Pandemic Influenza Risk Communication: The Teachable Moment

by Peter M. Sandman and Jody Lanard

The goal of this column is help figure out how to alert the public to the risk of an influenza pandemic, and how to involve the public in the pandemic preparedness effort. After a brief discussion of this season's flu vaccine shortfall in the U.S. — which has helped make influenza newsworthy — we will suggest talking points for a pandemic pre-crisis communication campaign. Then we will discuss some of the difficult risk communication challenges that arise, illustrated with "mini-case studies" of flu pandemic media coverage.

In the last few months we have become increasingly preoccupied with bird flu — the H5N1 flu strain that threatens to turn into a devastating human pandemic. Our friends find this a weird obsession. "Bird flu," they comment. "Isn't that the thing that's a problem in Asia?" We were preoccupied in the months after 9/11 too, but we weren't alone with it. This is a different kind of edginess, worrying about something that most people consider uninteresting and unimportant.

Many infectious disease experts and medical journalists right now have similar feelings — a sense of impending disaster, a need to sound the alarm, alienation and frustration that people don't get it. The tension takes a toll. The sources of H5N1 information sometimes have to struggle to keep their equanimity when talking to the largely apathetic public about an uncertain but potentially catastrophic pandemic.

The same tension makes it harder for us to analyze their communication efforts with empathy.

We started drafting this column on November 12, when the pandemic flu numbers game began. Pandemic risk communication since then has been on a roller coaster. This column is current as of December 2. We may add an addendum or two later, as the situation evolves.

We apologize to the reader — and to the worried, dedicated people who are trying to sound the alarm — for the length and edginess of what follows. We hope risk communicators will harvest it for whatever's useful.

Influenza has long been the unwisely neglected child in the infectious disease family, at least so far as the public was concerned. Every winter, tens of millions of people, including millions of Americans, get the flu. Most are home for a week or two, sick and miserable, then recover; some — mostly the elderly frail — die. The number of U.S. deaths in the average flu season is thought to be around 35,000. The number is uncertain because medical authorities don't usually verify who actually died of influenza and who died of a "flu-like illness." Most Americans think of the flu as a minor nuisance; we excuse ourselves from unwanted social obligations by telling friends we have "a touch of the flu."

At that, the U.S. pays more attention to influenza than most countries. In the average year, we vaccinate about two-thirds of our elderly and much smaller fractions of other high-risk groups; only Canada vaccinates a higher percentage of its population. (Vaccination has to be done every year because different strains of the flu virus keep arising and mutating. Last year's vaccine is likely to provide only minimal protection against this year's flu.) Flu vaccination is mostly a low-profile affair. Vaccination clinics merit short squibs in local newspapers; predictions about the upcoming flu season and reports of early outbreaks get dutifully covered. Though an occasional kerfuffle attracts some attention, most years influenza is quietly deadly, not controversial or even interesting.

In fact, when some other infectious disease like SARS or West Nile Virus captures the headlines, authorities and columnists wishing to debunk the "hype" usually offer up influenza as their clincher. Whatever we're "overly" worried about kills fewer people every year than the flu, they tell us. And we're not worried about the flu. So why worry about this other thing? Their point is never that we ought to worry more about influenza. It's that we shouldn't bother worrying about something much less deadly than influenza. This point is most likely to be stressed when media hype and public worry are distracting or irritating the people in charge.

None of this is surprising. Flu is a perfect paradigm of the high-hazard low-outrage risk, the sort of risk that kills people but doesn't much upset them. It is natural, familiar, anything but memorable. It isn't voluntary, but in western countries getting vaccinated against it usually is. It's as chronic as chronic gets, reappearing every year like

clockwork. It's not especially dreaded. And there aren't very many flu controversies in a typical year — no big knowability questions, no battles over control or fairness, no issues of morality or trust or responsiveness.

In the United States, the winter of 2004–2005 is a phenomenal exception. Contamination at a Chiron Corporation vaccine plant in Liverpool cost the U.S. nearly half its vaccine supply this season. News of the shortfall apparently led millions of Americans who don't usually bother to get vaccinated to want their vaccine this year — in many cases, to want it badly enough to stand in line for hours. The greatly reduced supply and the significantly increased (and much more impassioned) demand together produced what felt like a crisis, leading many states to order doctors, hospitals, and drugstores to vaccinate only people in high-risk groups, and to hand over the rest of their vaccine for reallocation.

Though superficially chaotic, this ad-hoc authoritarian strategy for coping with the shortfall seems to be working pretty well. Too many commentators have over-reacted to what they see as the public's over-reaction — to the lines and complaints and confusion — not quite noticing that both the system and the populace have responded with resilience. By redirecting most of the available vaccine into high-risk arms, the U.S. may even end up vaccinating more high-risk people this year than it usually does. Depending on how bad a flu season we get, we may actually see fewer flu deaths than usual.

That won't keep reporters from making big news out of this season's flu deaths. People who could have been saved if only we'd had enough vaccine are much more newsworthy than people who could have been saved if only they'd bothered to get a shot. This year, flu vaccine outrage issues are everywhere you look — issues of voluntariness, control, fairness, and morality — even issues of blame, converting a familiar, uninteresting, natural disease into an unprecedented and memorable industrial or governmental blunder. Influenza is big news for a change.

Not Your Garden Variety Flu

Hold that thought, and change focus to a different flu news story — one that may turn out profoundly more important than the Chiron contamination. In 1997, a human being in Hong Kong died not of human flu but of bird flu, an avian influenza strain known to virologists as H5N1. Bird flu has been

known for over a century. Starting in 1995, several other bird flu strains were found to have directly infected a small number of people. These people mostly developed mild symptoms such as conjunctivitis, and no sustained "human-to-human transmission" occurred — the transmission from bird to human led to a dead end for the virus. H5N1 was the first flu strain proved to have passed directly from a bird to a person and then caused that person's death. It threw the world's infectious disease experts into a tizzy. It may soon throw the world into an infectious disease pandemic.

The rest of this section is a sort-of primer on H5N1 — everything we needed to learn about the disease and the public health threat it poses in order to make sense of the risk communication issue: How to alert the public. If you already know the H5N1 basics, you can skip to the next subhead, "Pre-Crisis Flu Pandemic Talking Points." But beware: Judging from much of what has been written about H5N1, even in government documents and medical publications, a lot of people are skipping the basics and then writing things that make fundamental mistakes about H5N1. (We may make some too.) Often these mistakes are in the direction of over-optimism and under-reaction. Even when they're not, it is very difficult to convince people they ought to be worried about H5N1 without actually explaining what's so special about H5N1. And it's very difficult to explain if you don't know. So think twice before you skip this section.

Since at least 1997, H5N1 has spread inexorably throughout Southeast Asia's bird population. It has already killed millions of chickens, and efforts to control it have forced the extermination of millions more. It is a big, big problem for the poultry industry. So far it is only a small problem for human health care. A few dozen people so far are known to have caught H5N1 directly from birds. A couple of people so far are thought to have caught it from other people, though the evidence of human-to-human transmission still isn't ironclad. Thirty-eight people, mostly young people, are known to have died.

Because H5N1 has never infected people before, people haven't built up any natural immunity to it, as we have to the flu strains we face year after year. And of course there is no H5N1 vaccine developed and approved for human use (though researchers are working on several candidates). Moreover, H5N1 is a particularly virulent strain of influenza. It seems to kill up to 70 percent of the people who catch it. That's almost certainly a higher-than-realistic number; we probably missed a lot of milder cases whose victims recovered without needing medical attention. Still, we know that H5N1 kills far more readily than the typical annual flu strain, which has a mortality rate of way less than one percent. And while most annual influenza viruses kill their victims mostly through

secondary infections like pneumonia, which healthy people generally manage to beat, H5N1 seems to kill more directly. Even strong, healthy, young people with good immune systems are vulnerable.

None of this matters too much yet because H5N1 is hard for people to catch. Getting it requires very close contact with an infected bird (or on rare occasions an infected person), plus very bad luck. But influenza viruses keep changing. They mutate. And they exchange genetic material with other flu viruses, a process called reassortment. All that's needed is a mutation or reassortment that produces a new variant of H5N1 — one that's as deadly as the current strain but as easily transmitted from human to human as lots of other flu strains. Most virologists believe something like this will happen sooner or later, and many believe it will happen soon.

When it does, H5N1 will inevitably spread throughout the world. Worldwide mortality estimates range all the way from 2–7.4 million deaths (the "conservatively low" pandemic influenza calculation of a flu modeling expert at the U.S. Centers for Disease Control and Prevention) to 1 billion deaths (the bird flu pandemic prediction of one Russian virologist). The estimates of most H5N1 experts range less widely but still widely. In an H5N1 pandemic, the experts guess that somewhere between a quarter of us and half of us would get sick, and somewhere between one percent and five percent of those who got sick would die — the young and hale as well as the old and frail. If it's a quarter and one percent, that's 16 million dead; if it's a half and five percent, it's 160 million dead. Either way it's a big number.

A worldwide epidemic is called a pandemic. That's what many experts think we're facing sometime in the next few years.

For example, on November 17, 2004, CIDRAP News reported that Anthony Fauci, the head of the U.S. National Institute of Allergy and Infectious Diseases, had said a flu pandemic was "probably on the way but not likely to begin in the next few weeks.... Is it going to happen sometime in the near future? The answer is yes, we're due for it, but you can't predict when it's going to happen."

Of course if it does happen the authorities will move mountains in an effort to develop, mass-produce, test, license, and distribute an H5N1 vaccine. Clinical testing of the first of 8,000 doses of candidate vaccine may begin as early as January 2005. It could take anywhere from three months to a year after that to get an approved vaccine ready to go into the first arms. Nobody's even guessing how long it would take to get enough vaccine to go into everyone's arms — it's never been done before,

and today's manufacturing capacity simply isn't up to it. If the total current flu vaccine capacity were focused on H5N1 alone, as opposed to three different strains like the annual flu vaccine, we might — in a very best case scenario — be able to come up with about 900 million doses a year worldwide. Most experts think it will take two doses to work against a new strain like H5N1, so maybe we're ready to protect 450 million people a year. The current world population is 6.4 billion, requiring 14 years' worth of vaccine at current production levels. And once the vaccine is manufactured, it also needs to be distributed and administered, a far-from-trivial problem in countries with uncertain refrigeration, poor roads, and few medical practitioners. Of course that might not be a problem if the countries with flu vaccine plants decide to meet domestic needs first and forbid export to other countries. At present, there are plants in only about nine countries. The U.S. has one domestic source of flu vaccine. So far only Canada is building up domestic vaccine production as part of its pandemic influenza plan.

In the meantime, for a year or two probably, waves of pandemic flu would roll around the planet, and life would change. Travel would be curtailed. Schools would close, off and on, and most public gatherings would be banned or strongly discouraged. Many economies would be devastated. With some people too sick to work and others staying home to avoid infection, maintaining essential services like police and water treatment would be difficult. That's in the U.S. and other western countries. Try imagining what it would be like in poorer countries.

Reality check time: Nobody — nobody — is sure this will happen. Well, the experts are sure some flu strain will produce a pandemic eventually, but they don't know which and they don't know when and they don't know how bad it will be. There have been flu pandemics before. The granddaddy of modern times was in 1918-19, when somewhere between 20 million and 100 million died of the so-called "Spanish Flu," an H1N1 strain. We had less devastating though still serious pandemics in 1957 and 1968. Knowing a flu pandemic will happen eventually doesn't tell us that a bad one will happen soon, or that it will be H5N1 when it happens.

In 1976, U.S. experts became really worried about a swine flu strain, a different H1N1, when it infected a few humans for the first time. After one U.S. soldier died in New Jersey, President Ford mounted a national swine flu vaccination program, and managed to double the number of U.S. flu vaccinations that year, to more than 40 million. The swine flu vaccine is believed to have caused about 500 cases of a serious side-effect called Guillain-Barré Syndrome — and the 1976-77 flu season turned out to be a mild one. There have been eleven other "novel" flu viruses identified in humans since the 1968 pandemic. None of them turned into another human

pandemic; then again, none of them looked as likely to do so as H5N1 now looks. Even though H5N1 has already wreaked more human health havoc than the 1976 swine flu did, it could still fizzle the way swine flu did. When we talk about an H5N1 pandemic in the next few years, we're talking maybes.

Still, the majority of the world's virologists, epidemiologists, and infectious disease experts are trembling in fearful anticipation of the epidemiologic equivalent of Code Red: "Pandemic Imminent." The absence of dissenting voices is stunning. On most risk issues, the experts are loudly divided. Most of them think global warming is real and eating too much cholesterol is harmful, but it won't take you two minutes on the Web to find respectable experts who disagree. Not on pandemic flu.

The experts are doing what they can to get ready, and to persuade the world's governments and pharmaceutical companies to get ready. In February 2004 the Canadian government unveiled a national influenza pandemic plan, updating its 1988 plan. In August 2004 the U.S. government released a draft plan of its own. And earlier this month the World Health Organization hosted a Geneva meeting of governments and pharmaceutical companies from around the world to discuss what needs to be done, mainly about ramping up vaccine availability.

It's hard to know what to make of this virtual consensus about the fairly near-term future. We'd love to see a tightly woven rationale for the consensus: a list of the characteristics of H5N1 that make the experts think it's bound to mutate or reassort into a pandemic strain; an assessment of which, if any, prior influenza strains have evidenced each characteristic and whether they did or didn't end up causing a pandemic; a comparison of H5N1 with swine flu and other flu strains that raised pandemic concerns that never materialized; some history and some statistics to back the hunch. We'd love to know how much of the experts' current concern is grounded in scientific factors, like unique characteristics of H5N1 that portend trouble, and how much is grounded in superstition, like a sense that we haven't had a pandemic in a while and we're overdue.

Of course we assume this is exactly the sort of thing the experts talk about when they meet. But at least to some extent, they may also be validating each other's guesses and feeding each other's anxiety when they meet (much as neighborhood parents sometimes talk each other into a cancer cluster scare) — a phenomenon that social scientists have long recognized and have appropriately labeled "contagion." Influenza experts are a small and tight-knit community, after all. In interviews, many experts have recounted hearing about the first human H5N1 case in

1997 and experiencing an immediate, personal "Oh My God" moment. Like American adults recalling the Kennedy assassination, they remember where they were when they heard. Still, these are people who talk to each other constantly. They did not arrive independently at their shared belief in an impending pandemic.

A psychologically inclined skeptic could certainly think of other reasons why flu experts might see flu risks in their worst possible light. If a flu pandemic is among the most serious threats now facing our planet, then flu experts are among the most important people on the planet. A disease that keeps getting dismissed as a mere nuisance will finally come into its own, and flu research budgets will go through the roof. Time for a heartfelt if courteously suppressed "we told you so." We're not suggesting that these motives are conscious, only that flu experts are human too.

Still, it's not as if this is their umpteenth worldwide warning and the others all turned out duds. Swine flu, a genuine dud, was 28 years ago. On balance, it would be foolish to ignore such a widespread educated guess among the people whose guesses are most educated. You don't have to believe a horrific flu pandemic is certain and about to happen to believe preparedness is a good investment. And high on the list of urgent preparedness tasks is preparing the public.

On the subject of pandemic influenza, the public is still mostly divided into two groups: those who are blissfully unaware, and those who are distantly aware but not especially concerned. Arousing public concern about this still hypothetical threat won't be easy. But at least in the United States, it will be easier over the next few months than it was before or will be later, because influenza itself is temporarily a hot topic. Now is the teachable moment. The purpose of this column is to help figure out how best to capitalize on the moment to alert and involve the public.

Pre-Crisis Flu Pandemic Talking Points

What follows is a list of flu pandemic talking points — what we consider the most important messages to be delivered now, before a pandemic arrives. In the U.S. especially, "now" means *right now* — while the vaccine shortfall is still making influenza newsworthy and the public might be persuaded to pay some attention. The rest of this column will look at how well some of the main talking points are being addressed so far.

We’re not going to focus here on the messages that would need to be delivered in the early weeks and months of the pandemic itself. Of course a pandemic crisis communication campaign is worth thinking through beforehand. It’s important to be prepared to roll out your campaign if it’s needed. Moreover, thinking now about what we’d need to be talking about in the middle of a pandemic will shed important light on what we need to be talking about before the pandemic. The goal of pre-pandemic communication, after all, is to help people get ready for a pandemic. Imagining mid-pandemic communication will help us understand just what people need to get ready for. But we’re skipping that step right now (although we have worked on it with various government agencies), and focusing directly on pre-pandemic messages.

We’re skipping another step as well. Proper message design requires audience assessment research that we haven’t done, though the U.S. CDC and Health Canada are both doing it now. There are three key factors in choosing messages on any topic:

(1) *What your audience already knows, thinks, feels, and does.* This includes people’s questions and concerns, what they want to learn more about. It includes their misimpressions, if any, what they think they know that needs to be respectfully corrected. Importantly, it also includes their accurate impressions about things the experts are misperceiving. During the SARS outbreaks, for example, people we asked had some exquisitely logical reasons for wearing masks in public, though officials kept ridiculing this behavior without understanding it. One person said: “They keep telling me to cover my mouth when I cough, but not to touch my face, and to wash my hands often. But I can’t do that in the crowded subway, and other people are coughing too, and then grabbing the railings and poles with their snotty hands. Isn’t wearing a mask kind of like covering your mouth when you cough? Plus, it helps remind me not to touch my face.”

(2) *What you want your audience to know, think, feel, and do.* This list of the goals of your communication effort should always include telling people what preparations you want them to make and why. It usually includes telling them what preparations you are making — which is fine, as long as you don’t overstate how prepared you are. And it ought to include asking for their input, their own suggestions and their feedback about your evolving preparedness plan.

(3) *The relationship between the first two factors.* The focus here is on how your audience is likely to respond to the messages you’d like to be giving them, and what additional messages are needed to help produce an appropriate response. This can get complicated. It includes, for example,

a list of truths you need to tell people even though you don't really want to, because otherwise your credibility will self-destruct when they learn those truths elsewhere.

We know a good bit already about the second factor. We're guessing about the first and third.

Nonetheless, here is a preliminary list of messages:

1. A flu pandemic seems really likely in the next few years. Nobody can be sure, but because of the ongoing bird flu outbreaks in Southeast Asia, experts are more worried than ever before.

2. A flu pandemic would be really awful. We may well be looking at many tens of millions of deaths. And we may well be looking at a year or two of worldwide social disruption and economic devastation. This is what we think it would be like....

3. A flu pandemic has little or nothing in common with the annual flu season that most people see as more nuisance than threat. We're talking about a new strain of influenza against which there is no natural resistance and no vaccine (until researchers and pharmaceutical companies manage to create one). It's not just that you are more likely to get the flu in a pandemic; the actual disease is likely to be more deadly, even if you are young and healthy.

4. Nothing but luck can prevent a flu pandemic. When a "novel" flu strain develops that is transmitted easily from human to human, it will spread throughout the world whatever we do — and if it's deadly, many will die. But we can do things to slow its spread and reduce its impact, buying time for vaccine development, manufacture, and distribution.

5. The sooner we start preparing the better. So let's take the time we need to get used to the idea, to feel a bit frightened or depressed or stunned. (The experts have already gone through this phase.) Then let's pick ourselves up off the floor and get moving.

6. Local planning is vital. How is your community going to handle education when the schools are closed? How will essential local services get staffed when some people are out sick and others are frightened to come to work? How will your family cope when some of you have the flu? How will your employer cope when many of you have the flu? How will your government, your hospitals, and other organizations

recruit and use volunteers?

7. Hygiene is also vital. What can you do to reduce your chances of catching the flu ... or passing it on to others? Now is a good time to develop habits like frequent hand-washing and covering your mouth when you cough — habits that may feel inadequate to the size of the problem but in fact may help a lot. And now is a good time to think through how you can restrict your daily contact with other people when the time comes, and still maintain a life and a living.

8. A major national and international priority is the vaccine supply. We may or may not want to stockpile vaccine doses against the flu strain that seems likeliest to start a pandemic, the bird flu strain H5N1. The right stockpile could save many lives. But if there is no pandemic, the investment will be wasted. If a different flu strain emerges in a year or two, we'll need a different stockpile. And when the pandemic strikes, if the strain that spreads isn't similar enough to the strain we prepared for, the stockpile could turn out useless.

9. Whether we stockpile a specific vaccine or not, we can certainly take steps now to be ready to produce a targeted vaccine as quickly as possible, once we know what we need. Some things can be done immediately, like streamlining the process for testing and licensing new vaccines. Others will take longer, like developing better methods for creating new vaccines, ramping up vaccine manufacturing capacity, and figuring out how to distribute the vaccine efficiently, even in developing countries.

10. Vaccine preparedness requires government action and government funding. Pharmaceutical companies understandably will not manufacture and stockpile a vaccine that they won't be able to sell if it's not needed, and that governments may well nationalize if it is needed. They will not invest much in new manufacturing capacity for a process that may be about to become obsolete, and they will not invest much in a new process that may render obsolete the one they have. Protecting public health is intrinsically a governmental function, and governments must make a market for the public health precautions they want taken.

11. We know that the public will want a vaccine supply once a pandemic starts. But we're not sure whether or not the public supports a risky investment now in a supply that may or may not turn out useful. We need

public input to resolve this dilemma. For the first time ever, we have the science to prepare a vaccine that might actually work against a pandemic that hasn't happened yet. Without active and informed public support, there may not be enough incentive for the government to invest in this capability in advance.

12. Besides vaccine availability, there are other medical decisions to be made, from improving hospital preparedness to stockpiling such things as antiviral medications and face masks. And there are a host of non-medical decisions to be made — decisions about how best to cope with the economic and social impacts of the pandemic, and decisions about how best to reduce social contacts and thus slow the spread of the disease. To make these decisions wisely, we need the public's input. Here are some preliminary decisions that need to be thrashed out, some debates that need to be resolved, some open questions that need to be addressed....

13. Inevitably, fairness will be a key issue. In a widespread public health crisis, scarce medical supplies will need to be allocated to those in the most critical occupations rather than to those who are most vulnerable; cops and waterworks managers and nurses will get priority over seniors and children. We need to think this through now, balancing practicality and compassion.

14. Internationally, too, we will need to balance practicality and compassion. Every country will act quickly to protect its borders and its vaccine supply — but most countries will have little if any vaccine and no way to manufacture more. And pandemics ignore borders. A pandemic is intrinsically international, and can best be fought with international cooperation. What can we do now to facilitate that cooperation?

Why say these things? Why say anything much at all? Why not wait till the pandemic begins?

One of us (Sandman) outlined the generic case for warning people about possible awful events in a recent column on "Worst Case Scenarios." But it's ground worth going over again. Here's why you warn people about the risk of a flu pandemic:

- They need to prepare cognitively. That is, there are things they need to know, facts and ideas they need to get used to — like the reality that scarce medical help will go first to those who are most needed (for their labor or expertise), not to those who are most

vulnerable.

- They need to prepare logistically. There are plans they need to make, supplies they need to gather.
- They need to prepare emotionally. People adjust to new threats in stages. Typically, apathy and denial give way only reluctantly. Then comes the "adjustment reaction" phase: vicarious rehearsal, hypervigilance, a temporary flood of emotion as people begin imagining what it might be like. Only after that can we roll up our sleeves and get serious.
- You need their help. Local planning has to be done locally if it's going to be done at all. What the national public health leadership thinks of as "the public" turns out to be made up of school board members and water company managers, Rotarians and hospital volunteer coordinators — that is, people whose preparations and decisions will largely determine how well we all cope. Until we have a vaccine, the only people who are relatively safe from pandemic flu will be the people who already got it and recovered. Perhaps some communities will want to institute an "early flu survivors' corps," or even a mandatory "flu survivors' draft" if needed to maintain essential services. The best time to discuss such a possibility — and hundreds more — is before the pandemic.
- You need their advice. Nobody planned much for the 1918 pandemic, and not many are left who remember it. We're on new ground, and we need all the advice we can get. Though some of the decisions that need to be made require technical expertise, many of the toughest decisions are nontechnical.
- You need their buy-in. Most emergency plans require public cooperation to work — and public cooperation depends more than anything else on prior awareness, understanding, input, and acceptance. Whether it's persuading sick people to stay home or persuading well people to venture out, whether it's investing now in vaccine supply improvements or agreeing later to vaccine allocation decisions, it all starts with pre-crisis consultation.
- Secrecy leads to recriminations. When a crisis occurs that you decided not to warn people about — or you warned them about rather quietly — they are absolutely guaranteed to blame you for blindsiding them. This will not be a good start to your efforts to lead them through the crisis; people will tend to mistrust you just when you most need their confidence.
- Decisions that weren't publicly debated are exceedingly vulnerable to Monday morning quarterbacking. An example will make this clear. Right now we're not sure whether there's going to be an H5N1 pandemic or not, so it's hard to decide how much to invest in an H5N1 vaccine. But after such a pandemic has arrived, it will be obvious to all that you should have invested more. Or, after such a pandemic has failed to materialize, it will be obvious to all that you shouldn't have invested anything. (In the wake of new data on Vioxx cardiac risks, similarly, it is obvious to all that the regulators should have yanked the product earlier, at the first sign of a possible problem; it is equally obvious that they should not have curtailed the use of other drugs whose preliminary "yellow flags" later melted away instead of mounting up.) If you don't like after-the-fact second-guessing about decisions you had to make with uncertain data, you must share the data, share the uncertainty, and share the decisions beforehand.

Sounding the Alarm

Of the 14 messages on our list, the two most important ones technically, of course, are the first two — that a flu pandemic is likely and that it would be awful. High probability and high magnitude are the two characteristics that make a risk technically serious.

As all risk communicators know, convincing people that a risk is technically serious isn't necessarily the same as persuading them to take it seriously — to get concerned and get prepared. High probability times high magnitude equals high hazard — but it's outrage (which includes fear), not hazard, that usually determines whether people take a risk seriously. Nonetheless, convincing people the risk is technically serious is a start. And unlike most risks, the flu pandemic risk is potentially so serious (*really* high probability, *really* high magnitude) that hazard alone may do the job — if the experts are willing to say it with flair.

But are the experts willing to say it with flair, to craft flu pandemic warnings that are suitably dramatic? The "Worst Case Scenarios" column used bird flu as a bad example; the column acknowledged that national and international authorities were in fact issuing warnings about the possibility of an H5N1 human pandemic, but commented that they were "bloodless" warnings that seemed unlikely to capture the public's imagination.

Certainly the public's imagination hasn't been captured yet — but it's probably unfair to blame that on the experts. No doubt, unfounded fears of provoking panic and well-founded fears of being criticized for provoking panic have led to some ambivalence about how vividly to sound the alarm. But the majority of the experts who are hugely worried about the flu pandemic risk want the public to get worried about it too. They want to tell people that a pandemic seems really likely and would be really awful. And they are trying to get the word out. Look at a few sample quotations:

> "All of us were immediately aware of the potential implications [of the first human bird flu death, in Hong Kong in 1997]. It made all of our guts tighten considerably. I've been involved in a number of investigations, but in terms of infectious diseases there are very few comparable events to an influenza pandemic. Most infectious diseases have regional or local implications; even a really devastating disease like malaria is confined to warmer areas. There's probably no other disease like influenza that has the potential to infect a huge percentage of the world's population inside the space of a year.... I don't think

anybody's prepared. I don't think even people in the field really have a good understanding of what it could be like."

— Dr. Keiji Fukuda, head influenza epidemiologist at the U.S. Centers for Disease Control and Prevention, in *The Guardian*, August 1999

"The firing pistol has gone off in the race for pandemic flu preparedness."

— Dr. John Oxford, Queen Mary's School of Medicine, London, in the November 28, 2003 *Daily Telegraph*

"Everyone believes we're overdue for [a pandemic].... In Canada, everyone has used SARS as a dress rehearsal for pandemic influenza."

— Dr. Arlene King, Health Canada's Director of Immunology and Respiratory Infections, in the January 2004 *Canadian Medical Association Journal*

"Never in history have we seen such outbreaks of highly pathogenic avian influenza over such a wide area, simultaneously."

— Dr. Klaus Stöhr, World Health Organization Senior Virologist, in the January 26, 2004 *New Scientist*

"In view of the high mortality of human influenza associated with this [H5N1] strain, the prospect of a worldwide pandemic is frightening."

— Editorial in *The Lancet*, January 2004

"There's no reason to say the virus will not continue to evolve so that it can transmit directly from one person to another. There's a realistic chance that could happen. If it does — if the virus becomes adapted to man and can transmit efficiently — there'll be no point in selling a vaccine. You might as well give it away at that stage, because money would be meaningless. The world order would change."

— Dr. John McCauley, British Institute for Animal Health, to the BBC on April 21, 2004

"This is going to be the most catastrophic thing in my lifetime.... When this situation unfolds, we will shut down global markets overnight. There will not be movement of goods; there will not be movement of people. This will last for at least a year, maybe two.... Even the vaccine that we have takes six to eight months, if we can get it to work.... So we're going to be confronting this situation without vaccines."

— Dr. Michael Osterholm, Director of the University of Minnesota Center for

Infectious Disease Research and Policy (CIDRAP), in the November 16, 2004
Minneapolis Star Tribune

> "[An influenza pandemic would be] three years of a given hell.... I can't think of any other risk, terrorism or Mother Nature included, that could potentially pose any greater risk to society than this.... This to me is akin to living in Iowa ... and seeing the tornado 35 miles away coming. And it's coming. And it's coming. And it's coming. And it keeps coming.... You just see it. And we're largely ignoring it."
>
> — Michael Osterholm to the Canadian Press, November 17, 2004

Yes, it's possible to write starker, jazzier quotes. But as expert pronouncements go, nobody can say these are pulling their punches.

As the bird flu crisis continues, the experts are less and less inclined to pull their punches. As recently as August, we regularly observed that experts would use the word "pandemic" without explaining that it meant "millions of people might die." We even joked about an award for officials who actually said that "millions might die"; we called it the Omi award, named after Shigeru Omi, a World Health Organization official in Manila who was particularly open about the dire risk of a bird flu human pandemic. Now, just three months later, officials are speaking more vividly more often. "Millions" has become the norm; "millions and millions" and even "tens of millions" are sometimes heard. [See the section on "The Numbers Game."]

The question of whether the experts themselves are realistically or excessively alarmed is separate from whether they are vividly or tepidly expressing that alarm. They're a lot less tepid than they once were. They may still sound less frightened in public than they sound when they talk to each other at meetings, but the gap is narrowing.

Notice that the experts find it easier to be explicit (if not quite dramatic) about how awful an H5N1 pandemic would probably be — Osterholm, the most dramatic of the lot, says "will be" — than about how likely or imminent it is. Understandably, the experts have had trouble making an ironclad case for the high near-term probability of a pandemic. It is a widely shared hunch that H5N1 is a perfect storm in the making, but it's still mostly a hunch. The experts can't quite explain why they surmise that this particular influenza virus is likelier than others (and likelier than not) to mutate or reassort into one that's easily transmissible between humans and still extremely virulent. After all, there have been false alarms before, animal influenza strains that threatened to launch a human pandemic but didn't. We have gone 36 years since the last flu

pandemic, and 86 years since the really big one. A gambler might say we're overdue, but wouldn't a statistician conclude that horrific flu pandemics are rare? So why expect one now?

"Overdue," by the way, is a fairly common locution used by experts to justify their expectation that we'll probably see another pandemic soon. If there are really reasons for thinking flu pandemics are cyclic (for example, if going a few decades without a pandemic makes the human population more vulnerable to a novel strain), then this makes sense. But we haven't seen it argued as a scientific proposition. There were only 11 years between the pandemics of 1957 and 1968; have we been "overdue" since '79? If pandemics are random events, then each year's odds are the same, regardless of what happened the year before. (Roulette players should learn this lesson quickly, but some never do; in the risk perception literature, the error is sometimes called "the gambler's fallacy.") Unless the science really says pandemics come in cycles, we'd rather see warnings grounded in what's unique about H5N1 than in the 36 years since the last pandemic. The best reason to take H5N1 seriously is H5N1, not how long we've gone without a pandemic.

An honest expert has no choice but to concede that all predictions of an impending H5N1 pandemic are speculative — and virtually all experts do concede this. A cautious expert might well hesitate to offer any such speculation. It's a lot safer, politically and professionally, to say simply that there will inevitably be another flu pandemic some day, ground your precautionary recommendations in that indisputable fact, and move on to how horrific it will be when it happens. Only one problem: Few societies are inclined to spend much time, effort, and money taking precautions against risks in the indefinite and possibly far-off future, even if they are horrific. This is especially the case, of course, when many of the precautions have, quite literally, a short shelf life. (This shelf life issue — #8 on our list — hasn't been clear in a lot of the public communications about pandemic flu. It's awfully tempting to imply that you're confident the vaccine you want to develop and stockpile now will still be the right one when a pandemic finally arrives.)

Some health officials believe it is unwise to warn the public about an impending pandemic until the experts are virtually certain it's really on its way. Ontario's former chief medical officer of health, Richard Schabas, is in this camp; he recommends against any claims of near-term pandemic likelihood in the absence of repeated human-to-human transmissions. Testifying before Canada's SARS commission, Schabas accused senior public health officials and other experts of "swine-flu-think": hyping the expectation that the next pandemic is close. The accusation ignores the 11 novel flu viruses that have appeared

since 1968 without provoking experts to issue the sorts of public warnings we are seeing now about H5N1. Schabas, who consistently misdiagnoses resilient, resourceful, attentive publics as "panicking," wants to avoid alarming the public (at all) with speculative flu worst case scenarios. But he still wants the public to support costly-though-useful preparedness measures, such as universal influenza vaccination to help build manufacturing capacity before a pandemic. He has yet to explain how to talk people into precautions without alarming them about risks.

The emerging but unprovable expert consensus is that it will be H5N1 and it will be soon. The experts need to say so, even more consistently and aggressively than they are already. They need to acknowledge that any vaccine stockpile is a gamble, concede that they have been wrong before (they were certainly wrong about swine flu) and could be wrong again, and argue that it still makes sense to take precautions now. In other words, we need responsible speculation about the likelihood of an H5N1 pandemic as well as its magnitude. We need experts talking about their hunches and their fears as well as their data, and talking about their colleagues' hunches and fears too. We're getting some of that now, and we need more.

The Numbers Game

Estimates of how many people a flu pandemic will kill are basically informed guesses. Nobody knows how virulent the influenza strain that launches the pandemic will be, or how that strain will attenuate or intensify once it starts to spread; nobody knows what percentage of the world's population will be infected or what percentage of those infected will die; nobody knows how soon a vaccine will be mass-produced and distributed; nobody knows how well the vaccine will work or how successful "social distance" strategies will be in the meantime.

Nor do the fatality estimates matter much, beyond a certain point. It isn't clear what (if anything) the authorities would do differently to prepare for a pandemic that was likely to kill 70 million people as opposed to one likely to kill just 7 million. As for the public, most people are notoriously "innumerate." We have no idea how many deaths are required to turn a routine infectious disease problem into a major world health crisis. We take our cues from the context. "Flu Pandemic Could Kill Up to 7 Million!" sounds bad. "Flu Pandemic Would Probably Kill Fewer than 70 Million" sounds better. There are more effective ways to make vivid

the magnitude of the pandemic flu risk than coming up with a higher fatality estimate.

When a major pandemic happens, of course, what will make it vivid — terrifying, even — is the illnesses of friends and the enforced lifestyle changes when travel and public gatherings are severely constrained. Long before we know how many will actually die, we'll all be riveted. And long after we think we know how many died, experts will be doubling and halving their estimates, trying to model how many actually died in the Great Avian Influenza Pandemic of 2---. In the meantime, the numbers game — by itself — has little to do with rousing us to concern and action.

Still, it is illuminating to watch the pre-pandemic fatality estimates wax and wane, because it's a pristine example of how experts, governments, international organizations, and journalists cope with the competing demands of the situation — how they balance their desire not to be accused of sensationalizing the risk and panicking the public against their desire to warn people adequately.

Social scientists, pharmaceutical executives, government officials, and influenza experts are all understandably frustrated by the media's (also understandable) desire for numbers. All estimates of pandemic influenza fatalities are based on modeling, on assumptions, on "if-then" propositions — and all of the "ifs" are unknown! It is even more frustrating when these intrinsically hypothetical numbers are perceived as The Official Pandemic Death Estimate of the State of Calizona, and then played off against other supposedly "official" numbers.

For a very brief period starting November 25, the number most cited by the media was "two to seven million." It is based on a calculation by Martin Meltzer, senior health economist at the Office of Surveillance of the U.S. CDC. Plugging specific assumptions into his FluAid software program (at www.dhhs.gov/nvpo/pandemics/), he came up with 2 to 7.4 million deaths in a hypothetical flu pandemic. The FluAid website is explicit that the estimates it produces are not predictions: "The numbers generated through its use are not to be considered predictions of what **will** actually occur during a pandemic. Rather, they should be treated as estimates of what **could** happen" [bold in original]. Dr. Meltzer emphasized to us that the real goal of the software is to help plan how to allocate scarce resources.

Dr. Meltzer brought his calculations to a World Health Organization pandemic preparedness meeting in March 2004. The estimate is on the WHO website (at www.who.int/csr/disease/influenza/pandemic/en/), which says: "In the 20th century, the greatest influenza pandemic occurred in

1918–1919 and caused an estimated 40–50 million deaths worldwide. Although health care has improved in the last decades, epidemiological models from the Centers for Disease Control and Prevention, Atlanta, USA project that today a pandemic is likely to result in 2 to 7.4 million deaths globally." In news stories this became "two to seven million."

Dr. Meltzer believes this estimate is on the low side. Even so, two to seven million is enough to justify a "could kill millions" or even "would kill millions" headline, and it was briefly the favorite of most U.S. journalists covering the story in late November.

The highest estimate we could find in print then was one billion, offered by Dmitri Lvov, a Russian virologist, in a report from the Russian news agency Novosti. It got almost no coverage. Think about that when you're tempted to claim that journalists invariably hype risk stories. They tend to hype small risks, and downplay the biggest ones.

The World Health Organization is by far the most important source of information about the spread of H5N1 among birds in Southeast Asia and the threat of a human H5N1 pandemic. Until recent months, WHO shied away from giving a fatality estimate, even a vague and low estimate like "millions"; it preferred to let the word "pandemic" speak for itself. In January 2004, after Thailand acknowledged its bird flu outbreaks, Shigeru Omi of WHO's Western Pacific office told CBS and AP: "There's always potential for this kind of outbreak to result in a serious global pandemic, which involves not hundreds, but could kill millions of people globally." For WHO at the time, this was an unusually alarming statement.

So it was important on November 12 when the WHO's Klaus Stöhr offered reporters some higher and more detailed numbers. He said — guessed — the attack rate "would be between 25% and 30%," then extended that a bit to "a third." He also said "one percent of those who fall ill might die." And he pointed out that the 1918 flu pandemic was thought to have killed 2.6% of those who got sick — thus suggesting that his estimate might actually be on the low side.

Stöhr didn't do the math at the news conference, but one reporter did: 1% of 30% of the world's population of 6.2 billion people would be 18.6 million deaths, the Canadian Press's Helen Branswell wrote. She also (somewhat misleadingly) multiplied Stöhr's 30% attack rate by his 2.6% estimate of the 1918 mortality rate to come up with 48 million deaths. "That would mean," her story concludes, "the next pandemic might kill between 18.6 million and 48 million people around the world." And in a follow-up article, Branswell quoted University of Minnesota expert Michael Osterholm's upper-end estimate of 177 million deaths (his range

was 36 to 177 million, applying a range of assumptions about the 1918 Spanish Flu to the current situation). Hardly any of the other media coverage of the November 12 briefing used Stöhr's assumptions to calculate a fatality number. Most reporters stayed with "millions" — another example of the media's tendency to underplay the most scary-sounding pieces of genuinely scary news.

On November 25, Stöhr again briefed the media, this time in Bangkok. He used his 30% attack rate estimate again. But this time he gave an explicit fatality estimate too — though not the 18 to 19 million a well-informed reporter might have expected. Instead, he used the estimate the CDC's Meltzer had prepared for WHO in March, telling reporters: "There are estimates that would put the number of deaths in the range between two and seven million." Reporters agreeably went with the new estimate, though some of them must have known it was a change.

Later on the 25th, Stöhr clarified his surprisingly changed numbers. An evening CNN story put the 2 to7 million in a much more appropriate context, quoting Stöhr as follows: "Even with the best case scenario, the most optimistic scenario, the pandemic will cause a public health emergency with estimates which will put the number of deaths in the range of two and seven million."

Several days passed before any reporters pointed out the WHO's big change from November 12 to November 25, although at least one reporter did track down the source of the 2-to-7-million figure. Deborah Van Brenk of the London (Canada) *Free Press Reporter* interviewed the CDC's Martin Meltzer. Van Brenk's November 27 story quotes Meltzer as saying his numbers "are conservatively low estimates.... They're intended to be public health planning tools, not predictions."

Sources in news stories periodically qualify their flu fatality estimates by pointing out that the numbers are "conservative." It's worth noting that this word is systematically misleading. What "conservative" means to normal people is "on the low side." To the public, therefore, a conservative prediction of how many people would die in a flu pandemic is a low number. But what "conservative" means to risk professionals is "protective, cautious" — so a conservative prediction of flu pandemic deaths ought to be a high number, almost a worst case scenario. Experts should avoid the word altogether when talking with the public. Call the risk estimates that experts consider conservative "worst case" or "high-side" or "protective" or "erring on the side of caution"; call the ones the public considers conservative "best case" or "low-side" or "optimistic."

When experts tell reporters that a low fatality estimate is "conservative," probably they're just trying to talk like normal people. The other possibility is that the risk they're worried about isn't the risk of death and devastation from pandemic flu, but rather the risk of "unduly alarming" people by citing a high fatality estimate. In that case, the low estimate really is conservative; it's more protective of people's supposedly fragile psyches — a protection we devoutly believe they don't need.

Following Stöhr's "best case scenario" on November 25, the other shoe dropped on November 29, when WHO's Shigeru Omi answered the implicit question: If 2 to 7 million is the best case, what might be the worst? Here is how the *The New York Times* reported Omi's Hong Kong speech:

> While the agency has previously said that the death toll would be from 2 million to 7 million people, Dr. Omi said the toll "may be more — 20 million or 50 million, or in the worst case, 100" million.

In a wonderful comment that humanized expert frustration with the numbers game, Klaus Stöhr then told the *Times*: "No one knows how many are likely to die in the next human influenza pandemic.... The numbers are all over the place." That kind of openness from a credible, competent expert like Stöhr can help the public come to grips with the uncertainty we all face.

Stay tuned for later developments.

How should the experts resolve the numbers conundrum? Obviously, competing estimates of flu pandemic fatalities can undermine expert credibility, especially if they're offered up with no explanation for the discrepancies. So should Stöhr, Omi, Meltzer, Osterholm, and the other experts try to settle on one estimate of how many people a flu pandemic would kill? We don't think so.

The temptation has got to be strong to seek a consensus number, to persuade as many sources as possible to "speak with one voice." But our risk communication experience suggests this is unlikely to work and quite likely to backfire. With uncertainty as high as it is, any number you pick as your consensus estimate is foreordained to turn out "wrong." Moreover, journalists are quite likely to pounce on a negotiated consensus as an effort to muzzle the outliers, quickly unearthing outlying quotes from prior publications as evidence. Although expert disagreement does generate more anxiety and more friction than expert consensus, the solution isn't a manufactured consensus. It is to take as much sting as possible out of the disagreement by showing that the various experts are aware of and respectful of each other's opinions; that they all agree

nobody really knows; and that the different estimates probably don't lead to radically different policy recommendations anyway.

Here's a model paragraph on the numbers:

> Estimates of how many would die from an H5N1 pandemic are all educated guesses. Depending on their assumptions about the virulence of the virus, its attack rate, the success of various measures to fight it, etc., experts have come up with numbers ranging from two million all the way to nearly 200 million. My own estimate is [whatever it is]. It is based on the following assumptions about what percentage of the world population would get sick and what percentage of those who got sick would die.... But estimates much lower than mine and much higher than mine are being advanced by experts just as qualified as I am. And we all agree on the main thing: The risk is serious enough to justify urgent steps to improve our ability to fight this virus if it starts to spread....

In pre-crisis situations, experts and officials often fall into this sort of agonizing debate over how bad it will be — and they often settle on a consensus answer that is less alarming than the private opinions of many of them. We think the debate (and the agony) isn't so much a data question or a policy question as it is a symptom. It's a stand-in for two widespread concerns. One is the experts' and officials' reluctance to be seen by the public as uncertain and in disagreement. The other, even more powerful, is their "fear of fear," their overwhelming reluctance to frighten the public.

But experts and officials who worry about "unduly" frightening people don't usually have a threshold for when it is time to "duly" frighten people; they imagine the choices are "unduly frightened" or "totally calm." We wish we could persuade the infectious disease community that the public is more resilient and resourceful than you think. People don't enjoy being really frightened, and they don't like uncertainty and expert disagreement either — but with rare exceptions they can tolerate both without panicking. The data for this contention are far more convincing than the data supporting any pandemic flu fatality rate estimate.

Understating the Problem

Despite the numbers game, H5N1 experts are doing their best to sound the alarm. But other information sources seem to be muting the alarm. This includes some stunning examples from government health agencies, medical

newsletters, and others who ought to know better. And it includes some examples from journalists, who might have been expected to err on the sensationalist side instead. It's as if these other communicators can't quite believe what the experts are telling them, and keep toning it down to something they consider less "panic-provoking" and more "responsible." We're not sure if this toning down is conscious or unconscious, intentional or naive. But it is common.

In July 2004, for example, the American Medical Association newsletter *American Medical News* discussed the soon-to-be-released U.S. draft pandemic influenza plan. The newsletter article raises the question: "In the event of the next dreaded pandemic, should it be young adults who first roll up their sleeves to be vaccinated?... Or should the oldest and youngest continue to have priority, as they do now, during annual flu seasons?... In the event of a pandemic, such decisions will be primary."

Actually, such decisions will be decidedly secondary, after prioritization among essential workers: hospital janitorial, kitchen, laundry, and medical personnel; sewage and sanitation workers; morticians; power and water plant operators; food producers and distributors; police, firefighters, and military personnel; telephone system workers; etc. In a pandemic, the need to protect essential workers first will be painfully obvious. A tougher call will be how to use any vaccine that's left over — not likely to be a problem until long after the pandemic starts. Healthy adults in less essential jobs nonetheless contribute to the economy; elderly people don't but are likelier to die if infected.

The article states that "although there would be a push to manufacture enough of the appropriate flu vaccine for everyone, initial supplies would likely be less than adequate." Unless we guess right on which flu strain to expect and spend big bucks on a stockpile, initial supplies may well be non-existent. "Less than adequate" is pretty much guaranteed.

Finally, the article reassures us that "surveillance is the 'keystone' to detecting and identifying a [pandemic] virus in time to develop an effective vaccine to thwart it." The author is right about surveillance; the sooner we know which flu strains are around, the better. But any time you see a word like "thwart," "prevent," or "avert" in a sentence about pandemic flu, you're in the presence of over-reassurance. Experts talk about "slowing" the pandemic, about "increasing social distance" to "buy time" while they try to ramp up vaccine manufacturing and distribution. Pandemics don't get thwarted.

Here's another example, this one from the *Stirling Community Press* of November 5, 2004. The small local Ontario newspaper was covering two

speeches by Peterborough City/County Medical Officer Dr. Garry Humphreys. Reading between the lines, it's fairly clear Humphreys was going further than local health officials usually go to sound the alarm about a possible flu pandemic, and to push local governments to start planning. But reporter Mark Hoult pulled some of Humphreys' punches.

The lead is appropriately alarming:

> An influenza pandemic in Ontario could make four million people ill and result in 12,000 fatalities, says Peterborough City/County Medical Officer of Health Dr. Garry Humphreys. In Peterborough and Peterborough County, between 18,000 and 46,000 people could become clinically ill, Dr. Humphreys told Asphodel-Norwood and Havelock-Belmont-Methuen councils this week during presentations on how the health unit and Peterborough city and county are preparing a plan to cope with a flu pandemic that could hospitalize close to 400 area residents and kill as many as 136.
>
> Dr. Humphreys admitted his numbers are only approximate. However, they indicate "the magnitude of the problem" the city and county would face if a virulent strain of the flu struck the region, he said. "It's an event I sure hope doesn't happen. It would be a devastating event if it should occur."
>
> However, according to the province, the federal government and the World Health Organization, the world is due for an outbreak of extremely contagious influenza, Dr. Humphreys said. "All indications are that they do believe were going to have a pandemic," he said....

The article goes on to say appropriately scary things about bird flu's high mortality rate and its spread throughout Southeast Asia. Then, quite suddenly, the mood shifts: "Dr. Humphreys said the health unit has a plan in place that will deliver a flu vaccine to everyone in the county within ten days." It's quite possible that Dr. Humphreys did indeed say he had such a plan; what he doesn't have is the vaccine to go with it! That was probably clear in Dr. Humphreys' speeches to the local councils, but it is far from clear in the newspaper report.

The rest of the story focuses quite optimistically on local pandemic response planning. It's wonderful that such planning is going on, and wonderful that the local newspaper is covering it thoroughly. (This is #6 on our list of talking points.) Given how few local stories about local pandemic planning we have been able to find, we hesitate to criticize the story; over-optimistic coverage is better than none.

But over-optimistic coverage is less than ideal. On the subject of antiviral medications, for example, the story reports: “Dr. Humphreys said the [Canadian] federal government is currently stockpiling antiviral drugs designed to reduce the severity of flu symptoms. If the drugs can be delivered and administered locally within 48 hours they will prevent many people from getting seriously ill, he said. ‘We can try to reduce the number of people who are ill and the number of people who get the severe flu. Then we will have fewer people die of the illness.’” This passage is typical of media coverage of antivirals. It’s even a bit better than typical; at least it focuses on reducing the flu’s severity rather than on taking the drugs prophylactically to keep from catching the flu altogether.

It all sounds reasonable enough if you think of a flu pandemic as a short-term event, a wave that sweeps over a community and then departs, like a hurricane. The reality: perpetual, repeated, and invisible exposures over months and possibly years, as waves of influenza surge and recede around the world. Like vaccines, antivirals will be in very short supply. (And getting more will be a forlorn hope, since countries lucky enough to have a plant will immediately outlaw exports.) What’s available will be triaged. Ordinary people will be very lucky to receive any, even after they get sick. At best, essential workers will receive what they need to get them back to work.

In February 2004, CDC Director Julie Gerberding testified at a congressional hearing on influenza preparedness that “this season CDC acquired, with the strong support of Secretary Thompson, several hundred thousand treatment courses of one antiviral drug as part of the Strategic National Stockpile.” In September 2004, Ben Schwartz of the CDC’s National Vaccine Program Office presented data estimating that 16 million health care workers and public safety officers would need 93 million courses of antivirals — 8 weeks’ worth for each of them — as protection against flu during the start of a pandemic.

In the face of such shortages, hardly anybody will be able to just keep taking antivirals every day to keep the flu at bay. (Some renowned influenza experts already have their own antiviral supplies at home; we have not asked them how many doses they have stockpiled.)

The Canadian news story above illustrates a widespread tendency to focus excessively and over-optimistically on vaccine and antiviral supply issues. Such an emphasis may be useful for driving public policy in the direction of funding these crucial pandemic response measures. But this emphasis also leads the public away from involvement in lower-tech planning about daily life during a pandemic. Dr. Humphreys seemed to want

to draw attention to the latter, but the reporter ended up concentrating on the former.

But for sheer over-optimism, *American Medical News* and the *Stirling Community Press* can't hold a candle to the communication section of the draft pandemic plan released by the U.S. Department of Health and Human Services in August 2004. In fairness, it's a draft; it's going to be revised. (We have already shared some of our comments with HHS officials.)

The 10-page "Communications and Education" section (Annex 9) of the U.S. draft plan starts going wrong with its list of goals, which includes this one: "Instill and maintain public confidence in the nation's public health system and its ability to respond to and manage a pandemic influenza outbreak." Let's not dwell on the fanciful notion of a "pandemic outbreak" — as if the U.S. might experience a pandemic in just one or two isolated towns somewhere. Consider instead the equally fanciful notion that the Department of Health and Human Services is ready to "manage" a pandemic. The experts tell us that pandemics don't get managed. They get endured, mostly; if you're really well prepared they get mitigated, softened a bit.

The experts have been insisting for years that we are not well prepared, not even adequately prepared. Like many western governments, the U.S. government is beginning to move more quickly to remedy some of the inadequacies. Is it asking for our help and guidance and support, even our forbearance and prayers? No, it just wants to instill and maintain our confidence.

The problems continue on Page 2, in a section entitled "Lessons Learned." There's nothing much wrong with the lessons, but here's how they are introduced: "After the SARS response of 2003, federal, state, and local public health colleagues conducted internal debriefings to prepare for future outbreaks *of this magnitude* [italics added]." If HHS is preparing for a flu pandemic the magnitude of the U.S. SARS eruptions — the CDC reported eight confirmed cases — then it is hardly preparing at all.

Next comes a list of "Key Messages" — what the draft's authors think should be said to the American public about a possible future flu pandemic. There are four of them:

- *"We have learned a great deal about influenza and this information is helping us prepare for a pandemic outbreak."*
  Accurate enough, if a bit vague and over-reassuring.
- *"Pandemic influenza can be controlled by rapid, appropriate public health action that*

includes surveillance, identification and isolation of influenza cases, infection control, and intense contact tracing. These measures can be a temporary inconvenience to those involved but are essential for containing a pandemic outbreak."

Grossly over-reassuring — and good luck tracing the contacts of millions of flu victims. In reality, a pandemic's "temporary inconvenience" may include prolonged school closures, suspension of public gatherings such as sports and theatrical events, severe disruption of travel, difficulty maintaining essential services such as food distribution and garbage pickup, cancellation of all elective medical procedures, bans on hospital visits, job loss, economic catastrophe, and problems no one has even thought of yet. We won't "control" or "contain" the pandemic so much as we'll slow it, cope with it, and ride it out.

- *"The United States is preparing for a possible reappearance of pandemic influenza by: 1) educating healthcare workers about pandemic influenza and disease diagnosis, 2) enhancing surveillance systems to determine if and where influenza strains with pandemic potential have emerged, 3) developing the capacity to rapidly produce vaccines that will work against pandemic strains, 4) improving laboratory tests for influenza, and 5) enhancing influenza treatment options."*

  Note how over-optimistic this message is on the extent and efficacy of U.S. government preparedness. Note also the over-emphasis on technical solutions, and the absence of messages about the social impacts that will probably dominate the daily life of citizens in at least the early months of a pandemic. A large part of pre-crisis preparedness is helping the public "imagine the real" — but this key message encourages the public to imagine itself in a rather passive role, waiting (but not long) for vaccines and treatments.

- *"The HHS is committed to preserving the health and safety of Americans and pandemic influenza preparedness is an important component of national biodefense readiness activities."*

  More bland over-reassurance. A boilerplate "key message" like this one is unobjectionable until you actually think about what it says: Relax, guys, HHS is on the case. And what it doesn't say: We are working as fast as we can to get as prepared as we can for what we consider a serious threat to the health and safety of Americans and the world.

Later in the draft communication annex, there is a good discussion of the need to inform the public in advance about such potential measures as isolation, quarantine, and travel advisories, so that people will be more likely to accept those measures in real time. And the section on communication logistics in the event of a pandemic is mostly straightforward, detailed, and well-organized. But it does include this earnest piece of naïveté: "If requested, HHS communication experts can be dispatched immediately to a community that has a confirmed case of pandemic influenza disease." *A confirmed case of pandemic influenza disease?* What "pandemic" means is that cases are popping out all around you. HHS is unlikely to be dispatching communicators to the scene of each one.

The draft "Communications and Education" annex is a good illustration of why communication planning should be integrated, every step of the way, with risk analysis and risk management planning — an important risk communication principle.

Fortunately, the rest of the U.S. draft pandemic plan isn't as over-optimistic as the communications and education annex. The overview chapter (Annex 3) is realistic and vivid:

> Pandemic influenza can be considered the most extreme example of an acute infectious disease outbreak.... Influenza pandemics ... are explosive global events in which most, if not all, persons 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 given modern travel patterns. Pandemic viruses also have the ability to infect, within a year, one third or more of large populations and lead to tens of millions of deaths....
>
> [P]andemic influenza has the potential to pose disease control challenges unmatched by any other natural or intentional infectious disease event.... [A]n influenza pandemic in the 21st century has the potential to cause enough illnesses to overwhelm current public health and medical care capacities at all levels, despite the vast improvements made in medical technology during the 20th century.
>
> [T]he spread of pandemic influenza to multiple countries is expected to lead to the near simultaneous occurrence of multiple community outbreaks in an escalating fashion. No other infectious disease threat poses the same threat for causing increases in infections, illnesses and deaths so quickly in the U.S. and worldwide.

We hope the authors of the communication section of the draft plan will take the overview section to heart and adjust their messages accordingly.

Government officials and journalists, in short, are often less willing than the experts to sound the alarm about the flu pandemic threat. No one is terribly surprised to hear that government officials are inclined to over-reassure. But journalists? Aren't they supposed to be sensationalist scaremongers?

Well, yes, when the risk is not too serious or the source is a kook, reporters and editors feel free to have fun with scary headlines. But the more serious the risk and the more authoritative the source, the more reassuring the media become. Sometimes, when government spokespeople are

trying to reassure the public in the midst of a crisis, what happens is a sort of Media Stockholm Syndrome. Reporters take on the values and views of their sources, toeing the official line and covering press briefings with minimal enterprise or skepticism. But the media are paradoxically most reassuring when their mainstream sources are convincingly alarmist about a dire situation. Is it a fear of panicking people, or of being accused of panicking people? A fear of scaring off readers or viewers (or advertisers)?

We don't know what the reasons are, but the phenomenon is consistent. From Three Mile Island to SARS, official sources and expert sources who issue over-reassuring statements about serious risks can usually count on the media to go along, so long as the sources don't actually lie. And official sources and expert sources who try to sound the alarm about serious risks can expect to find some of their most alarming statements cut or toned down, and their more "responsible" statements emphasized instead. In the U.S., CDC Director Julie Gerberding has briefed the media on one health issue after another. In telebriefing after telebriefing, we listen as she stresses how serious the situation is. Dr. Gerberding gives good quote. But when we check the next day's coverage, many of her most vivid quotes aren't there. A revealing exception: the controversy over this year's flu vaccine supply. Dr. Gerberding was less frank and less empathic than usual about how awful it feels to not be able to find anyone with vaccine for you. And the media, faced with a huge controversy that wasn't an actual public health crisis, felt free to sensationalize.

Helen Branswell is the medical reporter for the Canadian Press, Canada's news agency. She is also the author of some of the most candidly alarming news stories that have been written about pandemic flu. We asked her why her colleagues weren't all doing the same thing. "I'm puzzled and dismayed," she wrote back, "at the [low] level of attention being paid in the mainstream media to what appears to be the very real possibility we may be watching the opening rounds of an influenza pandemic."

Branswell recently spent more than three months at the CDC on a fellowship for medical reporters, and spent as much time as she could picking the brains of the CDC's flu experts. "The tension at CDC was palpable," she told us in a November 19 email. "I came back to work in early October convinced I needed to be writing regularly about pandemic flu, what preparations need to be taken to prepare for it and what the public needs to do to ready itself for what would be a tremendously taxing time. But within days, I discovered that outside the CDC, people (newspapers, broadcast media) didn't seem to be paying much attention to the pandemic potential. And the pandemic-related stories I've written haven't received wide play."

Why not? “I can’t say why more pandemic stories aren’t running. Maybe there’s too much else on the go — U.S. elections, Iraq, the killing of Margaret Hassan, flu shot shortages and the ensuing panicked search for vaccine. Maybe they don’t believe the threat or can’t fathom the numbers or don’t want to alarm readers about something that might not happen. Maybe they’re waiting for more human cases or some ‘proof’ that H5N1 will be the break-out strain. Maybe they remember the swine flu scare of 1976 (though I doubt it). Maybe the idea of something that might happen next week or next month or 18 months from now gets pushed into the ‘I’ll deal with it when I need to deal with it’ pile.”

The November 12 WHO Virtual Press Conference

A few weeks ago, the World Health Organization convened an important two-day Geneva meeting of government health officials and pharmaceutical companies, devoted to the problem of pandemic influenza vaccine supply. At the end of the meeting, Dr. Klaus Stöhr, the coordinator of WHO’s Global Influenza Program, held a “virtual press conference.” He was joined by Dr. Arlene King, Health Canada’s director of immunization and respiratory infectious diseases, and by Dr. Luc Hessel of Aventis-Pasteur. Reporters participated by telephone.

The inclusion of Dr. Hessel among the briefers was important. The World Health Organization has long harbored what looks to us Cowboy Capitalist Americans like a self-defeating aversion to capitalism. It periodically asks corporations to act like governments or charities, and expresses both disapproval and surprise when they act like corporations instead. But one of the explicit purposes of the November meeting was to figure out ways to circumvent the barriers to developing and stockpiling an H5N1 vaccine — including the all-important fact that pharmaceutical companies see little chance of significant profits and much chance of significant losses if they get involved. (Companies fear being stranded with unsold product if the vaccine turns out ineffective or isn’t needed; some also fear government takeover of the supply if it works and is needed.)

We don’t know what the balance was at the closed-door meeting: pushing governments to make a market for H5N1 vaccine versus pushing companies to make the vaccine without a clear market. But the focus at the virtual press conference was refreshingly on the side of pushing governments. As WHO’s Stöhr put it in his opening remarks: “What came clearly out from this meeting is that there is a very strong international need to increase funding for pandemic vaccine development. Normally, market forces regulate which products are going to be available for public health

emergencies or for normal medical interventions. The market forces ... have not brought companies into ... pandemic vaccine development. That's something which has been clearly recognized. What has also been clearly recognized is that there is a responsibility for health authorities to seek ways to support pandemic vaccine development if they consider vaccines to be a public health good."

Stöhr and Hessel both emphasized in response to later questions that a key barrier was the need for clinical testing of "candidate vaccines" two companies were developing against H5N1, and that government money would be needed to fund the testing and thus encourage continued development. Stöhr may sound a bit annoyed in the following answer, but he's literally on the money: "Without money, nothing is going to move in pandemic vaccine development. This is absolutely clear from this meeting, and it looks as if the companies will not come up with this money. So somebody else has to step in." This is exactly the thrust of #10 on the list of key messages above. The point needed — and got — strong emphasis.

The media briefing was also emphatic about the high probability and high magnitude of a flu pandemic (key messages #1 and #2 above). Most of the comments were given in the future tense rather than the conditional: the pandemic "will" as opposed to "would" — a clear signal of very high likelihood. Dr. King referred to "the imminent threat posed by H5N1 in Asia," while Dr. Hessel said that "based on the surveillance programs managed by WHO, the most likely virus to be close to a pandemic situation is this famous H5N1 avian flu strain."

As for magnitude, Stöhr estimated that the attack rate of a flu pandemic "would be between 25% and 30%," and that "one percent of those who fall ill might die." He didn't do the math, but with a world population of 6.2 billion people, that comes out to 15.5 million to 18.6 million dead. (The numbers get a little higher if you assume a world population of 6.4 billion; see the section on "The Numbers Game.") And he went out of his way to suggest that this is by no means a worst case scenario, noting that the 1918 pandemic had a case fatality rate of 2.6%, killing an estimated 40-50 million people. There are higher expert estimates around of H5N1 pandemic deaths. Michael Osterholm's worst case is a 50% attack rate and a 5% fatality rate. Still, no one can say Stöhr was minimizing the problem.

Where the press conference did poorly — as measured by the news coverage it produced — was in giving many reporters the impression that vaccine production will be the deus ex machina that makes everything all right ... if only there is enough investment. Stöhr spoke, for example, about the need "to ensure that at the time of a pandemic, influenza vaccines are

going to be available." As he himself noted immediately afterwards, that has never happened in the past. No expert actually believes it's likely next time either, if "available" means ready to go into billions of arms. Later in the press conference Stöhr returned to this optimistic theme. Asked about vaccine distribution problems, he conceded that they were daunting, but stressed: "For this meeting, what we wanted to make sure is that there is something to be distributed, that there is vaccine available when it's needed."

Look back at key messages #4, #9, and especially #8 — messages about the impossibility of preventing or stopping a flu pandemic, about the need to take steps to ameliorate it without expecting to prevent or stop it, and about the pros and cons of stockpiling a vaccine that might turn out useless. The press conference speakers not only neglected these messages, but at times almost seemed to contradict them. The most knowledgeable reporters knew better, and some of them wrote stories that were clearer and less misleadingly optimistic than the news conference they were covering. Other reporters just wrote what they thought they heard. They picked up — and subsequently conveyed — an unduly optimistic impression of the vaccine prognosis, even though none of the briefers actually said that a vaccine could prevent or stop a pandemic.

If the next flu pandemic turns out to be a strain of H5N1, a pretested and pre-approved stockpile of vaccine to fight a similar H5N1 strain might save millions of lives. But nobody expects a stockpile of six billion doses. Even a few hundred million doses would be ambitious. Since a stockpile in the billions just isn't going to happen, officials at the WHO meeting were wisely lobbying for pretesting and pre-approval, plus an improved ability to ramp up production quickly when the pandemic comes, so additional doses could be available sooner. But the vaccine would still be chasing the pandemic, not preventing it. And that's if the next pandemic turns out to be H5N1. If it turns out to be something else, streamlined processes will still help speed the day when vaccine goes into billions of arms — but they'll be starting from scratch. And in that case an H5N1 vaccine stockpile will probably be useless.

Nobody at the press conference actually denied any of this. But they declined several opportunities to confirm it. The very first exchange with a reporter demonstrates the problem:

> **Reporter:** Are you saying that it is possible for us in the event of a pandemic to get a vaccine available to be used to lessen the impact of a pandemic? Or what do you mean?... What exactly is possible?

Stöhr: Will it be possible to have vaccine during the initial phases of a pandemic? The answer is yes. But not now. Not in the next six months and perhaps not if we don't change what has been done so far. So far, we have two million doses of pre-formulated vaccine stockpiled by one country, the United States.... But in the global perspective, it's not a lot. So what is required is that all those who can make a difference, namely all companies, all regulatory agencies and all health authorities think about their input. And the first and most important input is, begin with clinical trials and ensure that the clinical vaccines are ready for testing.

Reporter: But if we don't know what the pandemic strain is, what are they testing in the clinical trials?

King: Well, I think that it's important to realize that ... if the pandemic struck tomorrow, there will not be a pandemic vaccine available. However, there are many other public health measures that can be considered. Individual measures — things like respiratory etiquette, ensuring that when you're sick, you don't go out, you cover your mouth when you cough and other public health measures that are under consideration like reducing crowds, crowded situations, those kinds of initiatives. Of course, the work on the development of pandemic vaccine is progressing and it's progressing well, but there are a number of barriers as well.

Instead of conceding that we probably won't have enough vaccine to help much at the start of a pandemic, Stöhr says we can stockpile more than we have now, and then changes the subject to clinical testing — a critical goal of the WHO meeting, but hardly responsive to the question. Instead of conceding that whatever we test and stockpile might turn out to be the wrong strain, King says there's no vaccine available yet, and then changes the subject to personal hygiene and crowd control — also good topics (see key messages #6 and #7), but again hardly responsive to the question. But the main issue isn't that these answers weren't what the reporter was asking about. The main issue is that the answers didn't clarify what we can reasonably expect from vaccination in an influenza pandemic.

It was the third briefer, Dr. Luc Hessel of Aventis-Pasteur, who came closest to warning reporters that the vaccine might not be needed and might not work. But he didn't dwell on these drawbacks; he bridged to a discussion of why pharmaceutical companies couldn't be expected to pay the cost of vaccine development. There is a pattern here. Industry

spokespeople tend to support government funding of vaccine supply improvements by pointing out that the investment is too risky for the private sector. Government spokespeople tend to support the same funding by downplaying what could go wrong with the vaccine project. So the skeptical information is coming largely from industry.

Over-optimism about the efficacy of the solution being urged is good short-term salesmanship — but there are several ways it can backfire as risk communication. Consider four scenarios.

1. An H5N1 pandemic happens, and your preparations help only a little. Many people are sick or dying, and much more funding is needed. People are understandably angry. "We already gave you the support you said you needed to solve this problem!"
2. A pandemic happens, and it isn't H5N1. You have stockpiled the wrong vaccine, and have to start from scratch on a new one. People are understandably irate. "You told us you had a pandemic vaccine!"
3. No pandemic happens, and a few years later a different flu strain threatens. You rightly want funding and support to get prepared for that one too. People are understandably confused. "Didn't you already do this?"
4. With a possible pandemic looming, local leaders are urging serious planning to cope with the awful reality that may soon be upon us. People are understandably impatient. "Why do we need meetings about how to maintain essential services and enforce quarantines? We thought there was a vaccine ready to roll."

Preventing these four scenarios means convincing people that vaccine improvements are enormously important and well worth funding even though they may turn out unnecessary or useless, and even though at best they are only a partial and belated protection against what will still be a horrific health crisis if it happens. Otherwise the over-optimism will inevitably backfire, damaging credibility — and officials will be stuck searching for a flu pandemic vaccine fallback position.

Part of what goes wrong is the use of the term "pandemic vaccine." This is a term of art in infectious disease circles. It was part of the formal title of the WHO meeting, and it was used over and over at the November 12 press conference. But it is very misleading to the general public. A "pandemic vaccine" sounds for all the world like a vaccine against pandemics. But all that's possible is a vaccine against a specific strain of virus. We can manufacture a vaccine against H5N1, which will come in very handy if there's an H5N1 pandemic. We cannot manufacture a vaccine against flu pandemics.

But more fundamental than the innocently misleading use of a piece of technical jargon is the (probably unintentional) use of the traditional one-two punch popularized by commercial advertising: First dramatize the

problem, then oversell the solution. Dramatizing the dangers of H5N1 is necessary and important. But many reporters took home the oversold impression that a "pandemic vaccine" will be ready in time to stop, thwart, prevent, or stave off an H5N1 pandemic. Even though the briefers never said this was so, they needed to do much more to say it wasn't.

In the short term, over-selling a solution often works. Like commercial advertising research, the health communication fear appeal literature also documents the effectiveness of scaring people first, then telling them what to do so they don't have to stay scared: "This is very likely to kill you! But if you just wear your seatbelt/exercise three times a week/get a shot, you'll be okay!" But when a precaution is oversold as easy, cheap, guaranteed, and available — and later turns out to be complicated, expensive, uncertain, and not-quite-ready-for-prime-time — people feel misled. And so they become angry and distrustful, just when they most need confidence in their leaders. And they become even more frightened, just when they most need to stay calm.

How did the media cover the news conference? Most reporters wrote stories, and most headline writers wrote headlines, that made an H5N1 vaccine (the solution) sound easy, cheap, guaranteed, and about to be available, awaiting only $13 million to fund clinical trials. Most stories and headlines also captured the experts' sense that an H5N1 pandemic (the problem) is likely and would be bad. But they generally didn't manage to say how bad, either with high numbers or with vivid descriptions.

The Voice of America, for example, wrote that WHO had concluded "a two-day meeting in Geneva on how to prevent a future pandemic." What's a pandemic? According to VOA, it is "a possible global influenza outbreak — a health emergency that could kill millions of people." The reporter may have thought "outbreak" and "millions" were alarming enough, but they understate the magnitude of the risk. We're left with a possible mini-crisis that a vaccine can prevent.

The Associated Press coverage went out under the optimistic headline: "WHO Says Flu Vaccine Coming Within Year." Emma Ross's story begins: "With the right coordination, international commitment and about $13 million, scientists could deliver within a year a candidate vaccine to combat global flu outbreaks." The article does not mention that this applies only to paying for clinical testing of 18,000 doses of two H5N1 "candidate vaccines" being developed by Aventis and Chiron. Actually manufacturing a vaccine takes much longer and costs much more. And the AP story doesn't use Stöhr's fairly alarming estimate of flu pandemic deaths; Ross went instead with a less alarming speculation (up to seven

million deaths) from the U.S. CDC modelers — a number that wasn't even mentioned at the press conference she was covering.

Emma Ross produced a much better story for AP that moved on the wire a little later. Though it says nothing at all about the expected number of deaths, the story does point out (if you read carefully) that the short lead times WHO mentioned refer to things like clinical testing and legislation, not producing huge quantities of actual vaccine. Far less optimistic than her other story, and than most stories, this one promises only that "there's a chance scientists could get a jump on a pandemic and produce a vaccine that would limit the damage." The *Wall Street Journal*'s online edition was among those that picked up this AP story, but the headline writer, unfortunately, missed the nuances. The *WSJ* head reads: "UN Says Flu Pandemic Vaccine Possible Within A Year."

Delthia Ricks's story in *Newsday* uses "tens of millions" of deaths instead of "millions." But it reports that global flu experts believe a vaccine "capable of thwarting a pandemic strain of flu can be produced, but not within the next few months." Stöhr, according to this article, "said the capability exists to produce an appropriate vaccine."

Lawrence K. Altman of *The New York Times* did much better than most. His story has no fatality estimate, though it does give Stöhr's 30% attack rate and 1% mortality rate, leaving the reader to figure out how many deaths that would be. The story stresses the barriers to vaccine availability, especially the need to ramp up manufacturing capability and government funding. The following paragraph from Altman's story is almost unique in its discouraging candor about an H5N1 vaccine:

> Only 2 million doses of an experimental vaccine against the avian strain are being made; the first batches are about to undergo testing in the United States. But Stöhr said that "there is currently too little momentum in the development of influenza pandemic vaccine" — largely because companies would lose millions of dollars by producing a vaccine that became outdated or might never be needed. Also, a vaccine produced now might prove to be the wrong one if another strain of virus caused a pandemic.

David Brown of the *Washington Post* also got it right. Here's his wonderful second paragraph:

> A vaccine is unlikely to prevent the global spread of a pandemic strain of flu virus, but it could save millions of lives. To do so, however, the world must be ready to make, test, pay for, distribute, and probably share what will be a scarce supply, the experts concluded.

But the Canadian Broadcasting Company online edition was more typical. It managed to encapsulate both errors — understating the problem, overstating the solution — in one headline: "Flu will kill millions unless vaccine pushed through: WHO."

Any time a news story reports that if we only take these few steps there will be a pandemic vaccine "ready" within so many months, one of two things is true: Either the source of that story meant to mislead, or the source tried and failed to convey the less reassuring truth. If governments and pharmaceutical companies do all the things recommended at the November 12 press conference, and if nothing goes wrong, then sometime early next year we could know that one or more of the candidate vaccines works against the current H5N1 strain. Then we would be "ready" to start thinking about manufacturing it in bulk; we wouldn't be ready to put it into many arms.

Two weeks after the vaccine summit, there was a major bird flu preparedness meeting in Bangkok, drawing together Asian health and agriculture ministers with WHO and other international officials. Briefing the media during the meeting, Klaus Stöhr continued trying to sound the alarm. As we discussed in the "Numbers" section, he switched — without comment — to the lower CDC fatality estimate of two to seven million. But in other ways he was appropriately apprehensive, even hyperbolic, noting for example that "the number of people affected will go beyond the billions."

But reporters got the same over-optimistic impression about vaccination as they had on November 12. Here's how Reuters paraphrased Stöhr:

> Two U.S. companies were working on producing a vaccine against the H5N1 virus, but one would not be available until March at the earliest, he said. That meant people would be vulnerable in Asia through the winter and spring when the virus thrives best, Stöhr added.

This is phrased like a piece of bad news (Asians will have to manage till March without a vaccine), but in fact it is misleadingly optimistic. The vaccine that won't be "available" until March at the earliest is a candidate vaccine that will, with luck, be tested and licensed in the next few months, and then will be ready for the laborious manufacturing process to begin. The implication that Asia's populace — or even the U.S. populace — might be able to get vaccinated against H5N1 by next March is a fantasy.

Are news sources responsible for fantasies perpetrated by journalists? Sometimes the answer is simply "no"; reporters and editors occasionally

mangle something the source said just fine. But blaming the receiver for an unsuccessful communication is usually a mistake. Far more fruitful is this three-step protocol: (1) Read the coverage and notice what messages didn't get through or turned out misleading. (2) Take most of the blame on yourself; aim for an "I wasn't clear enough" attitude instead of a "you didn't understand" attitude. (3) Try to correct the miscommunication — not by complaining about what they misheard, but by explaining (apologetically) what you misstated. Over the years, our clients have often had trouble making themselves adopt this protocol. But when they were able to do so, the results were good.

The Rest of the Story

Four other messages on our list have received insufficient attention in pre-pandemic communications with the public.

#5 Adjustment Reaction.

The stages of adjusting to a new and serious risk are well-known. The first stage — before the adjustment reaction — is some mix of apathy and denial. That is, we legitimately don't know much about the new risk, but we also don't want to know; we resist adding something new to our worry agenda. When that defense is finally breached, next comes the full-fledged adjustment reaction. Instead of under-reacting, we over-react for a bit. We imagine the possible future risk is a here-and-now risk; we may start taking precautions we ought to be only preparing to take. Then we get through the adjustment reaction. We adjust. Our New Normal includes a sensible coping strategy: increased vigilance so we'll know if things get worse; improved preparedness so we'll be ready to act if we must.

As we have written elsewhere, it is very useful to legitimize and guide people's adjustment reactions, rather than criticizing or ridiculing them. But first you have to get people past their initial denial and *into* the adjustment reaction. To do that, it's important to scare people sufficiently (not excessively, but sufficiently) — which is why strong messages are needed about the probability and magnitude of the H5N1 risk (#1 and #2).

But it's also important to tell people that it's okay to be scared. Legitimizing fear is one of the keys to helping people avoid or overcome denial. And a crucial part of legitimizing fear is expecting people to be able to bear it, act sensibly in spite of it, and come out the other end of the adjustment reaction into the New Normal.

There has been virtually nothing so far in either media coverage or public documents that tells people to expect themselves to react emotionally to the pandemic risk, to cope with that reaction, and to get past it. The sources' failure to say these things, we believe, is part of why the public has failed to take the pandemic risk to heart. Under the headline "Nation Braces for Global Flu Battle," a public health official told the *Toronto Star* the other day: "But people shouldn't be scared. Just remember, every year we go through flu season and the best way to prevent it is always the same boring way: wash your hands, cover your mouth when you sneeze, get your flu shot and stay home from work when you're sick." Telling people not to be frightened about something legitimately frightening is tantamount to encouraging apathy or denial; and it leaves people who *are* frightened alone with their fear. This is exactly the opposite of what's needed.

There is another aspect of getting people into the adjustment reaction that deserves mention: the need to address audience skepticism. One way people defend themselves against anxiety about new risks is by mistrusting the source of the scary information. In general, official warnings are more trusted than official reassurances; people tend to assume, rightly, that governments are likelier to over-reassure than to over-alarm. But there is always a cohort that mistrusts warnings, doubting the motives or the competence of the source. The current political climate in the United States makes this reaction likelier (and perhaps more justifiable); many may respond to word of H5N1 in the context of color-coded terrorism alerts and WMD controversies. Finding ways to acknowledge and diminish this mistrust is part of the task of delivering effective warnings.

#6 Local and Individual Planning.

Another key to helping people avoid or overcome denial is to give them things to do. With one important exception, hygiene, the communication efforts of infectious disease experts, government officials, and the media have pretty thoroughly ignored this possibility. The blogosphere seems to be taking it seriously, however. In his blog at www.futurepundit.com, Randall Parker has brainstormed about how regular people can cope with pandemics. The following is partly from Parker's emails to one of us (Lanard), partly from the blog itself:

> A book or a web-based document that is needed: A Thousand And One Ways To Slow Or Stop A Killer Pandemic By Changing Everyday Life.
>
> Imagine all the little suggestions about how to shop, how to reduce exposures to other people, and so on, all aimed at reducing the risk of passing pathogens along. There could be sections on what individuals could do and other sections on what businesses and various levels of government could do.

> People who go shopping can go less often, buy more per trip, and not go during rush hours when the aisles are crowded. They could switch to canned and frozen fruits and vegetables, which keep longer, so shopping can be less frequent.
>
> Optional activities such as vacations, club meetings, movie outings, concert attendance, and the like can be cancelled. People who are able to work from home can stop going into the office. Even the people who cannot change their daily routine will be at less risk if all those who can change their daily routine do so to the extent that they can.

Part of the issue here is psychological: People need things to do to help them get through the adjustment reaction and emotionally ready to cope with the crisis itself. Part of the issue is logistical: Emotions aside, there are things we all ought to be planning and doing to get ready.

Beyond all that, even, is a still more fundamental reality: Virtually all meaningful emergency planning has to be local. This is especially true for pandemic planning. A pandemic by definition happens everywhere. And one of the first things that will happen in a pandemic is a huge reduction in travel — some of it voluntary, some mandated. There aren't likely to be a lot of unaffected communities sending help to the affected ones. National governments will do what they can to help, but they will be helping everyone at once. Most communities will cope with the pandemic pretty much on their own.

Of course if and when there are sufficient stockpiles of vaccine or antiviral medications, that could change. But most experts don't expect much from that quarter until well after the pandemic strikes.

Over-optimism about the vaccine solution, in other words, is connected to paying too little attention to low-tech local coping strategies. Some local hospitals and local health officers (like Peterborough's Dr. Garry Humphreys, quoted earlier) are developing plans for an H5N1 pandemic — but many are not. Maybe even a few local school boards and power plants and sewerage authorities and businesses are figuring out how they'd cope — but most are not. And virtually nobody on the national or international scene is aggressively urging them to do so when talking to the news media about the risk of a flu pandemic.

Understandably, the national and international medical experts and health authorities who are focusing on the pandemic flu risk — and trying to get us to focus on it too — think first of national and international

medical strategies. Local strategies, especially local non-medical strategies, may get lost in the shuffle.

But four of the most obvious, well documented issues in a flu pandemic are these:

1. Providing medical care to people who get the flu, and to people with other medical problems who don't want to be exposed to the flu during their treatment.
2. Increasing "social distance" so there will be reduced contact between people who are infectious and people who are healthy, in hopes of slowing the spread of the disease and buying time for the production of a vaccine.
3. Maintaining essential services — from education to water treatment — in spite of people's illnesses and their fears, and in conformance with social distance policies.
4. Mobilizing volunteers (retired health care providers and recovered flu victims, for instance) to deliver supplies to the homebound, replace sick workers where their skills permit, and generally help cope with the other three items on the list.

These are all local issues. How much progress has your community made on them? Has it started yet?

#7 Hygiene

The only thing experts and officials routinely tell the public about what we can do to help cope with a pandemic is hygiene: Cover your mouth when you cough; don't go to work when you're sick; keep your hands away from your face; wash often with soap; etc. This is important advice, and we're certainly not urging that it be curtailed. But there's some fine-tuning to be done.

For one thing, these hygiene recommendations tend to come up in the course of talking about vaccine supply problems. This was notable when the U.S. faced a vaccine shortfall at the start of the annual flu season. It's happening again with pandemic flu. The sources may be reluctant to say explicitly that there won't be enough vaccine until late in the pandemic, so when they get close to this touchy topic they start talking about hygiene instead. (For a good example, look back at Arlene King's answer to a reporter's question about not knowing which flu strain to make the vaccine for.) This makes a kind of sense. Covering our mouths is what we all have to do till they get us vaccinated. Still, hygiene deserves (and sometimes has) its own place on the message list; it's too important to be used as a way to evade addressing vaccine supply problems.

The experts also need to rethink their approach to face masks, their response to the widespread intuitive sense that when an infectious disease is around, both healthy and sick people ought to wear masks. Yes, we know that ordinary face masks do not prevent airborne spread of viruses. But they cover your mouth and help keep you from touching your face.

Mask-wearing is more practical than covering your mouth with your hand when you cough because it works when your hands are full or busy, and it works when you forget — not to mention where people's hands tend to go after they have blocked a cough (the eye, the doorknob, the cheek of a loved one). During the SARS outbreaks, we noted the strange reluctance of experts and authorities in some countries to recommend, or even tolerate, mask-wearing. Then it seemed to be about sending too worrisome a message; in Toronto, especially, officials didn't want people wearing masks because they didn't want to add to public anxiety. (Singapore, on the other hand, positively connoted mask-wearing as a sign of respect for other people's health, comparing it with the Japanese tradition of people wearing surgical masks when they have colds.) Certainly in a flu pandemic, face masks will do more to alleviate anxiety than to exacerbate it. We continue to be a little bewildered by the ongoing anti-mask bias.

More generally, the problem with most hygiene recommendations is that they seem simultaneously impractical and obvious, inadequate and over-familiar — and more than a little saccharine. Sounding like your mother or your kindergarten teacher is not a recipe for widespread public responsiveness. One of the advantages of face masks is that they're not what your mother or your kindergarten teacher recommended. Similarly, the advice to wash your hands tends to go unheard. Why not also recommend a switch from hand-operated to elbow-operated faucets and doorknobs in public washrooms? It works in hospital surgical suites; it's low-tech and feasible; and above all it sounds like a specific, serious response to a specific, serious problem, not one-size-fits-all advice for the ages.

Finally, hygiene advice should make liberal use of a communication strategy called counter-projection: acknowledging the reservations or doubts or "yes buts" that people may be feeling (often without saying so, sometimes without even realizing it consciously).

- "I know this doesn't sound like much of a response to the most serious national health threat in decades, but...."
- "At the risk of sounding like a kindergarten teacher, let me suggest...."
- "Some of these things are hard to do in real life, but whenever you can...."
- "Here are some of the obvious but often-ignored infection-fighting strategies we try to drum into new medical students...."

#12 Public Involvement.

There is a long list of good reasons for involving the public in advance decision-making about how to handle a crisis like an H5N1 pandemic. To mention just the most obvious ones: You get better decisions; you get better public understanding of the decisions; and you get more public buy-in, and therefore more compliance in implementing the decisions.

You also get a calmer public. We do not share the concern of many experts and officials about "unduly alarming" the public. Since we accept their judgment that the flu pandemic risk is serious, we think the job is "duly alarming" the public. If and when the pandemic comes, people's anxiety will go through the roof, of course. Odds are they still won't panic, even if they were inadequately warned or involved and end up feeling unprepared. But if you're worried that an actual pandemic might panic the public, all the more reason to warn them, prepare them, and above all involve them before the pandemic strikes.

Infectious disease experts, after all, are incredibly worried about H5N1. They're nowhere near panicking, partly because they're busy trying to get ready instead.

So the scarcity of flu pandemic public involvement efforts and public involvement messages is a major pre-crisis communication failure. Pandemic planners face a huge number of unresolved problems, most of them dilemmas with no easy answers. We have discussed at great length the problem of how much to invest in stockpiling vaccine against what may turn out to be the wrong strain of influenza. This is in part a scientific question, of course. But it is largely trans-scientific. Ordinary people have plenty of experience making cost-risk decisions about precautions that might or might not be needed, and that might or might not work. They buy (or don't buy) insurance; they carry (or don't carry) spare tires; they take (or don't take) vitamins. It's their money and their health. They are qualified to help decide about vaccine stockpiling. And people who have helped decide are likelier to accept the effects of the decision.

Similarly, some of the most important H5N1 dilemmas are about fairness (key messages #13 and #14). How will we allocate scarce medical resources — vaccines, antivirals, ventilators, hospital beds, doctors? What is the relative priority of protecting the most vulnerable people versus protecting the people whose occupations make them most essential to keep healthy? Do we vaccinate a cop or his grandmother and his school-age children? Just as daunting are the international fairness dilemmas. Is this pandemic going to be every-country-for-itself, or do we want to take steps to help less advantaged countries? These questions have a scientific side, but they are mostly about values. Once again, ordinary people are qualified to help make these decisions. And they are likelier to be willing to accept them if they were asked to help make them.

Experts and officials have made significant progress toward overcoming their reluctance to warn us about the H5N1 flu pandemic risk. Though they

are still skittish about using high fatality estimates and their warnings are sometimes less vivid than they ought to be, they really are trying to sound the alarm. But their vision of our role is still an extremely passive one: Support funding increases so they can get ready. The notion that we might need to get ready ourselves is conspicuous by its absence. So is the notion that we might meaningfully help them get ready.

The three main changes we hope to see in flu pandemic risk communication:

1. Keep moving toward more and more emphatic messages about the seriousness and likelihood of a pandemic. Apathy and lack of awareness are still the big problems, not panic. Work to persuade journalists to use the alarming parts of your quotes, not just the optimistic or low-end estimates they are already using.
2. Reduce the over-optimism in vaccine discussions. The next flu pandemic will be the first flu pandemic for which it may be possible to develop a vaccine in advance. We'd be fools not to try. But don't let the public think that will "prevent" the pandemic, or even keep it from causing worldwide devastation.
3. Broaden the focus beyond vaccine issues. Focus much, much more on low-tech local problem-solving — on how individuals can (and will have to) protect themselves, on how communities can (and will have to) get ready and cope on their own, on how individuals and communities can help resolve tough national and international dilemmas.

And a fourth recommendation, to balance the other three: Keep saying you might be wrong. Swine flu turned out to be a non-problem. SARS receded, at least for now. H5N1 could do the same.

But your gut and your expertise tell you that you're probably right. You need to help us all get used to the idea of this new, huge threat. Then we need to get busy together. And the best time to move forward is now, this winter, while influenza is still on our minds and in the news.

Post Script

As we were finishing this overlong column, several excellent news stories came out that moved pandemic risk communication forward:

1. by addressing the need for planning to cope with what life during a pandemic would be like;
2. by explaining why experts have been ratcheting up their alarm about H5N1; and
3. by countering recent media over-optimism about "pandemic vaccines."

The following excerpts are from *The New York Times* and Reuters on November 29, reporting comments by WHO's Shigeru Omi.

Keith Bradsher in the Times, covering the need for local planning:

> Governments should be prepared to close schools, office buildings and factories in case of a pandemic, and should work out emergency staffing to prevent a breakdown in basic public services like electricity and transport, said Dr. Shigeru Omi....

Bradsher covering the reasons for increased H5N1 concern:

> Researchers have been struggling to determine how and whether the disease might develop the ability to spread easily from person to person through the air the same way human influenza viruses do. Omi said that it was becoming more and more likely that the virus would develop the ability to spread among people for several reasons.
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> The virus has proved highly versatile in mixing genetic material with other viruses, he said. The disease has recently developed the ability to survive in domesticated ducks and be excreted in large quantities without making the ducks sick, making it hard for farmers to know which birds to cull.

Tan Ee Lyn in Reuters covering the limitations of vaccines:

> Two U.S. companies and a Japanese firm are working on a vaccine against H5N1 and clinical trials on its efficacy and safety have begun, Omi said. But he cautioned people against thinking that vaccines were a cure-all.
>
> "Vaccines are very useful in reducing the scale of a pandemic but it is not a magic blitz in averting a pandemic," Omi said.
>
> Due to commercial reasons, mass production of vaccines would only start after a pandemic begins, which means it would only reach the public after a time-lag of at least five to six months.

The learning curve of pandemic influenza risk communication is steep for all of us. The progress is uneven but real. And there is much work ahead to help the public brace for the pandemic we will eventually face, and the uncertainties between now and then.