Testimony of Alan P. Zelicoff, MD[1]
Little Hoover Commission
Sacramento, California
May 26, 2005

Almost three years ago, I had the opportunity to address several Commissioners while presenting at one of your advisory committee meetings on public health preparedness. Thankfully, while bioterrorism has not reared its ugly head in the intervening time at least two completely novel infectious diseases have appeared or spread across the country – SARS and West Nile fever. So, as was easy to predict, we have experienced two new epidemics and because the public health system is still unable to perform anything close to real-time monitoring and analysis, we respectively over-reacted and under-reacted to these two diseases. This will happen again and soon. Thus, I am honored to be invited back to provide formal testimony to the full Commission because the issues that you have asked me to address could not be more timely, more pressing, or more relevant to both preparedness against novel disease and to the threat of terrorism.

Many years ago I met the fellow next to me, Dr. Bob Kadlec when we both happened to end up working in the same office in the Pentagon devoted to multilateral negotiations on the Biological Weapons treaty. He was a young Captain at that time and I was to be his mentor. Within weeks, our roles reversed. It was I who soon started to learn from him and its been that way ever since. So, while I couldn't know exactly what Bob was going to say in his testimony today, it wasn't hard to guess: this State (and just about all others) have done little to substantively prepare for the next naturally occurring, totally new and unexpected disease outbreak (let alone bioterrorism) *and* even more important we have not solved the fundamental communications problem among public health officials, physicians, emergency response personnel, nurses and other health care providers, hospitals and veterinarians. Notice that I say "among"; *all* of these communities are critical – equally critical – for the earliest possible detection of untoward infectious disease events that are certain to occur.

Let me answer the first question about California's progress – directly and with the bluntness that sometimes gets me into trouble: California's public health preparedness since the LHC report of 2003 has *very* modestly improved – but not nearly to the extent that is could by employing already available, *extraordinarily* inexpensive tools which would save many lives from the next West Nile fever or from the devastation from a bioterrorism event. As Dr. Kadlec would probably tell you, such an attack has likely been planned by terrorists around the world, so

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this is not simply a theoretical threat. Heaven knows that individual public health officials have made near Herculean attempts to improve their "situational awareness" in recent years, but the very nature of public health practice is local. This is good in some respects: NO one knows the local public health scene (and what is "normal" or not) than the professionals who operate individual offices. At the same time, devolving of functionality to the local level by definition balkanizes communication and stovepipes almost all reporting. Fortunately, there is a *proven* solution to this problem that I will discuss in this testimony.

Dr. Kadlec shared several critical elements of what is needed for detection *and* response: situational awareness, timeliness, accuracy, and avoidance of overburdening already overwhelmed public health officials. In addition, he noted that animal disease is *frequently* the precursor to human disease (which is exactly what we've seen with West Nile Fever, SARS, Hantavirus and numerous other serious infections in the past 15 years in the US); thus, to abjure or ignore veterinary surveillance is to virtually guarantee missing new human infectious disease – including just about *all human* bioterrorism events – in a timely way. This brings me to Dr. Kadlec's final point: in infectious disease – especially communicable disease, bioterrorism or novel imported diseases, *hours matter*; days are simply too late. The difference between detecting, say, a case of human inhalational anthrax on the first day when a few people become symptomatic after 100,000 are exposed vs. even a day later is saving perhaps 15,000 lives. If we wait until day 3, most exposed people will die. We will have been too late.

In my view as a physician and scientist devoting my research to the unnecessary loss of life from preventable infectious disease, there is no more important place than California to focus on the need for biopreparedness. I can think of no more perfect venue than this one for trying to solve this problem because, in the end, protection of the public's health is a state and local responsibility, and the special challenges in California – its size, its diversity, its agriculture and manufacturing base, its enormous economy driven largely by massive overseas trade, and its location along a porous but economically productive border make this State the perfect place to wrestle with this difficult problem and actually test and find solutions.

The ugly 21st Century realities of biological threats demand 21st Century response from government to protect its population. That means employing the best available tools, including computerized mapping of symptoms in the population. In my opinion this is California's number one priority for immediate implementation and improvement in homeland security, public health and clinical medicine. I've dedicated my career developing tangible, practical responses to the scourge of biological agents. For the past ten years of my career, first as Senior Scientist in the Center for National Security at Sandia National Laboratories and now as Scientific Consultant to ARES Corporation of Burlingame, California, I have been developing and testing internet-based software the meet these exacting – and exactly correct – requirements as laid out by Dr. Kadlec. You heard about one of these efforts when I was here in 2002.

We learned a lot with that "proof-of-principle" software which ran quite successfully in west Texas until this year. And, we've now taken that experience, summarized in a technical paper from the officials in Texas that I will leave behind for the Commission, and created from the ground up an a highly evolved 3rd generation system that is fully supported 24/7 by ARES, including the development of self-training materials, extensive field testing, and inclusion of new tools that make it easy for even the smallest of public health offices to gather key information from local clinicians, analyze it, and respond quickly to signs and symptoms that are strongly suggestive of a nascent public health problem when it is still possible to curtail an epidemic among *either* animals or humans.

How might one do this? Clinicians – both veterinarians and physicians -- see a patient with fever with appears unusually ill or with severe or atypical symptoms. Within seconds, the clinician can:

- First check to see what is "going on" or get the "infectious disease lay of the land"
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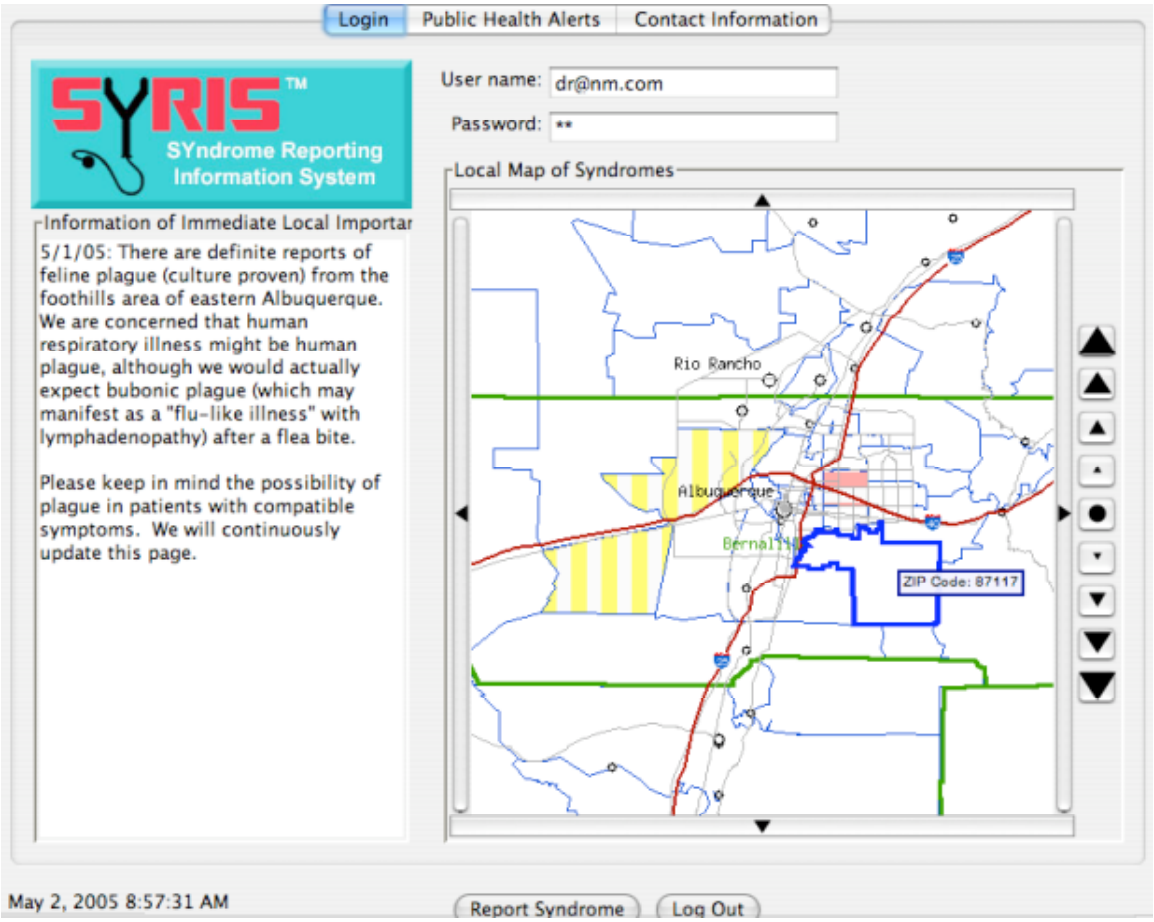
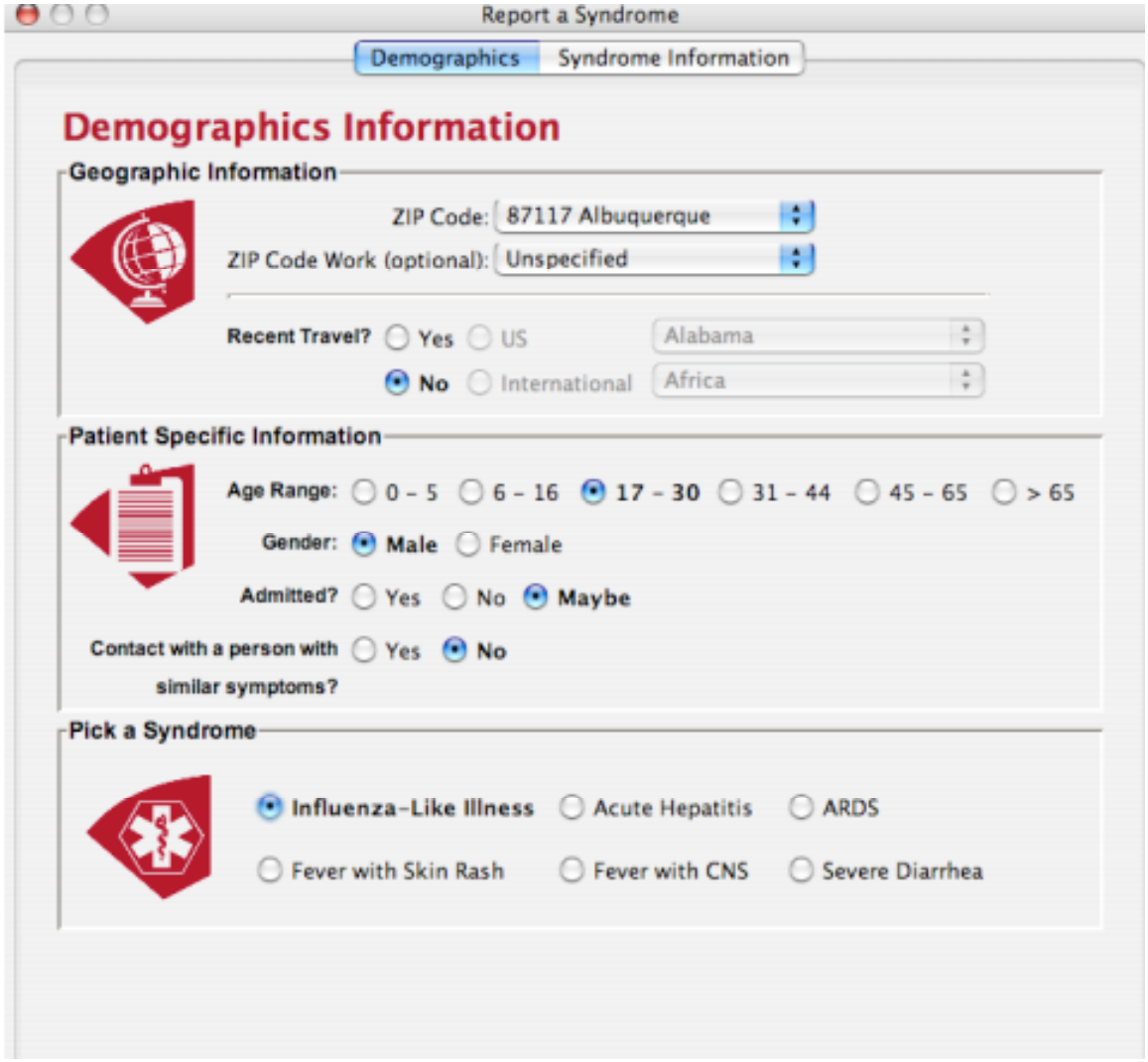
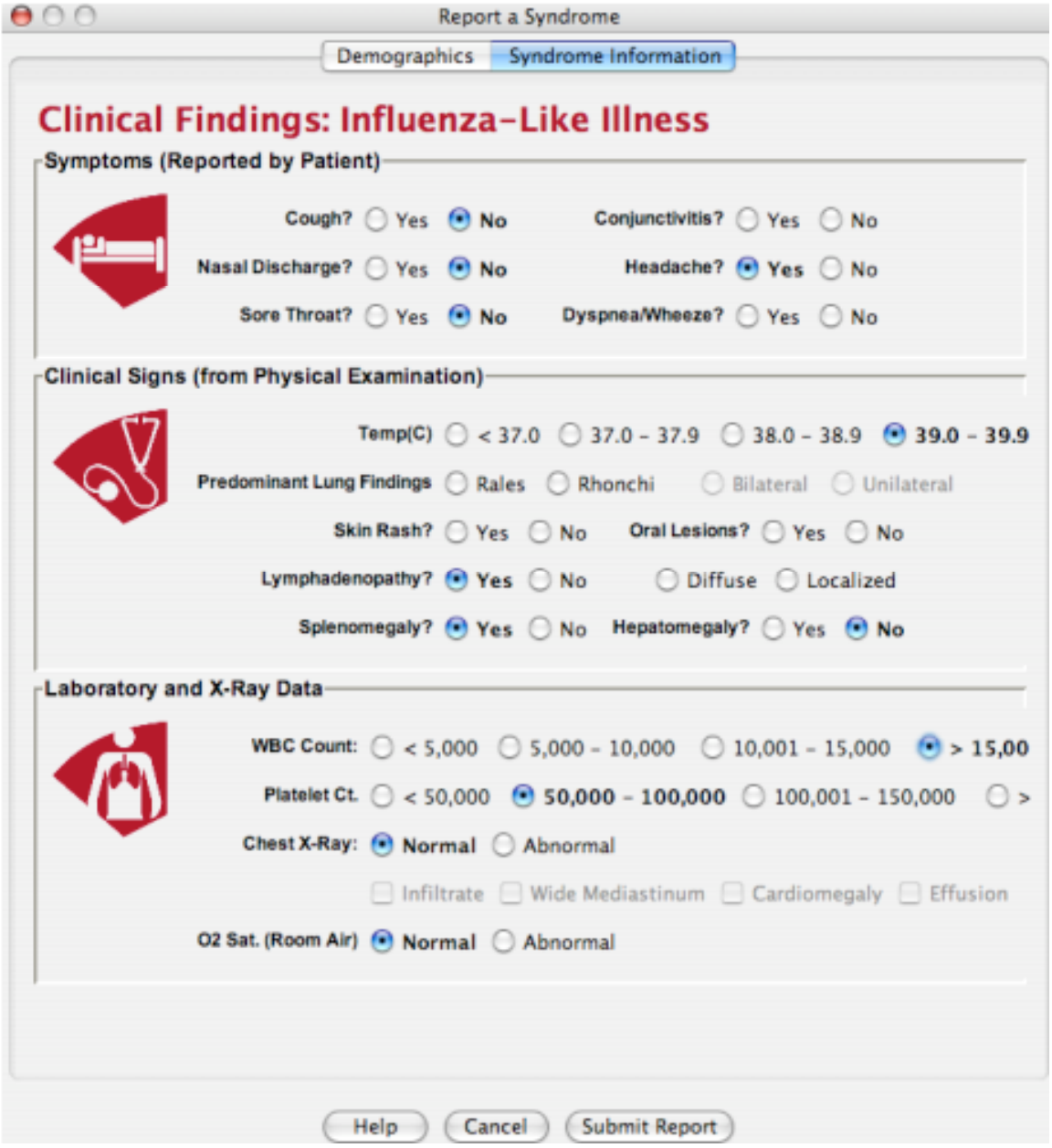
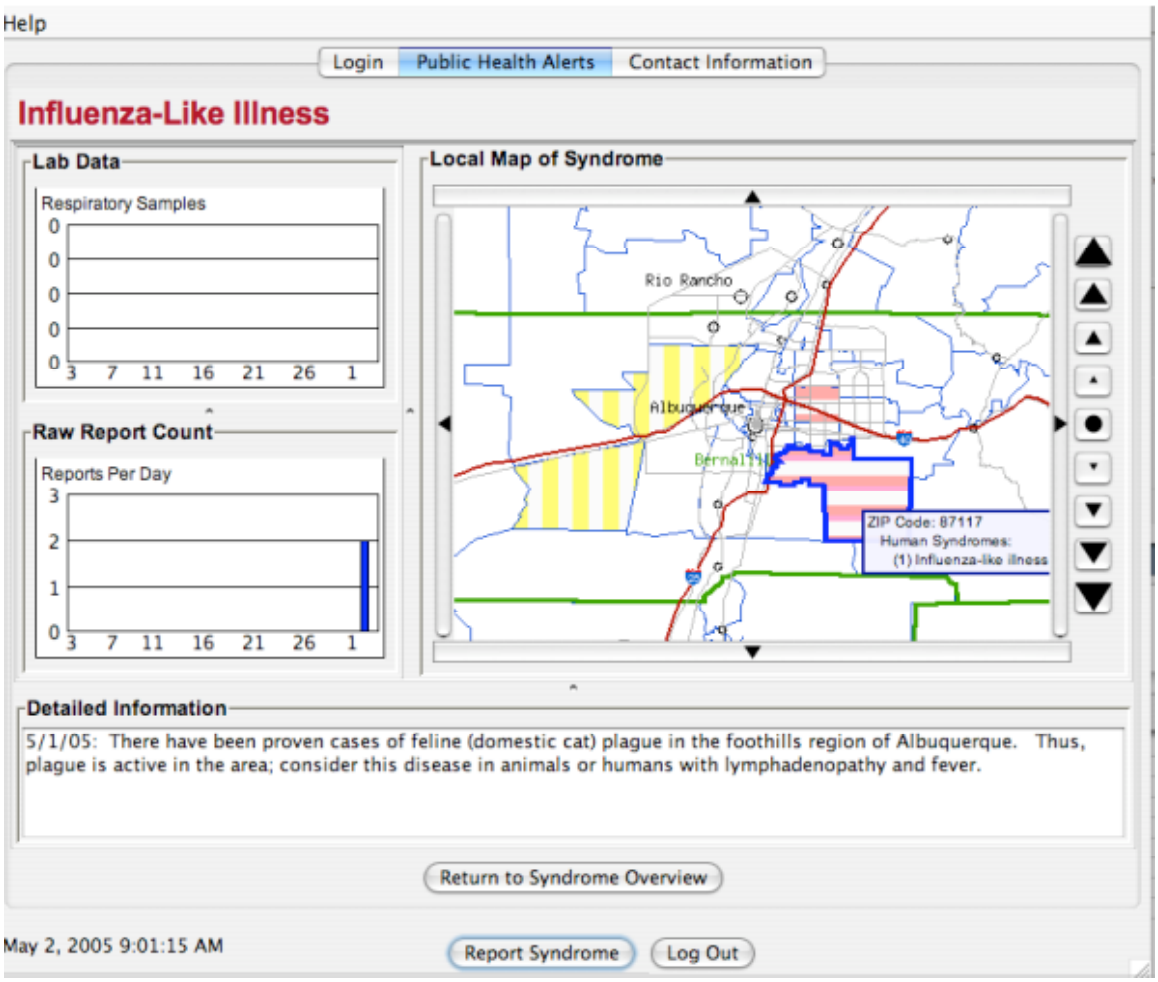


- quickly – in less than 20 seconds -- report a new case with all necessary detail

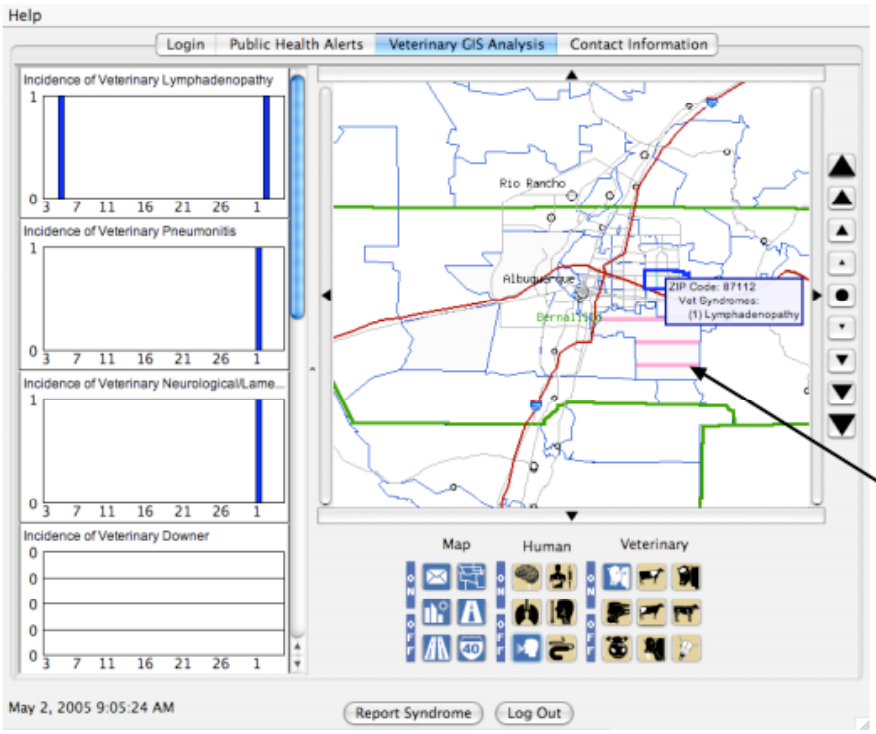

Report a Syndrome
Demographics
Syndrome Information
Demographics Information
Geographic Information
ZIP Code: 87117 Albuquerque
ZIP Code Work (optional): Unspecified
Recent Travel? Yes US Alabama
No International Africa
Patient Specific Information
Age Range: 0 - 5 6 - 16 17 - 30 31 - 44 45 - 65 > 65
Gender: Male Female
Admitted? Yes No Maybe
Contact with a person with similar symptoms? Yes No
Pick a Syndrome
Influenza-Like Illness Acute Hepatitis ARDS
Fever with Skin Rash Fever with CNS Severe Diarrhea



- then *instantaneously* transmit it to a database where both local public health officials and other clinicians can see it immediately



- the system permits public health officials to quickly analyze the and compare it to their years of observation and experience (and the system can, if they wish, *automatically* send officials alarms that meet criteria that they can set with the click of a mouse ; and



Human Influenza-like Illness nearby **veterinary case of lymphadenopathy**, thought to be domestic feline plague

Raw data -- examined by public health officials: May 1, 2005

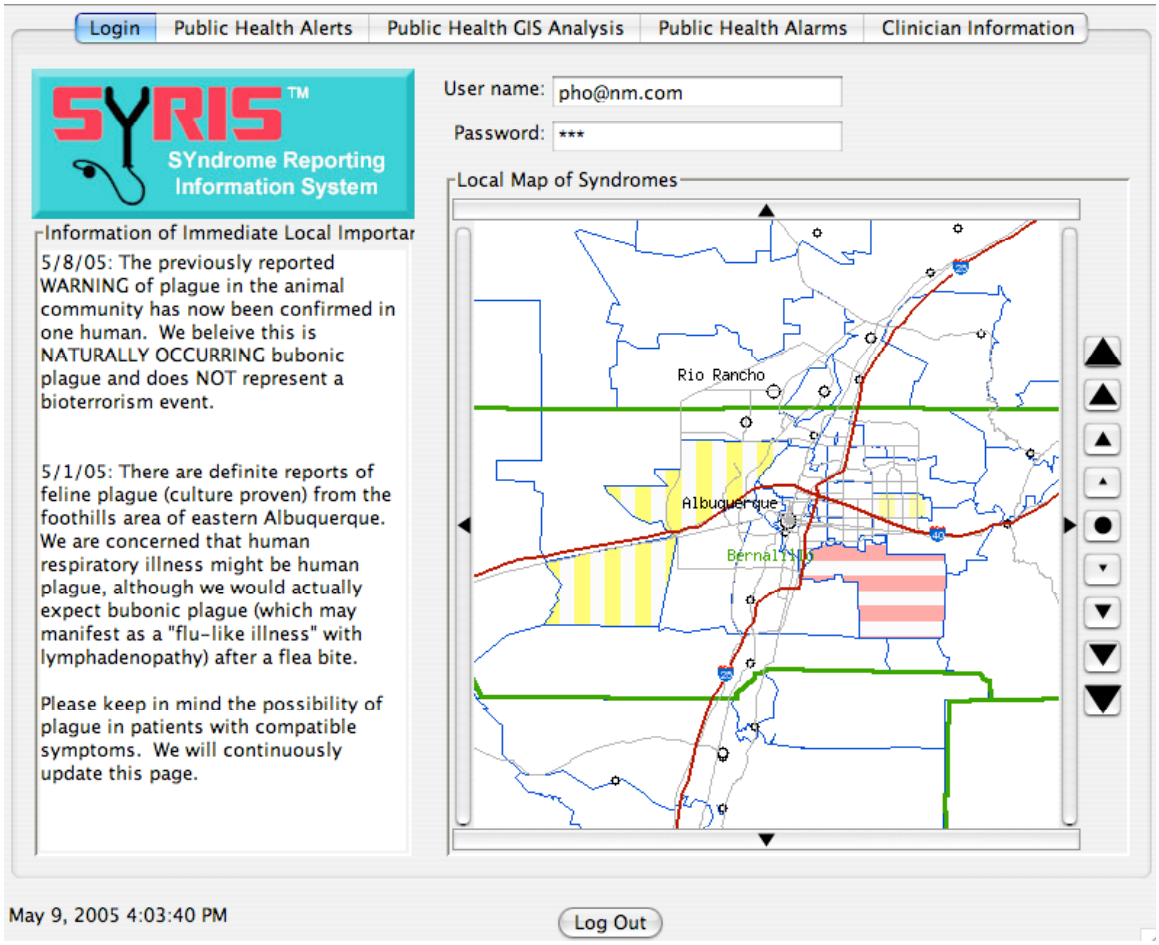
Human Syndrome Reports

First	Middle	Last	Work	Cell	Home ZIP	Work ZIP	Syndrome	Ag	Lymphader
Dr	@	NM.com			87114	Unspecified	Influenza-Like sympton	6	
Dr	@	NM.com			87114	Unspecified	Fever with Skin Rash	17	
Dr	@	NM.com			87114	Unspecified	Acute Hepatitis	Ur	
Dr	@	NM.com			87114	Unspecified	Fever with Skin Rash	Ur	
Dr	@	NM.com			87114	Unspecified	Fever with CNS	Ur	
Dr	@	NM.com			87114	Unspecified	Sever Diarrhea	45	
Dr	@	NM.com			87114	Unspecified	ARDS	31	
Dr	@	NM.com			87117	Unspecified	Sever Diarrhea	0	
Dr	@	NM.com			87121	Unspecified	Fever with CNS	31	
Dr	@	NM.com			87121	Unspecified	Fever with Skin Rash	Ur	
Dr	@	NM.com			87110	Unspecified	Acute Hepatitis	31	Yes
Dr	@	NM.com			87118	Unspecified	Influenza-Like sympt	17	
Dr	@	NM.com			87117	Unspecifi	Influenza-Like sy	1	YES

Veterinatry Syndrome Reports

First	Middle	Last	Work	Cell	ZIP	Syndrome	Site	Class	Date	Comment
VET	@	NM.com			87120	Neurological/Lamene	Zoo	Horse	5/1/05	I think this is a case
VET	@	NM.com			87120	Pneumonitis	Residence	Dairy Cattle	5/1/05	
VET	@	NM.com			87112	Lymphadenopath	Residence	Domestic Cat	5/2/05	Probable bubonic plague in a cat in the foothills of the Sandia Mountains on the eastern Edge of Albuquerque

- then take this *actionable information* to provide warnings and suggestions to vets and doctors, and even alert political decision makers (including ruling **out** with high confidenmce the presence of a bioterrorism attack, one of the most difficult tasks facing public health officials)



This system, fondly known as "SYRIS", short for the **SY**ndrome **R**eporting **I**nformation **S**ystem, is certainly not "perfect," but to my knowledge, is the fastest, most agile and most dependable system yet developed to provide global information and response. And the practical members of the Commission will know that it is light years better than the disjointed, paper-based system that California is currently struggling to make sense out of. In order to entice physicians and their counterparts to take this tiny leap into the 21st Century, it is designed to be no more difficult than playing Nintendo – it is user-friendly, widely accepted and enthusiastically embraced by physicians, nurses, veterinarians, and even coroners because it helps them in their daily practice. It is cost effective, and can save patients and animals lives. At less than **15 cents per capita**, a license (with full continuous support to users) for the entire state of California is less than $5 million per year (far less than one tenth of 1% of the public health budget). For a major metropolitan area such as Los Angeles and Orange County, the cost would be less than $1 million annually. As has already

been seen in our west Texas experience, the return on investment has been enormous: a serious, "false positive" bioterrorism threat was diagnosed and eliminated at *zero* cost to the medical and public health communities; and an unusually early appearance of influenza was detected – and stopped – in 2003 before it got out of hand.

I want to emphasize however, that my goal here today is to encourage you to take specific action in California to protect its public, whether it is through this product or another if anyone can find something superior. The experimentation is documented; the products and their track records are available. It is time for a concrete decision and implementation, bolstered with the knowledge that the talented people who work in public health – and under information-poor conditions – will provide feedback to tweak and improve any clinician-based, real-time reporting system to make it ever better.

There remains a heated debate over the relative value of "automated" surveillance systems (which seek to exploit existing data streams such as an ER clerk's reporting of patients "chief complaint" or pharmacy sales or even absenteeism in schools and the workplace) verses "clinician driven" systems like SYRIS to identify the presence of an infectious disease problem. Some states – Texas in particular – has thoroughly tested both approaches. While data-mining systems may have some role, allow me to quote from one public health official there:

> "Automated data-mining systems are superficially attractive because they appear to require no additional work on the part of physicians and public health officials. But our experience shows that that first impression is simply wrong. These systems generate enormous numbers of false positive indicators – dramatically *increasing* the workload of doctors and PHOs – and usually miss the subtle early indicators of important disease. Further, they are inherently delayed in their distribution of information, and fail to keep the clinician "in the loop". Thus, the major benefit of disease surveillance – the cost-effective use of scarce medical resources – is completely lost.
>
> Clinician-driven systems, *if made simple and intuitive*, capture physician and veterinary attention and more important their judgment. Nothing could be more important to public health officials in separating the wheat from the chaff. Further, these systems dramatically improve the relationship between local clinicians and public health offices which has atrophied over the years. I am convinced that while there are doubtless further improvements to be made, clinician-driven syndrome surveillance systems are ready for prime time *now*. To *not* do this is, in a word, unjustifiable."

Members of the Commission: it is time for California to implement – as widely and as quickly as possible – a clinician driven disease reporting system to replace the current decrepit reporting mechanism with which few physicians comply. As a civilization, this is well within our reach. Is it negligence on behalf of public

officials to leave their public unguarded? I will leave that question for you to answer. The fact remains that we can do this now and at very low cost.

I look forward to your questions and again, my heartfelt thanks to you and your staff for inviting me to appear before you.

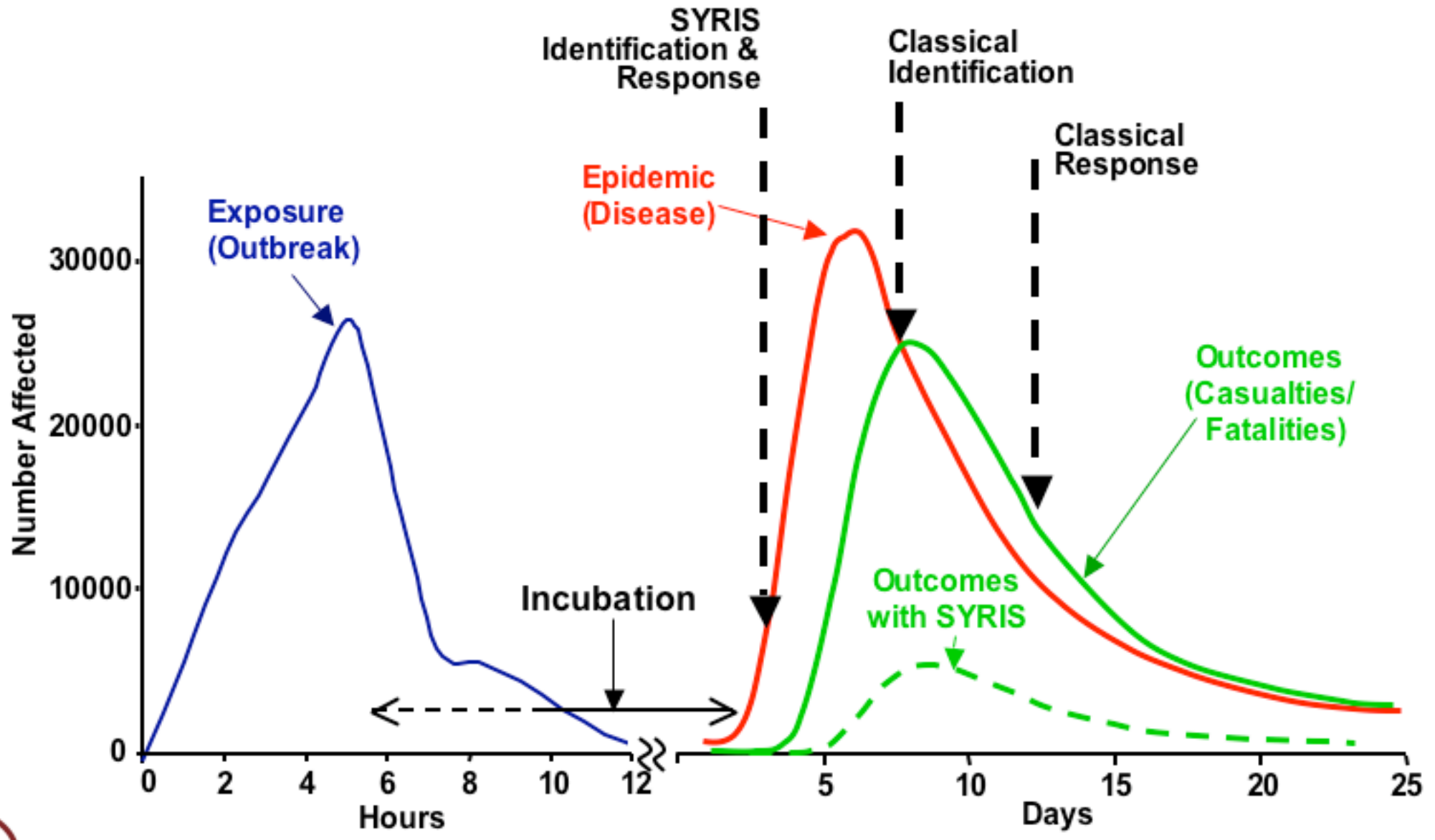
SYRIS enables earlier detection and immediate response to Outbreaks: Example - ANTHRAX Bioterrorism attack

Exposure: People/Animals are exposed to infectious agents

Epidemic: People/Animals begin to show signs of infection

Outcome: People/Animals begin to die or get very sick

SYRIS Outcome: 80% fewer People/Animals get sick or die



SYRIS enables earlier detection and immediate response to Outbreaks: Example - SMALLPOX Bioterrorism attack

Exposure: People are exposed to the variola (smallpox) virus

Epidemic: People begin to get ill

Outcome: Number of people sick with or incubating smallpox

SYRIS Outcome: 90 - 99% fewer people get sick with smallpox