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## **A “Meta” Epidemiological Relationship between H1N1 and HIV ?**

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There are not many references in either recent scientific literature or the general press that suggest a link between the emergence and spread of HIV (AIDS) worldwide and the current H1N1-2009 influenza pandemic. This brief memo attempts to draw a few interesting observables and threads of logic together, along those lines, but not, it must be pointed out at the outset, in the manner that most readers may at first expect.

The relationship of interest is neither one of virology nor one of infection, diagnosis, medication or prognosis. Rather it is a “meta” relationship having to do with social and psychological processes, and with practical, public responses. There is something to learn, as we deal with not only the present H1N1 pandemic but future ones that will surely arise with other micro-organisms, from how we as a society responded (and pointedly did not respond) to HIV, in order that we may learn from past mistakes and habits and (hopefully) do a better job in the present and future for our public and personal health.

As HIV first began to emerge, particularly in the early 1980's, a few interesting phenomena stand out as memorable facts. There was denial, there was resistance, there was slowness on the uptake about the need for comprehensive, society-wide responsive measures, and there was a rash of early prognoses and recommendations, particularly in the area of suggested treatments and medications, that however well-meaning were mistaken and had grave consequences.

There are indeed parallels going on with H1N1, and we really need to address these head-on before we suffer – potentially, and perhaps not this year, not next, but unpredictably and probably sooner than later – far steeper consequences in terms of illness, death and related social consequences than most nations have experienced from HIV. Now the costs of HIV are actually far greater than they may seem at first to many casual observers; part of the reason why HIV may not strike many people as a very present danger and burden to us all is the fact that it has become a kind of “slow burner” that, like a forest fire that has gone underground and into the peat and substructure of the forest floor, is not blazing, fearfully overpowering on all fronts, and posing an immediate and unmistakable threat to large numbers of people all at once. Nonetheless, the fact is also present that unlike the influenza virus, HIV is not likely to be contracted by 30% to 50% of the world's population over the next year (or less), and it is not likely – in the event of a reasonable-probability mutation - to be lethal within weeks to 25% or even 10% of those who have been infected.

Our society has been pushed and pulled into confusion and uncertainty about public health and infectious diseases, particularly those that can be easily transmitted among people by close contact, with or without the exchange of bodily fluids. We have been barraged and mesmerized by the mass media and in particular by the internet through websites and blogs and a plethora of news, opinions, editorials, and, frankly, a great deal of misinformation and plain garbage. We have seen in less than one generation all of the following appear as real or as suspected and/or expected “killer pandemics”

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or as problems of epidemic but uncertain proportions, and we have “heard it all” about how one disease or the other of these would or could be devastating:

- HIV
- Legionnaire's Disease
- Anthrax as a terrorist WMD
- Smallpox as a terrorist WMD
- West Nile Virus
- Tuberculosis
- SARS
- H5N1 (avian flu)
- and now H1N1 (so-called swine flu)

Currently, since the end of April of this year (2009) we have seen H1N1 be front page and “breaking news” all over the media, and we have begun to see a most disturbing convergence occurring, predictably, just as the normal “flu season” gets underway in the northern Hemisphere. On the one hand, we are seeing the progression of trans-species infections (human → pigs and human → birds), and signs of mutation and novel shifts in virulence, particularly within deep-respiratory effects. On the other hand, we are seeing a “goulash” effect in the general population’s reactions, ranging from severe downplaying to denial to conspiracy theories to simple deadening of the mind to all the reports and news including what comes out as genuine “news.”

At the same time, there is little in the way of substantive action for preventive and proactive measures to enhance and accelerate detection, diagnosis, and categorization of viral types and infection effects. There is and has been a great emphasis upon vaccine preparation, even though it is clearly acknowledged in the medical community that there are many open questions about the effectiveness of any near-term vaccine, given the likelihood of H1N1 mutations and variations, particularly if there are mutations involving H5N1 strains. Vaccines are popular, hot topics in the news, big money, big attention, and from a medical perspective, of questionable value if they stand alone in a sea of ignorance, poor preventive practices, and basic lack of understanding of the real dynamics of any pandemic.

In a recent series of news stories, an outbreak of H1N1 at the University of Kansas was highlighted. One student, currently self-quarantined along with her dorm roommates, was astonished and dismayed that she had contracted the flu. Interviewed in a report (“University of Kansas students isolated by the flu” – CNN News (online), Sept. 1, 2009) by Elizabeth Cohen, CNN Medical correspondent,<sup>1</sup> the student exclaimed, “We took all the necessary precautions. Like, we really did. It wasn't like I was licking the handlebars of the bus or anything,” she said. “I was hand sanitizing. I was being very careful. I don't know how this happened.”

From my perspective, I see this response as being yet one more example of the problem. Misinformation, disinformation and simple lack of information reaching the public or being absorbed and learned by that public. While all forms of hygiene including hand-sanitizing are important, including for minimizing contagion of an influenza virus, the fact is that such techniques are of virtually no value whatsoever if one is in very close and continuous personal contact, such as in a four-person shared dormitory room with a common bathroom and other close-contact and shared-object facilities. Can a person avoid getting H1N1 if sharing a dormitory room? Quite possibly so! But definitely not if one is mistakenly relying upon hand-sanitizing and forgetting to exercise a whole battery of other precautions and “standard operating procedure” practices.

This brings back memories of the early years (which stretched into decades although less so in countries like USA, CA, AU and throughout the western EU), that saw gross ignorance and misinformation run rampant and amok in the matter of HIV. One can never forget the abuse and

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<sup>1</sup> <http://edition.cnn.com/2009/HEALTH/08/31/kansas.swine.flu/index.html>

discrimination toward people, including young children, who had contracted HIV from such methods as blood transfusions. One can never forget the misunderstandings and misplaced apprehensions and defenses about how to avoid infection and how to protect oneself from infection, all of which resulted in higher incidences, higher numbers of deaths, and higher levels of suffering including among those who were not infected but in some way close to the situations.

I would like to quote here from a paper that I consider to be one of the best in terms of exposition, clarity and practicality on the subject of influenza pandemics, their consequences and some of the issues, particularly for non-pharmaceutical intervention (NPI) techniques in response to pandemics. This is a work entitled “White Paper on Novel H1N1” and its author is John M. Barry.<sup>2</sup>

“Getting and sustaining compliance – changing behavior and keeping it changed – requires winning public trust. Gaining trust requires explaining in detail why each recommendation was made and why others were not. It also requires, when decisions are made, taking the offense through a massive campaign to dominate all media, including the internet. And if the situation becomes severe, experience from 1918 to SARS demonstrates that only full and candid disclosure of the truth will contain panic. This author is wary of the term “risk communication.” It implies management of information. You do not manage the truth. You tell the truth.”<sup>3</sup>

There is one clear path for creating effective social and personal defenses against a pandemic disease such as influenza. Giving people accurate, free, simple, direct Truth. Information resources that they can use, over and beyond the pipedream of a magic shot or magic pill. This is not to say that vaccines and medications are not useful or important! What I am saying is that people need to know more about the scope of the threat, the risks, the consequences, and the need to act in their own personal lives, in their homes, in their behaviors, for minimizing the risks of contagion and for dealing with the sickness if and when it occurs in their household, family, self.

Furthermore, it is important to have widespread, in-the-field, close-to-incidence detection and diagnosis. It is invaluable to have more information in the hands of the health providers and emergency responders to know, as much as is technically and humanly possible:

- Who has an infection and what is the strain, what is the specific type of virus (or non-viral agent)?
- Where do they live, where do they work, who are the others most at risk?
- What is the level of their dis-ease, their condition, and their prognosis?
- Who needs emergency medicine or hospitalization the most, or might likely need it, judging from the strain they have, their condition at present observation, and what is known about the behavior of the virus for their genotype, age, and prior/present other health conditions?
- Who has family members to help care for them and who is alone?
- Who has a basic good care environment including warmth, water, nutrition, and who does not?

The answers to these questions are essential for caregiver and pandemic responder-managers. These answers can be highly integrated in how they are obtained, found, managed. These answers do not – they absolutely do not – require more high-cost, long-term, “erudite-commission” studies, reports, mega-contracts to major consulting firms and high-priced experts, or (what can too easily be the death of science, engineering and/or medicine) complicated computer-based simulations. These answers are available at low cost, together, by applying common sense and acquired intelligence to how we do detection, diagnosis, and therapeutic response in the first place, but also making use of our advanced technology of communications, micro-sized instrumentation, and smart informatics.

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<sup>2</sup> Dr. Barry is a Distinguished Scholar at the Tulane University Center for Bioenvironmental Research and also a Member of the Advisory Board for the MIT Center for Engineering Systems Fundamentals.

<sup>3</sup> John Barry, “White Paper on Novel H1N1”, ESP-WP 2009-07, rev. 7/27/09, MIT Engineering Systems Division, Working Paper Series

There are some specific resources, some concrete tools, that exist today and that can be helping our society and all segments of it, so that we do not need to go through a “repeat” of the HIV ignorance, confusion, misinformation and other mayhem but now on the scale of a major influenza pandemic. One of these is CRAIDO – Community Rapid Response for Infectious Disease Outbreaks. It is something that should be thought of as first and foremost an open-source, open-access, as-free-as-possible suite of tools, including an almost-beyond state of the art mobile-capable laboratory station, for any and all communities around the world. CRAIDO actually evolved as a design, architecture, set of instruments and software, and system, with direct inspiration and influence from the entire last twenty-five years of the HIV, SARS, and H5N1 experiences. All that history went into it, and thus it has something intelligent to offer to the world of 2009-2010 that is facing the first pandemic in history that affects a global population of nearly 7 Billion inhabitants on a tightly-coupled and totally-interconnected world where “just-in-time” supply chain economics, big-box retail mega-markets, airplanes carrying 250-300 people at a time, and metro subway systems serving upwards of 10M passengers a day, have totally, totally altered the way we are as a society and as a population subject to the risks of virulent infectious disease.

This is the advantage that CRAIDO, using the CUBIT-delta model, built upon established and accepted and proven RT-PCR (gene-sequencing and microarray) bioassays, brings to the situation. CRAIDO gives you the compact, portable, easily manipulated tools. Beyond diagnostics, it gives you the informatics engine with also fault-tolerant communications. If all else fails, you have short-wave and punch in a few codes, get on the right frequency, and you are sending your packets of data into the same destination database engine thousands of miles away, and to the lab tech doing this in the small room of the portable PodLab (labstation), he or she does not really even notice the difference from having a direct broadband ethernet connection.

Without a CRAIDO labstation, you are in the present era. Slow, cumbersome, unwieldy, requiring some extra specialists no doubt, bogged down by a lot of things that don't want to work right or at all in a high-stress, high-noise, high-clutter environment. You don't even have the fast diagnostics at all, and you definitely don't have the capacity to be picking up indicators of anomalies, doing tracking, doing forecasting, and getting a bead on the person(s) who have this H1N1-XXX and where they came from and are mingling and going.

With a CRAIDO workstation, you have an Edge on the Competition. But that Competition, that is not some other person, not some other department of health or company. No, the Competition is your viral opponent, a very unfeeling but smart operator that has its goals, its objectives, its mission. You have an Edge on it because you have some better knowledge, sooner, faster, more readily and accurately distributed, that tells you something about who and where are those high-risk or medium-risk people in your hospital, school, factory, community. You are able to get a better discrimination, a better separation, of the data about which virus with what qualities and parameters, is where and within whom.

Now you have a chance at executing some type of intelligent disease management, some type of responsible epidemiological countermeasures for the benefit of all those people and also all those people “out there” with whom these people in your domain will soon come in contact. You have a chance to separate out the ones who should be getting the most intensive care, and meds, and in some cases vaccines, and you can plan how you are going to accommodate the fact that you have some people that can just be sent on their way, either back home or to some next-stage emergency healthcare center, and some people who should not be going to mingle with anyone until they are no longer contagious.

CRAIDO is no miracle engine. It is not the philosopher's stone nor a magic wand. It is simply a very intelligently engineered set of biomedical tools that will make epidemiological response and treatment better for more people. And it is ready to deploy right now. There are no barriers except those of bureaucracy, red tape, and some things that don't need a panel, nor a report, nor a collection of high-ranked, high-credentialed, and highly-published pundits, but rather a very small group of people who can sign their names and get the balls rolling.

In closing, I want to simply reflect on the difference a CRAIDO could have made, had it existed and been available, for the reduction in the pain and suffering and death due to HIV. It is hard to make estimates in terms of numbers. One can simply think qualitatively about what could have been some of the differences. Of course, much of what is in CRAIDO did not exist back in the 1980's or even in the early 1990's. However, it absolutely does exist today. And yet, amazingly, tools and solutions like CRAIDO are still receiving "deaf ears" within some circles and from some individuals. This is something that needs to be addressed, and not only for the current H1N1 pandemic. We do need to address the "hearing problem" within some people who are in government, in the healthcare industry, in public health departments. Now is not too late, but it is almost getting to be too late. Your active assistance in taking the steps of moving from reader to activist for intelligent change in epidemiology and public health practices can make, literally, all the difference in the world for millions of people.

Remember, and do not forget HIV, still a very major problem, epidemic throughout the world, incredibly intense in some parts of the globe, and addressable by CRAIDO solutions.

Remember, and do something today, about H1N1 which is a pandemic, which is a sleeper but not a pushover, and which could mutate into something that if it gets out of control could make HIV look small in comparison.

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