affairs. *Hurricane Katrina: A Nation Still Unprepared*. May 2006. (http://hsgac.senate.gov/_files/Katrina/ExecSum.pdf)

[5] Associated Press. Engineers: 1985 test predicted levee break. *USA Today.* 3/13/2006. (http://www.usatoday.com/news/nation/200603-13-katrina-levees_x.htm)

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XII.
Lessons We Could Learn

After the one-year viral holocaust, maybe longer, most people will remain alive. A large number will still be suffering from the effects of extreme illness, but most will eventually recover and lead normal lives. The economy will be battered, but recovering. Will we learn from this collective trial, or will life on this planet return to blind old patterns?

Because science is rapidly advancing against microbes, the great avian flu pandemic of this decade will most likely be the last multi-wave global catastrophe of its kind. There could be other catastrophes on this scale, such as a regional nuclear war, but they will not involve microbial nature out of control, just human nature out of control. Even an "accidental" nuclear war would be set up by human actions and intentions. More likely we will see the effects of global warming caused by greed, denial, and diminishment – followed by adjustment, and a whole new set of winners and losers.

Let's see... avian flu facilitated by traditional family farming, nuclear war sparked by old hatreds, global warming accelerated by wasteful ways of using energy. Crisis creates opportunity. Will we quarrelsome primates move forward in wisdom, or fall back into old patterns that hardly worked in the past, and won't work at all in the future?

A global pandemic of Spanish Flu dimensions will bring out all sorts of religious promoters ready to quote their favorite holy book to prove why you should join their religion, or forever be damned. I believe in free enterprise and freedom of religion, but remain uncomfortable with those who would use mass misery to fill their collection plates.

The best that can come out of any disaster is a renewed sense of community, and a heightened sense of the value of precious life. I am reminded of the great song by Tim McGraw, "Live Like You Were Dying." Strangely, modern life tends to separate us at the very time we see more of each other electronically. Fragmented modern life will remain in place even after a pandemic. Cybernetic tools of advanced civilization are there for us to help rebuild our communities, and to help each of us rise above

our petty concerns and vanities. All of the world's humans are genetically virtually identical. There is no rational reason we should kill off millions of each other from sick hatred in wars that prove nothing. There is also no earthly reason to mindlessly overpopulate and pollute our very own biosphere. Hopefully, in the aftermath of the coming viral pandemic our stone-age consciousness will better blend with our space-age technology for the betterment of all people. When all else is gone, hope remains.

Ecologists sometimes speak of "Indian equivalents." This measure is the number of rural Indians in India it would take to equal the ecological footprint of one American or other First World resident. For Americans that number is about fifty. One American has about the same effect on the environment as fifty peasants in India. If a million suburban American souls were to perish from the bird flu, it surely won't be equal to fifty million rural Indian souls perishing; but there would be an ecological benefit of that magnitude for the biosphere.

Unleashed population tends to increase geometrically, whereas resources tend to increase arithmetically. The Rev. Thomas Malthus knew that in the 18th century. There can be deceiving fluctuations along the road, but the general trend remains.[1] After World War II the population of Europe rapidly rebounded. After the mid-fourteenth century's Black Death, surviving women had more babies than before. Such is the power of human procreation.

The Earth will have a brief period of time after a worst case pandemic where localized pressure on ecosystems will be less. We can rush back to the bedroom to fill up that "empty" space, or we can pause and ponder our place in the Big Picture. Will our species waste this unique opportunity? Probably.

In 1918 the world had about two billion people. Today there are more than six billion.[2] The population of China and India alone equal the entire world's population eighty years ago. Even if two billion people were to die now from an absolutely worst-case scenario, we would still have twice the population of the world at the dawn of World War I.

Contrast the fat footprint our species now has on this planet with the tentative footprint our ancient ancestors had: Genetic historians and volcanologists have found that the entire population of our species shrank to less than 10,000 around the time of a super volcano we call Toba, on Sumatra, Indonesia, 74,000 years ago.[3] Today, even if the

Yellowstone super volcano reignited, it would "only" kill off tens of millions, not billions.

We are a lusty species bent on using, and not replacing or recycling, every bit of resources we can. *Apparently, the only near term force that could exterminate all of us is our aggressive stupidity, through global thermonuclear war. Contemplate the irony of history's most brilliant species eradicating itself.*

There are several astronomical possibilities for global destruction, but they have a very low probability.[4] A huge asteroid or comet would do the job. Also, the passing of a wandering star could do it too, but there are no stellar candidates anywhere near. The Earth twice in its distant past became a totally frozen snowball, and there are scenarios where it could happen again not too far into the future. Our moon was created billions of years ago by a Mars-sized planet that collided with early Earth, but Mars itself is not a candidate. A nearby supernova could extinguish life with gamma rays, but there are no candidates in this era sufficiently close. All of these astronomical possibilities are remote in space and time. I prefer to deal with realistic threats in the here and now, especially those over which we have some control.

Our arrogant and selfish species appears to be only concerned about immediate survival, ignoring that we are part of an extremely complex web of life on the thin skin of this planet. Arrogance is the best explanation for why we are mindlessly killing off other species at a rate not seen since the great asteroid finished off the large dinosaurs 65 million years ago. According to a U. N. report on biological diversity, the current pace of extinctions is 1,000 times faster than historical rates.[5]

We are so egocentrically time challenged that debate still rages about global warming, while ice in Greenland, the Arctic Ocean, and even in Antarctica is already melting. If some predictions come true, much of the low areas of the Gulf of Mexico, including New Orleans, and most of Florida will be submerged.[6] But that's for later generations, not our problem, even if we caused the problem.

The lessons we can and will learn from our viral trials in this decade will be guided in part by the scale and timing of the pandemic. If we are incredibly lucky, and the current killer virus mutates into a much less lethal form, then little will change. If we are not lucky, entire societies may be swiftly transformed. Our species of course will survive, but our

culture will change. The plague helped eliminate western European serfdom, stimulating the modern era. What will happen to global societies after a viral catastrophe of Biblical proportions?

Our generation's pandemic could see something like the 1918 avian flu epidemic, with a slightly higher kill rate. That would mean about 5% dying (which is down from the current 50+%), versus the roughly 3% of 1918-1919. Given that the world has three times the population as then, we are looking with horror in a possible 5% scenario of up to a quarter billion deaths worldwide, with hundreds of millions more taking a long time to recuperate.

Some geographical areas of the world will suffer more, mostly underdeveloped areas with malnourished and dense population clusters. Some population groups everywhere will suffer more, and not just the traditional victims of ordinary flu. The 50% death rate scenario, which Dr. Webster does not rule out, is almost beyond our imagination.

Will 2007 unfold like 1918, when many healthy young adults in their prime were swiftly slain by cytokine storms inside their lungs? Killing off young adults in their productive prime will have a much different effect on society than killing off the old and infirm. Losing a healthy worker with a family is bad for industrial productivity, not to mention the social costs. Losing an unhealthy senior smoker would yield lower medical and palliative costs, including reduced long-term care costs. The macroeconomics surrounding our micro-tragedies will be unseen, but not unfelt. Indeed, the post-pandemic world will have many ironies.

In conclusion, there are certain things that can help to discourage the Grim Reaper from visiting your family. Since most families will not receive any potent pandemic vaccine or effective patented antiviral over the next three years, we will mostly be left to our own wits and resources. This do-it-yourself prospect is scary for people used to being cared for like children by white-coated medical professionals.

Fortunately, most people are able to rally and cope, but only if they are given the factual tools and social support they need to wisely defend their very lives. Informed preparation with a military mindset always trumps pure panic. I trust this book will be among those widely used factual tools. Defensive tools that we individually and collectively can wield will enable many to gratefully live who otherwise would have died.

Yes, I believe the biosphere is seriously overpopulated with polluting people. I also fervently believe that every person now here on Earth has the right to life, liberty, health, and happiness. All human beings have innate spiritual value.

If only one precious human soul on our blue planet is saved from the viral assassins by this book, then I have written well.

[1] http://www.prb.org/Content/NavigationMenu/PRB/Educators/Human_Population/Population_Growth/Population_Growth.htm

[2] http://users.erols.com/mwhite28/20c-pop1.htm

[3] http://zyx.org/TOBA.html

[4] http://qntm.org/destroy

[5] Doyle, Alister. Humans spur worst extinctions since dinosaurs. *Reuters.* March 20, 2006. (http://abcnews.go.com/US/wireStory?id=1746569)

[6] Rincon, Paul. Sea rise could be "catastrophic." *BBC News.* 23 March 2006. (http://news.bbc.co.uk/2/hi/science/nature/4834806.stm)

Appendix
The Federal Pandemic Action Plan

On May 3rd, 2006 the federal government issued its battle plan against an avian influenza pandemic. The *National Strategy for Pandemic Influenza: Implementation Plan* has 232 pages of uneven reading. You can download it from several sources, including http://pandemicflu.gov.[1]

In the post-Katrina world our federal government is not going to be caught without a nice plan (with 300 action steps) well before hundreds of thousands of Americans could be slain by a worst-case scenario avian flu epidemic. Such a plan would be golden for any administration. If disaster happens, elements of the plan will help save some lives. If disaster does not happen, politicians can point proudly to this document anyway.

With a careful reading you might be able to discern aspects of this report written by scientists, and aspects crafted or influenced by politicians. Scientific statements can be adapted to enhance political priorities. Sometimes what is not said is more important than what is said.

This appendix will focus not on the many pages bloated with bureaucratic tedium and action steps containing very little of real value. Yes, the idea is to have a comprehensive plan that will inspire others to do their own planning. Problem is, we are now well into 2006, and those in the private and local sectors who haven't started planning for this rapid but persistent emergency likely will continue to procrastinate, only to "plan" on the spot.

I would like to first point out some elements of this plan that will benefit us. Later, I will point out some weaknesses. America is better off having this belated plan than having nothing. The question is, how much better than nothing?

* It is good to see the federal government trying to get out front on such an important issue. For many years they have been so far behind the scientific caboose, as to be out of sight.

* It is also important that the White House sees their message as encouraging preparation, to fend off social chaos. That strategy is somewhat parallel to my idea of developing a military mentality.

* Even though much of the $7.1 billion dollars directed to this battle has not yet been spent, and most of it will go to vaccines and antivirals of dubious potency and limited quantity, some small cash amounts will trickle down to communities to help synergize local efforts.

* There are some excellent action steps that companies should follow to avoid shutting down. Many companies won't act to protect their workers until they see key employees fleeing the workplace. Just fifteen percent of American companies even have a plan.[2] This document does provide practical guidance for companies wise enough now to understand that nothing happens in business until something gets sold, or until some working employee otherwise adds value.

* This document's mostly scientific planning assumptions are on page 32. I reprint them here, both because they are realistic, and because they are partially flawed:

"Planning Assumptions for the Implementation Plan

Pandemics are unpredictable. While history offers useful benchmarks, there is no way to know the characteristics of a pandemic virus before it emerges. Nevertheless, we must make assumptions to facilitate planning efforts. Federal planning efforts assume the following:

1 Susceptibility to the pandemic influenza virus will be universal.
2 Efficient and sustained person-to-person transmission signals an imminent pandemic.
3 The clinical disease attack rate will be 30 percent in the overall population during the pandemic. Illness rates will be highest among school-aged children (about 40 percent) and decline with age. Among working adults, an average of 20 percent will become ill during a community outbreak.
4 Some persons will become infected but not develop clinically significant symptoms. Asymptomatic or minimally symptomatic individuals can transmit infection and develop immunity to subsequent infection.
5 While the number of patients seeking medical care cannot be predicted with certainty, in previous pandemics about half of those who became ill sought care. With the availability of effective antiviral medications for treatment, this proportion may be higher in the next pandemic.
6 Rates of serious illness, hospitalization, and deaths will depend on the virulence of the pandemic virus and differ by an order of magnitude between more and less severe scenarios. Risk groups for severe and fatal infection cannot be predicted with certainty but are likely to include infants, the elderly, pregnant women, and persons with chronic or immunosuppressive medical conditions.
7 Rates of absenteeism will depend on the severity of the pandemic. In a severe pandemic, absenteeism attributable to illness, the need to care for ill family members,

and fear of infection may reach 40 percent during the peak weeks of a community outbreak, with lower rates of absenteeism during the weeks before and after the peak. Certain public health measures (closing schools, quarantining household contacts of infected individuals, "snow days") are likely to increase rates of absenteeism.
8 The typical incubation period (interval between infection and onset of symptoms) for influenza is approximately 2 days.
9 Persons who become ill may shed virus and can transmit infection for one-half to one day before the onset of illness. Viral shedding and the risk of transmission will be greatest during the first 2 days of illness. Children will play a major role in transmission of infection as their illness rates are likely to be higher, they shed more virus over a longer period of time, and they control their secretions less well.
10 On average, infected persons will transmit infection to approximately two other people.
11 Epidemics will last 6 to 8 weeks in affected communities.
12 Multiple waves (periods during which community outbreaks occur across the country) of illness are likely to occur with each wave lasting 2 to 3 months. Historically, the largest waves have occurred in the fall and winter, but the seasonality of a pandemic cannot be predicted with certainty."

This basically excellent page, among the 232, claims to be talking about a worst-case scenario, which is actually a population projection from the 1918 scenario. Yes, that era was truly horrible, but still not a worst-case scenario.

The worst case would be a continuation of the current H5N1 50+% clinical death rate among humans, not the nearly 3% death rate of 1918. That truly worst-case scenario would be nuclear in its implications. Furthermore, there are about 150 different strains of influenza in aquatic birds with the potential to cause a global pandemic. In a very recent conference in Singapore, organized by the *Lancet* medical journal, virologist Malik Peiris of the University of Hong Kong said the assumption that H5N1 will wear itself out if it triggers a pandemic might be wrong. "If this virus becomes a pandemic, will it attenuate its virulence in humans? I think that would be a rather optimistic assumption to make."[3]

* Throughout the 232 pages of the federal action plan there is lip service given to multiple waves, lasting months. At the same time, we are urged to stock food for only a few days. What good is this? Even stocking food won't work if we can't perfectly practice social distancing, apparently the only viable strategy available for the entire population from a government which has only recently "seen the light."

* The best possible political spin is given to the modest stockpile of antivirals. Even though the original idea of having a treatment course of Tamiflu being ten doses over five days has been shown to be clinically insufficient, this document perpetuates the error on page 215, so as to make it appear that more antiviral help is available than really is.

* Social distancing recommendations themselves are questionable. For example, it is recommended that workers stay three feet apart. That works where the aerosol virus is attached to water, or otherwise burdened. Individual viral particles can float much farther, making three feet only partially protective. Open windows, high humidity, and a strong flow of air out of the office building would help – except that such buildings are no longer designed, thanks to energy conservation and air conditioning.

* The use of N95 masks, which are more efficient than surgical masks, is of unproven value. These masks will save some lives, but cannot be relied on for total protection. They cost $1 to $3 each when bought in bulk, and should be used only once around infected people. They are designed to filter out 95 percent of particles that measure about 0.3 micrometers, or thousandths of a meter, in diameter.

However, influenza viruses range in size from 0.08 to 0.12 micrometers.[4] Fortunately, these nano-particles are often clumped together or stuck to other airborne debris, which would allow an N95 mask to catch most of them. Also, even less-efficient surgical masks are recommended for those already stricken, to help protect caregivers from infected coughs.

* One of the most "clever" aspects of this action report is how the World Health Organization's stages have been altered. The American report is very clear in showing how what the WHO calls a Stage 3 situation is now a USA Stage 0 situation. Saying that we aren't even up to Stage 1 implies that there is no threat, or that we are somehow isolated from the threat. Briefly, the denotation is correct; the connotation is psychologically deceptive.

* Beyond clever is the most critical failure of this report. While most federal monies are going to long-range research, and to buying antivirals and vaccines of dubious value, there is not much left for aiding local hospitals and other medical infrastructure in the near term. Hospitals in this competitive age do not have much surge capacity, and they have almost no surplus ventilators.

A recent *New York Times* article pointed out there are 105,000 ventilators, and even during a regular flu season about 100,000 are in use. In a worst-case human pandemic the country would need as many as 742,500. However, each ventilator costs hospitals operating on thin margins $30,000.[5]

Here's what *The Washington Post* had to say editorially:[6]

"True, there are plans for mobile medical units, and there have been rudimentary attempts to define and measure the nation's 'surge capacity.' But most of America's 5,000-odd hospitals are unprepared. Nearly half of the nation's emergency rooms report being at or over capacity; 80 percent of emergency doctors say their hospital is unprepared for an epidemic or terrorist disaster, and about a third of hospitals are losing money, meaning they can't invest in spare capacity."

An article in *USA Today* published just after the report was released quoted several expert stakeholders. Here is part of that timely article:[7]

"The plan 'is a start, but it's certainly not a finish,' says Patrick Libbey, director of the National Association of County and City Health Officials. Congress' authorization in December of $350 million to states for pandemic preparedness was more than offset by a 12% funding cut during the current fiscal year, Libbey says.

Irwin Redlener, director of the National Center for Disaster Preparedness at Columbia University in New York City, says that by placing so much of the preparedness effort on state and local agencies, the federal government has imposed 'the mother of all unfunded mandates.' …

Redlener says most of the money allocated so far for pandemic planning will be spent on vaccine development and drug stockpiling, leaving only about 5% for state and local readiness.

'This is where the plan doesn't jibe with the reality that hospitals in small towns and big cities are going to have to try to accommodate an unprecedented number of very ill patients for which the capacity is not there,' he says. He estimates that $5 billion more is needed for hospitals and local health care."

To date Congress has appropriated approximately $300 billion for the latest war in Iraq.[8] Purchasing 600,000 more hospital ventilators to potentially help save hundreds of thousands of American lives would cost about $18 billion. Purchasing only enough ventilators to effectively double what hospitals now have would be only about $3 billion. Where is the money?

- Bottom line: The latest federal action strategy is more good than bad, in the sense that something beats nothing. We must take from this bloated document what we can, and continue to prepare wisely for our loved ones' future. There is no panacea, and there will be no near term rescue by Washington.

[1] http://www.whitehouse.gov/homeland/pandemic-influenzaimplementation.html

[2] Jones, Del. *USA Today*. Few U.S. companies are prepared for bird flu outbreak. Updated 5/1/06. (http://www.usatoday.com/money/companies/management/2006-0430-avian-flu-usat_x.htm)

[3] Fogarty, David. *Reuters*. May 3, 2006. (http://news.yahoo.com/s/nm/20060503/ts_nm/birdflu_ viruses_dc_1;_ylt=At63waXo4grVxyyD5vQ3JU2TvyIi;_ylu=X3oDMTBiMW04NW9mBHNlYwMlJVRPUCUl)

[4] Brown, David. Face Masks Analyzed as Aid in Flu Pandemic. *Washington Post*. April 28, 2006; page A08. (http://www.washingtonpost.com/wp-dyn/content/article/2006/04/27/AR2006042702098.html)

[5] McNeil, Jr., Donald G. Hospitals Short on Ventilators if Bird Flu Hits. *The New York Times. March 12, 2006.* (http://www.nytimes.com/2006/03/12/national/12vent.html?ex=1146801600&en=28ed14ff26556db8&ei=5070)

[6] Editorial. Planning for Flu: Pandemic preparation plans still don't deal with the central question: How will America's hospitals cope? *The Washington Post*. April 21, 2006; page A22. (http://www.washingtonpost.com/wpdyn/content/article/2006/04/20/AR2006042001879.html)

[7] Manning, A., and Jackson, D. Bird flu plan lacks a key detail. *USA Today. 5/3/2006.* (http://www.usatoday.com/news/health/2006-0503-flu-plan_x.htm)

[8] National Priorities Project: Cost of War. (http://nationalpriorities.org/index.php?option=com_wrapper&Itemid=182)

Appendix
Some Top Web Sites

Many of these sites are updated frequently. No one has all the answers. This list is not in any order of value – since value for you is personal, and can change as a pandemic unfolds. Visit each and make up your own mind.

1) http://healthyamericans.org/

2) http://www.cidrap.umn.edu/idsa/influenza/panflu/biofacts/

panflu.html

3) http://www.webmd.com/content/pages/14/89767.htm

4)http://www.globalsecurity.org/security/ops/hsc-scen3_pand

emic-influenza.htm

5) http://www.pandemicflu.gov/

6) http://content.nejm.org/cgi/content/full/353/13/1374

7) http://avianflu.typepad.com/avianflu/2005/05/

has_the_next_fl.html

8) http://www.sciam.com/print_version.cfm?articleID

=000DCB5A-9CC7-134E-9CC783414B7F0000

9) http://content.nejm.org/cgi/content/full/353/21/2209

10) http://www.who.int/csr/disease/avian_influenza/en/

11) http://depts.washington.edu/einet/

12) http://www.wildlandfire.com/docs/flu-watchout.htm

13) http://www.msnbc.msn.com/id/9787849/site/newsweek/

14) http://www.birdflumap.com/birdflumap2.html

15) http://avianflu.typepad.com/avianflu/

16) http://www.cdc.gov/flu/avian/

17) http://www.cdc.gov/flu/avian/professional/

18) http://www.who.int/topics/avian_influenza/en/

19) http://www.wwwfacemasks.com/

20) http://www.birdflutoday.com/

21) http://www.fluwikie.com/

22) http://www.fluwikie.com/uploads/Consequences/

Pandemic3Aug2005.pdf

23) http://www.cdc.gov/ncidod/EID/vol12no01/051371.htm

24) http://www.promedmail.org/pls/promed/ f?p=2400:1000

25)http://www.whitehouse.gov/homeland/pandemicinfluenza-implementa

tion.html

Appendix
Sources for Supplies

When I began this book I was reluctant to come up with a list of sources for supplies. I didn't want to favor any select group, and I didn't want to stimulate a run on that group by anxious buyers. However, there are only so many sources for supplies, and all sources could experience shortages anyway.

Therefore, I am listing here a few sources for supplies. This list is just to help you get started; it is not encyclopedic. I have no financial interest in any of them. Start soon, not after the virus mutates and everybody else races to buy these items.

You probably don't need to accumulate several months of all supplies. A pandemic will come in waves, lasting several weeks each time. You may be able to partially restock after the first wave passes.

If you are part of a small community that is pooling survival resources, you will be better prepared for the unexpected. If not yet, talk to your neighbors or other local membership group, such as your church. The

time to plan and organize is before the time to act; and we don't know how far apart those two times will be.

There are three general places to buy pandemic products: mega-stores, such as Walmart; retail pharmacies; and through the Internet. Right now, Internet sources are your best choice for price and variety.
I predict that many retailers will quickly set up sections in their store for pandemic supplies, as soon as first news of the critical mutation comes in. Some stores will also feature books such as this one. How well stocked those last-minute sections will be is open to question.

Food and Hygiene Supplies

Stock up on **Lysol spray** and **Lysol sanitary wipes**. **Clorox spray** is excellent too. Stock up on multiple bottles of alcohol-based hand cleaners, being sure that the percent of alcohol is at least 60%. Have regular bleach ready for your laundry, and for selective sanitizing.

One widely available source of alcohol-based hand cleaners is **Germ-X**. Their web site is http://germx.com/ In my home state of Virginia this product can be found at Dollar General Stores, Food Lion, Giant Foods, Harris Teeter, Ingles, K-Mart, Target, Walmart, and Winn-Dixie. I have found the price at Dollar General to be especially low. Remember that such cleaners work best on non-soiled hands, so you may first need to use regular soap.

Lysol sanitary wipes are not recommended by their manufacturer for use on hands, because they have a chemical that can irritate your eyes if you rub them after use. Legalese aside, aren't you going to hold them with your hands anyway? I recommend them for wide use on such surfaces as automobile steering wheels, grocery cart push rails, and office equipment. I also wipe my hands when out in public with these antiviral disposable cloths, being sure to keep my hands away from my eyes. (If you are wondering, I am not an obsessive-compulsive "clean freak," just prudently cautious. Better safe than sorry.)

I have discussed **food supplies** elsewhere in this book. Common sense will tell you what your family needs, and what can be stored even when the electricity fails. Dried foods are great, but you will need to mix them with clean water for cooking. Your family will need lots of **clean water**. Nothing special is required. Buy large containers, not the very expensive little bottles. Distilled water and water cleaned by

reverse osmosis are best. Buy well in advance of the emergency. Dried and canned food will keep. Don't forget daily **non-food items**, such as toothpaste, soap, shaving supplies, deodorant, batteries, body powder, perfumes, detergent, and other basic items also available at the supermarket. If your family has **special needs**, such as baby diapers and formula, stock up now.

Medicines could be critically important for your family. Be sure that you have at home supplies needed for your family for an extended period of time. This is especially important for diabetic supplies, heart medications, and other critical prescriptions.

The Home Recovery Room

Prepare now a pandemic medical arsenal, according to the instructions of Dr. Woodson in Chapter X. Most drug stores should have what you will need. Some items will be over the counter, and some by prescription.

As part of your family's preparation for at-home care, consider both routine and extraordinary needs. Routine would include, for example, painkillers as recommended by Dr. Woodson, along with other medications. Extraordinary, for example, would include **adult diapers and absorbent bed pads** to deal with your sick if they develop severe diarrhea. These hygiene items are most economically purchased through your town's hospital and nursing home supplies company, and they will deliver.

Pre-position all supplies, because the caregiver may also soon need care.
Contagion comes both from touching and from breathing. The home recovery room could be a danger zone if the air is stale, and if the sick don't have **surgical masks** to wear. The sick in bed won't need to wear N95 masks, as the idea is to keep relatively large coughed droplets from spewing forth.

For critical room ventilation, consider putting a **window fan** in the room, with air blowing out in a linear fashion, not just circulating. The solution to pollution is dilution. There are some exotic air cleaning machines that attract viral particles to traps. The problem with them, beside high cost, is their inability to filter a large volume of air frequently enough to make a difference in a sick room with one or more highly contagious patients. Stick with moving out large volumes of air. High-tech clean rooms move

volumes of air out through floor grates; you will use your window. Let's hope it's not too cold outside. If so, run your furnace more, and don't worry about the fuel bill in this short run.

Highly Recommended Items To Take

Local stores include large stores such as at Walmart. They may have supplies of Vitamin C, Vitamin E, Vitamin D, green tea extract, St. Johns Wort, selenium, bilberry, coenzyme Q10, cranberry juice, tumeric, acidopilus, tea tree oil, ginger, garlic, alpha lipoic acid, and a few other OTC medications. Prices and quality should be excellent. However, everybody shops at Walmart, so expect supplies to vanish early. Buy now so they can restock for some of the late shoppers.

National nutritional supplement chain stores often focus on weight loss products, muscle building products, cosmetics, and highly complex formulas from redundant manufacturers. Nevertheless, if you know what you want, you can do well there. Also, they may be the only place left where you can find product if you procrastinate. Don't overlook your local natural foods stores, and especially **natural foods co-ops**. Volunteer co-ops are a good source to find knowledgeable help. They will also have a good selection of literature, hopefully including this book.

Certain items will be hard to buy in quantity locally, except at the chain supplement stores. Resveratrol is a prime example. Also, prices can be better when buying in quantity from a large Internet source. Comparison-shopping is advised, as the supply landscape could change quickly when a pandemic approaches.

Here below are a few good **Internet sources** for my top Chapter IX "What to Take" recommendations. They are not here in any order. Visit them all to see how they fill your needs:

Vitamin Shoppe
http://www.vitaminshoppe.com Many brands
and products.

AllHeart.com http://www.allheart.com N95 respirators, uniforms, and many other supplies.

National Allergy http://www.natlallergy.com All types of allergy products, including N95 respirators.

LifeExtension
http://www.lef.org/
Membership organization with good supplies and info.

Vitacost http://www.vitacost.com Excellent source for many recommended products, some of which come in easily taken combinations. Great prices.

Small Planet http://smallplanethealth.com
Several good sources.

iHerb http://www.papanature.com Good selection from several sources, and low prices.

Organic Pharmacy
http://organicpharmacy.org/
N.D. runs it, and also source of homeopathics

Health Pricer http://www.healthpricer.com/
Search engine to find low prices.

Final suggestion: If you aren't on the Internet, find somebody else who is. Go online together, and order together. Often you can receive volume discounts.