April 30, 2009

Your travel questions: Is it safe to fly? Should I cancel my vacation in Mexico?

Some of the most common questions asked during this afternoon’s chat concerned travel, both to Mexico and abroad. Here are the answers to some of them.

Should I travel to Mexico?

I put this question to Dr. Herbert DuPont, a traveler’s disease expert at the University of Texas Health Science Center at Houston, earlier this week. He advised postponing or canceling non-essential travel. If travel is essential, for example a business deal that would not be possible without a visit, he said people could minimize their risk by avoiding large groups and practicing good hygiene. The overall risk of infection seems low, DuPont said, but it certainly not zero.

What about domestic travel?

I have yet to speak with an expert who advises against traveling to other locations in the United States or Europe. Hani Mahmassani, director of the Northwestern University Transportation Center, said he would not think twice about taking a trip to, say, Europe.

"You're exposed to different risks all the time," he said. "There are probably much greater risks in our daily lives that we take for granted."

In other words, the dangers encountered while driving to Bush Intercontinental Airport may well outweigh the chances you'll become infected with swine flu on a flight to Europe.

But are airplanes safe?

"Not entirely," Mahmassani said. "They are recycling air, after all. Airplanes have a ventilation system, and while they may try to eliminate pathogens, they are not perfect."

Cabin airflow is often compartmentalized to reduce the risk, so if someone is sneezing in the back of the airplane, you're unlikely to re-breathe that air. The greatest risk probably comes from a contagious passenger sitting nearby who is coughing or sneezing.

The CDC has published guidelines for the airline industry to minimize the risk of passengers and crew members exposed to travelers who appear to have influenza.

What can travelers do to minimize risks?

Good hand washing is paramount. If that's not possible on board an airplane, health officials recommend an alcohol-based sanitizer. Products containing 50 percent or more alcohol content have been shown to effectively reduce the rates of influenza transmission.

You might also consider a professional face mask rated N-95, which may provide some protection. At the very least such a mask will prevent you from rubbing your mouth or nose without washing your hands first. You
might also bring a second mask along to give to a traveler who appears ill. This will reduce the chance of infected droplets being spread around.

**Are there any conditions under which airports might close?**

There are different scenarios, Mahmassani said, but shutting down an airport causes major problems for communities. He said colleagues who have studied outbreaks have also generally concluded that closing airports, or even banning flights from a certain country, have very limited effectiveness.

"They have found that preventing flights from Mexico, say, would have virtually no impact on the spread of the disease because it's already out there. It may have a difference in the time scales of the disease's spread, but it will not be effective at ultimately stopping the spread."

Review Thursday's swine flu chat.

Review the chat with Dr. Pedro Piedra, a physician, virus researcher and vaccine expert at Baylor College of Medicine.

**Computer simulations of worst-case swine flu outbreaks**

An engineering group at Northwestern University led by Professor Dirk Brockmann has developed a model to
predict the spread of swine influenza across the country, and their efforts offer a snapshot of what might come.

I will admit I am much more familiar with the shortcomings and abilities of hurricane models, and there's no question flu outbreaks are essentially defined by their unpredictability. Nonetheless, their predictions, which are based upon travel patterns, may offer readers some comfort because they're not as dramatic as one might think.

Below is a map of total U.S. cases showing a worst-case scenario for four weeks from now, May 27.

In their projection Harris County has the third most cases, 138, behind the Los Angeles and Miami areas.
Here's what intrigued me -- the modeling above assumes a worst-case scenario:

Our simulations yield projections and risk assessments of the epidemic outbreak in a worst case scenario, in which no containment measures are taken to mitigate the spread. Therefore, the actual case numbers are expected to be smaller as mitigation strategies and containment efforts become effective. We are constantly updating our forecast, taking into account new information on confirmed cases and more precise information on the transmissibility and disease-specific parameters.

Another group at Indiana University has likewise begun modeling the spread of the disease around the world, and these scientists suggest Wednesday's elevation of the pandemic threat to Phase 5 may have some effect in slowing the progression of the illness.

The two modeling groups are in somewhat good agreement with their results.

April 29, 2009

OK, a pandemic is imminent. Now what?

The World Health Organization says the swine flu outbreak has entered Phase 5 and is virtually pandemic. Can we start freaking out now, please?

No.

Here's what a pandemic means: Phase 5 is characterized by human-to-human spread of the virus into at least two countries in one WHO region. While most countries will not be affected at this stage, the declaration of Phase 5 is a strong signal that a pandemic is imminent and that the time to finalize the organization, communication, and implementation of the planned mitigation measures is short.

Locally this shouldn't have that great an effect as the county, state and federal governments are already making preparations for a pandemic. Federal health officials announced this morning they are pursuing the development of a vaccine, which may be ready by early fall.

At the state level, Gov. Rick Perry issued a disaster declaration that allows the state to implement emergency protective measures. At the county level, officials are already implementing their pandemic
plan as if a pandemic were imminent.

Lots of good planning is already in place for such an event.

Beginning in 2004 governments were terrified that avian influenza (H5N1) would gain the ability to jump easily from human to human. They were scared because the virus had a mortality rate as high as 60 percent. The virus still isn’t easily passed between humans, but the upside is that governments have had five years to develop pandemic plans.

There are reasons, then, to be optimistic that our government has taken reasonable steps to be prepared for an influenza outbreak. In the case of swine flu we appear to have several advantages:

**1.** The case fatality rate, while still a big unknown, appears to be nowhere near avian influenza's 60 percent, and is probably significantly lower than even 10 percent or 5 percent.

**2.** Another big unknown with avian influenza is that we weren't certain that the emergent strain would be susceptible to antiviral drugs. The swine flu virus appears to be susceptible to two of them, Tamiflu and Relenza. The government has stockpiled 50 million courses of these drugs.

**3.** Summer's not far away. There's a decent chance the virus will burn itself out during the next month in the Northern Hemisphere, only to re-emerge in the fall, as is the normal pattern for influenza. The upside there is that if all goes well there should be a reasonably good vaccine developed in large quantities by some time this fall.

These are some reasons to avoid panicking. At the same time I recognize that emerging viruses are certainly scary unknowns that have considerable potential to disrupt society. They're not fun. But they're manageable, especially if the public cooperates by following some simple, common-sense precautions.

Parents also should plan for the possibility that children will be released from school early for the summer, and that day cares might close. Under a worst-case scenario health officials believe 40 percent of employees may not go into work. I don't think we'll get there, but you need to begin asking yourself how you would handle such a situation.
What a U.S. swine flu death means for Houston

Here's some perspective on what this morning's death from swine-origin influenza means for Houston-area residents.

What happens when a patient presents at a hospital with flu-like symptoms?

With the threat of swine-origin influenza large hospitals like Memorial Hermann-Texas Medical Center have begun taking extra precautions. Once a nurse triages a patient suspected of having a fever or respiratory illness, the patient is immediately put in a private room that has negative pressure or has a special scrubber to keep air from recirculating into the hospital.

Nurses and physicians treating these patients also wear a good filter mask, gloves, gowns goggles, said Dr. Richard Bradley, chief of the Division of EMS and Disaster Medicine at the University of Texas Medical School at Houston.

Does the first U.S. death mean swine-origin influenza has escalated in the United States?

"We don't want anyone to freak out about this right now," Bradley said. "This is influenza, and influenza has been one of the things that we've dealt with for centuries. People need to take the simple precautions like washing hands, covering your cough, and staying home if you're sick.

"What we really want to do now is try and limit the spread of the disease."

Do we know yet whether the disease is progressing toward the pandemic stage?

"People should think about this like a hurricane in the lower part of the Gulf of Mexico," he said.

Sometimes such storms can be monstrous, and look pretty bad. But there's a good chance the storm will turn elsewhere whether than slam into Texas. Likewise, said Bradley, there's a reasonable chance that the current outbreak will cause some deaths and illnesses, but not become a pandemic.

The World Health Organization has currently classified the swine flu outbreak as a stage 4 illness, one step below a pandemic stage. To reach stage five, the illness would have to characterized by human-to-human spread of the virus into at least two countries on a fairly widespread scale.

If not panicking, what should people be doing?

"Even though there's a good chance it may not get worse, people need to be thinking about what they will do if it does get worse," Bradley said.

Schools in Comal County closed for two weeks after three suspected cases were found. Bradley said this suggests school administrators will have a low threshold of cases before taking significant steps to protect students.

In other words, parents with children in school or daycare should have plans if summer starts a few weeks early because of concerns about the outbreak.

When will we know whether this outbreak will truly become a pandemic?

We may not know for another week or 10 days. Bradley said pandemics typically follow a predictable course, if if this were to become pandemic the number of U.S. cases should double every two to three days.

If that happens, in a week or so, the CDC could be identifying thousands of new cases daily.

Is there any reason for hope this morning?

Yes. Some physicians are quick to note that historically outbreaks in the spring have burned out as April turns into May and summer comes on. There's no way to know for sure, but many doctors are cautiously optimistic that's what will happen with the current swine-origin influenza outbreak.

Cautious optimism on swine flu?

Today I spoke with several infectious disease physicians and researchers, and they all expressed cautious optimism that the swine flu outbreak we've been discussing may not reach pandemic proportions.
One of the reasons for their optimism is that despite stepped up surveillance efforts around the world, it does not yet appear as though the disease has begun spreading exponentially. It's far too early to say the swine flu outbreak will burn out, but it's OK at this point to have some optimism.

There's another good reason to believe the disease may begin burning out: Influenza is characterized by seasonal patterns, and it tends to go away in April or May, only to return in the fall and winter. There are lots of theories as to why this happens, but we really don't know why.

The last two virus outbreaks with pandemic potential, the spread of H5N1 avian influenza from 2004 to 2007 and SARS outbreak of 2003, have undergone this kind of fluctuation, which saw a rise of viral activity until mid-May, then declined dramatically through August, only to begin rising again in September.

"I'm cautiously optimistic that we will begin seeing a decline in swine flu cases in mid-May or in a couple of weeks," said C. Ed Hsu, director of Preventive Health Informatics and Spatial Analysis at the University of Texas Health Science Center.

The Spanish Flu also followed a similar course, with an early wave in the spring of 1918 before striking full force in the fall of 1918.

"That's what happened in 1918, the classic Spanish flu," said Dr. Herbert DuPont, director of the Center for Infectious Diseases at UT-Houston. "There's reason to believe this will happen again this time."

Any similarity to the 1918 pandemic may scare some people, but it actually may provide some reassurance.

That's because scientists and public health officials can now genetically identify the virus in circulation, and if they believe it will be a threat this fall they can incorporate it into the vaccine that will soon be developed for the 2009-2010 flu season. In other words, if this particular swine variant comes back in the winter, the new flu shot may protect against it.

Such biological weapons of mass protection weren't available in 1918, but they might save plenty of lives this year.

Live chat: An update on swine influenza

Please join me today for a live chat on swine flu at noon. I will have information on travel to Mexico, new cases as well as possible reasons for optimism.
Twittercast: Readers report on Houston’s severe weather

On my Twitter feed this morning ([@chronsciguy](https://twitter.com/chronsciguy)) I’ve been collecting reports from readers around the Houston area about last night’s unexpected, torrential rainfall over areas to the west of the city.

Below is a handful of the tweets I’ve received. Feel free to send me yours as I will update the list below throughout the morning.

**@fiveboyds**: Worst street flooding I have ever seen in Copperfield. Worse than Ike. Not in houses, though.

**@Aggiern95**: I am off of Richmond & beltway, where the water all the way up to the curb. It was very stormy through out the night.

**@pnutbtrjelee**: i was driving I-10 around Sealy/Columbus yesterday & the HEAVY rain was so sideways I wondered if I was driving near a tornado!

**@writeacher**: lots of rain, etc., in north-central Harris Cty, but no flooding, thankfully. (Between Tomball & Woodlands on your map.)

**@jkkendrick**: power outage for 4 hours, street flooding locally. 290 & 1960.
Flooding along Buffalo Bayou under the Waugh Dr. bridge Tuesday morning.

@**gabriellyn**: We live in Bear Creek. The intensity of the storm woke us up around 2:30. We witnessed sheets of rain - sideways.

@**gabriellyn** Our pool overflowed to the point where our patio was covered with about 3 inches of pool water. 1 more inch - in the house!

@**dsilverman** notes that Houston’s weather has become a **trending topic** on Twitter.

@**writeacher**: Willow Creek is up over its banks at Gosling and at Northcrest Dr. Spring Creek probably looks like the Euphrates at flood!

@**mclairfemrite**: Brays Bayou @ Chimney Rock/N Braeswood about 3-4 ft from top of banks. Husband said it was @ bottom of 288 bridge @ 7:00 am

@**bwmeier**: My mom lives in JV, flooded in Allison, etc. White Oak got close & flooded street, but not house, neighbors got hit, tho.

Posted by Eric Berger at 10:01 AM | Comments (2)

**Another intense rainfall event last night. Pattern to continue?**

Last night it was western Harris County’s turn.

Between 8 to 10 inches of rainfall have come down since midnight, *creating significant flooding problems* in areas such as Bear Creek where hundreds of homes have taken in water. Streets in subdivisions may have 3 to 5 feet of water. Some Katy homes have been flooded too. (Perhaps it’s time to put a moratorium on the Katy jokes, thanks.)

The storms seem to be winding down for now, but forecasters say there's likely another round coming this afternoon. The overnight totals, while preliminary, are impressive:
How bad might this afternoon’s storms get? The rainfall pattern over the last 10 days has been highly unpredictable, and in their forecast discussion this morning the pros at the National Weather Service are using phrases like, "not a textbook situation" and the storm has "taken on a life of its own."

I wrote a story a couple of years ago about the difficulties in predicting severe rainfall. From the story:

Forecasters rely largely on computer models.

"Models are good at telling us where the conditions are ripe for thunderstorms," said Bernard Meisner, the Fort Worth-based chief of science and training for the Southern Region of the National Weather Service. "But they're of little use in picking out where everything will come together in the atmosphere just right, or where a thunderstorm will stall and you'll get flooding."

The problem is that for our area, with a series of disturbances forecast to move across the region this week, atmospheric conditions will remain ripe for thunderstorms. During the last 10 days such conditions have generated torrential rainfall over parts of southeast Texas.

We can hope the trend doesn't continue this for the rest of this week, but I wouldn't bet against it.

UPDATE: Here’s a map showing the rainfall totals during the last 12 days. If a gauge is noticeably lower than surrounding ones, it probably means the gauge was inoperable at some point during the time period.

2nd UPDATE: The National Weather Service has issued a preliminary report on last night's intense rainfall, including totals for many parts of the greater Houston area. Jersey Village reports the highest total, with 10.13 inches.

April 27, 2009

Why swine flu scares public officials

One of the most common questions during today's live chat concerned the public health and media reaction to the swine flu outbreak. What, the readers asked, is the big deal with a virus that's infected just 40 Americans and made only one of them sick enough to require hospitalization?
It's a very good question.

The answer is a bit more complicated than one could address during a live chat so I thought I'd take a crack at it in a blog entry.

The influenza viruses we're most familiar with evolve from year to year and mutate all the time, a process known as **antigenic drift**. This drift, a gradual mutation in the genetics of a virus, causes the proteins on the surface of a virus to change, too. If these proteins change enough our immune systems may no longer recognize the flu virus. In years with enough antigenic drift a vaccine may no longer match its target.

However, there's another kind of change to viruses that concerns scientists even more: **antigenic shift**. During this process at least two different strains of a flu virus combine to form a new subtype. This can happen when two strains — say swine flu and predominantly human influenza — infect the same cell, replicate and assemble a brand new virus.

Here's a helpful graphic which shows how this process can occur.

The current virus in circulation has elements of human, swine, and avian viruses normally found in Europe or Asia, and it may have originated as a result of an antigenic shift. It is for this reason — we are dealing with an entirely new and unknown virus — that has elevated the level of concern for this outbreak.

It remains unclear how virulent the virus will ultimately be in humans, and the hope is that most people who become infected will not become terribly sick, and for those that do there remain ample supplies of antiviral drugs.

But those are far from certainties at this time, so rigorous vigilance and preparation are indeed warranted.
Swine flu in Harris County? What we know and what we don't

For a basic guide to swine flu, see here, and for updated information from the U.S. Centers for Disease Control and Prevention, see here. Below I've attempted to address some of the most important things we know, and do not know, about the illness.

WHAT WE KNOW

• The disease may have reached Harris County. There are rumors circulating in the Texas Medical Center this morning of a few suspected cases of swine flu in Harris County. Houston Health and Human Services spokeswoman Kathy Barton said, "We are in active surveillance mode. We have cases we are interested in, but we are only going to talk about confirmed cases." Confirmation may come later today.

• The U.S. Department of Health and Human Services has declared a "public health emergency," a designation that allows resources like a portion of the 50 million courses of antivirals in the Strategic National Stockpile to be prepositioned in states.

• Some of those antivirals are coming to Texas. Gov. Rick Perry has requested 850,000 doses, which would be added to the 840,000 courses of antiviral medicine the state bought in the year 2007. There remain just two confirmed cases in Texas, but there are eight additional suspected cases of swine flu.

• The disease is spreading globally after killing more than 100 people in Mexico. Health officials have confirmed the first case in Spain, and suspected cases are being investigated in the United Kingdom, Brazil, Israel and New Zealand. Mexico may be the origin for all of these cases.

• Despite words such as "epidemic" and "pandemic" being thrown around, the swine flu outbreak has not reach this level, at least not yet. Health officials also believe the world is better prepared now, than ever, to deal with such a threat. Nearly 150 countries claim to have contingency plans for just such an event.

• There are steps you can take to protect yourself and family. Personal hygiene such as hand washing is critical. If you cough, use proper cough and sneeze etiquette including throwing away your tissue when done with it. If you are sick, do not travel or work. These common-sense measures are the most important steps one can take.

• It is important to maintain perspective. The annual mortality due to regular influenza in the United States typically exceeds 40,000 people (see reference). Although no one knows how far the swine flu illness will
spread, nor how virulent it will become, so far the disease has killed no Americans. Therefore while this is a time for vigilence, it is not a time for panic.

WHAT WE DON'T KNOW

• Why is the virus more virulent in Mexico than here? Physicians suspect it may be that there have been many, many more cases in Mexico than elsewhere, and that of the thousands of cases there a small percentage have led to patients with severe symptoms. This remains the biggest unknown for health officials.

• How easily will this virus be spread? "Not all strains of influenza spread with the same ease," said Dr. Richard Bradley, chief of the Division of EMS and Disaster Medicine at The University of Texas Medical School at Houston. "Some spread easily and others require a little bit closer contact."

• How effective will antiviral medications such as Tamiflu be? "We're not really sure how effective antivirals will be in treating or preventing this strain of swine flu," Bradley said. When researchers put the swine flu strain in a culture dish, certain antiviral drugs stop it from growing. But it's not clear how effective the drugs will be against treating or preventing swine flu in the real world.

• How big is this going to get? "Are we going to have to implement some pretty strict control measures, like closing schools and business?" Bradley asked. In their modeling exercises, public health officials say in a severe pandemic, at the peak of an outbreak, 40 percent of people won't come to work. Imagine a world in which 40 percent of truck drivers or grocers don't come to work, Bradley said.

• Is Houston close to closing schools? Probably not yet, Bradley said. For one school to close there would probably need to be a cluster of cases in that school. For widespread closures there would need to be cases confirmed in multiple schools, and evidence of student-to-student transmission.

April 25, 2009

What is the fate of humanity?

That's the question put to theoretical physicist and science popularizer Michio Kaku by the Daily Beast, and here's his response:

We are in a race against time.

There are two trends in the world: one is for a type 1 civilization that controls the weather, earthquakes, volcanoes, and hurricanes. The other trend is for terrorism, chaos, hatred, and all those things. It's not clear which way we're going to go in the future.

I think it's going to be very close. On one hand we have nations that believe in prosperity, that believe in a science education, believe that tolerance is the way to go. We also have intolerance, the rise of bigotry (especially religious bigotry). We also have nuclear weapons.

In the old days, people used to duke it out on the battlefield. Nuclear weapons create a much more dangerous battlefield.

He seems quite close to declaring that the millennia of conflict between European civilizations and those of the Near East will soon come to a head as the Near East acquires nuclear weapons.

So who will win? Is this Our Final Hour? Although it's been closer before, The Doomsday Clock is now edging back toward midnight.

Personally, I'd sooner bet on an engineered virus wiping out the human population than nukes this century.

Putting last night's intense rainfall into perspective

The surprising rainfall last night in southeast Harris County and Galveston County, which caused a number of flash flooding events, pushed the area to historic rainfall totals during the last eight days.

Before the event forecasters expected less than 1 inch of precipitation from the storms, and it highlights the fact that one of modern forecasting's greatest challenges is accurately predicting severe rainfall.
Last night's intense rainfall event is all the more surprising because it essentially mirrored storms in the Clear Lake area last Saturday. During approximately two hours last night, according to the National Weather Service, the following amounts of rain fell:

- 7.05 inches near UH-Clear Lake
- 6.93 inches in Shoreacres
- 6.81 inches in Pearland
- 6.73 inches in Friendswood
- 5.15 inches in Baytown

By adding 4.72 inches to raise its total April rainfall to 13.19 inches, this month has become Hobby Airport's wettest April by far. Hobby has now received more than one-quarter of its normal annual rainfall total during just the last eight days.

The map below shows rain in the Houston metro area since Friday, April 17:

As you can see, the heaviest rainfall has come in the Clear Lake and League City areas, which have received about one-third of their annual rainfall totals during just the last eight days.

Further rainfall is possible today, forecasters say, but it's most likely to occur north of Houston rather than to the south again. Let's hope they're right. Southeast Harris County is waterlogged right about now.

April 24, 2009

You've got swine flu questions. We've got answers.

No, we're not all going to die from swine flu.

Yet while we're still at the surveillance stage and it's not a pandemic, there's reason for concern. And the spread of swine flu provides an important reminder it's always a good idea to practice good hygiene. The best practices you can take to protect yourself from any form of the flu are simple: cover your nose when you sneeze, wash your hands, etc. Now, onto the questions...

Q. What is swine flu?

A. According to the U.S. Centers for Disease Control and Prevention, swine influenza is a respiratory disease of pigs caused by type A influenza virus that regularly causes outbreaks of influenza in pigs. Swine flu viruses cause high levels of illness and low death rates in pigs. Swine influenza viruses may circulate among swine throughout the year, but most outbreaks occur during the late fall and winter months similar to outbreaks in humans. The classical swine flu virus (an influenza type A H1N1 virus) was first isolated from a pig in 1930.
Q. Can humans catch swine flu?
A. Swine flu viruses do not normally infect humans. However, sporadic human infections with swine flu have occurred. Most commonly, these cases occur in persons with direct exposure to pigs.

Q. Why is it in the news now?
A. Because as many as 60 people may have died from swine flu in Mexico. Mexico City closed schools across the metropolis Friday in hopes of containing the outbreak that has sickened more than 900.

Q. But it’s not a problem in the United States, is it?
A. Unfortunately, it may become one. The CDC has reported eight cases of swine flu in the United States, including two in Guadalupe County, near San Antonio, since March, and nine suspected cases. Contrast that with the period from December 2005 through February 2009, when there were a total of 12 human infections with swine influenza in the United States.

Q. Is the virus contagious?
A. Yes. According to the CDC there is evidence that swine flu is spreading from human to human. Clinicians in Texas are being urged to consider the possibility that patients who are in, or have traveled to San Antonio, who present with certain respiratory illnesses may be infected with Swine flu.

Q. What are the symptoms of swine flu?
A. Symptoms include fever and respiratory symptoms, such as cough and runny nose, and possibly other symptoms, such as body aches, nausea, or vomiting or diarrhea, should contact their health care provider. A health care provider will determine whether influenza testing is needed.

Q. Surely I can take a pill to zap the virus, right?
A. Similar to the treatment for influenza, four antiviral drugs are licensed for use in the United States on swine flu: amantadine, rimantadine, oseltamivir and zanamivir. While most swine flu viruses have been susceptible to all four drugs, the most recent seven swine flu viruses isolated from humans are resistant to amantadine and rimantadine. Right now, the CDC recommends oseltamivir or zanamivir for the treatment and/or prevention of infection with swine flu viruses.

Q. Is there a vaccine?
A. Not at this time.

For more information on swine Flu, click here.

Posted by Eric Berger at 03:06 PM | Comments (86)

Happy 19th Birthday to the Hubble Space Telescope

The Hubble Space Telescope turns 19 years old today. The following image is of a planetary nebula NGC 2818:
A description of the image:

The glowing gaseous shrouds in the nebula were shed by the central star after it ran out of fuel to sustain the nuclear reactions in its core. Our own sun will undergo a similar process, but not for another 5 billion years or so. Planetary nebulae fade gradually over tens of thousands of years. The hot, remnant stellar core of NGC 2818 will eventually cool off for billions of years as a white dwarf.

Planetary nebulae have been detected in several globular star clusters in our Galaxy. These densely-packed, gravitationally-bound groups of 100,000s to millions of stars are far older than their open cluster counterparts.

This Hubble image was taken in November 2008 with the Wide Field Planetary Camera 2. The colors in the image represent a range of emissions coming from the clouds of the nebula: red represents nitrogen, green represents hydrogen, and blue represents oxygen.

During the next month or so I will have extensive coverage of **STS-125**, the space shuttle mission to not only repair Hubble, but also to upgrade the instrument to collect data better than ever. The telescope originally had an expected lifetime of 10 to 15 years, but scientists say with the repairs it should now last until at least 2014.

**Question**: Has there been a scientific instrument in modern times as successful as the Hubble Space Telescope?

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April 23, 2009

**What’s Moo? Cow genome sequenced. Costs continue to plummet.**

Scientists at Baylor College of Medicine announced that the team they led has completed the bovine genome. ([See full story](#)). What amazed me while reporting the story was the continuing, dramatic fall in sequencing costs.

When they began the cow genome project six years ago they projected the cost at about $53 million. That seems astronomical today, when one could do a similar, though not quite as precise, job for about $100,000.

However, back when they started the cow genome, the human genome had just been completed for $3 billion.

Now, perhaps as soon as next year, a genome might cost only around $5,000. In short, the personal genome age is upon us. **Richard Gibbs**, director of Baylor’s Human Genome Sequencing Center, shared the following slides with me that show how costs have fallen since the beginning of the Human Genome Project.

The first lists some of the major sequencing projects, their dates, and costs.

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Project</th>
<th>Cost</th>
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<tbody>
<tr>
<td>1990–2003</td>
<td>Human Genome Project</td>
<td>$3,000,000,000</td>
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<tr>
<td>2000–2007</td>
<td>Mouse Genome</td>
<td>$250,000,000</td>
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<td>2002–2004</td>
<td>Rat Genome</td>
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<td>2003–2008</td>
<td>Bovine Genome</td>
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<td>2004–2006</td>
<td>Macaque Genome</td>
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<td>2007–2008</td>
<td>Baboon</td>
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<td>2006</td>
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<td>2007</td>
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<td>Deer Mouse</td>
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<tr>
<td>2009-10</td>
<td>Your Genome</td>
<td>&lt;$5,000</td>
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Richard Gibbs
And the following graphic shows a logarithmic plot of those costs over time.

The Cost of Sequencing a Human

![Graphic showing logarithmic plot of costs over time]

Richard Gibbs

If the trend continues, and it's easy to this this happening, the cost of sequencing your genome will be somewhere between $100 and $1,000 by the year 2012.

Medicine is about to change forever.

Posted by Eric Berger at 01:23 PM | Comments (12)

The lack of a NASA administrator now causing real harm

I'm at Johnson Space Center this morning for what should be a day of celebration for the space agency. This morning mission managers will discuss the STS-125 mission's plan to fix the Hubble Space Telescope, and this afternoon the crew will meet the media.

However, there's a definite undercurrent of unease. President Barack Obama has yet to name a new administrator to replace Mike Griffin, nor has he clearly elaborated his vision for the space agency's future.

That has left current employees and contractors to press ahead with their current plans to end shuttle flights in 2010, and the Constellation program to resume flying astronauts into space by 2015.

Yet the apparent indecision from Obama, which if nothing else suggests to NASA employees that they rate lower on the President's priorities than choosing a dog, is now causing some significant programmatic problems.

A recent memo from shuttle program manager John Shannon to shuttle managers and engineers, obtained by CBS News, indicated that if NASA is to stick to its plan to retire the shuttle next year it will need to begin shutting down critical components by this month's end.

In other words, managers need to be making the “hard decisions” that there will be just nine more flights and the shuttle program really must end in 2010. The lack of a new administrator precludes such clarity.

Then there are the swirling concerns about delays to the Constellation program, nicely outlined in this Orlando Sentinel story. Because of funding shortfalls NASA may have to delay its program to return to the moon by two years, and there's also concern about making the 2015 launch date to resume flying astronauts to the space station.

This would make a gap that's already five years even worse and further increase NASA's reliance on Russian launches.

We're at the point where the delay in naming a new administrator The Ares V vehicle faces at least a two-year delay has moved beyond being a political curiosity into the realm of
where it could be doing real and permanent harm to NASA.

And so while today is a day everyone at Johnson Space Center will celebrate, and everyone’s looking forward to the launch of STS-125 next month, most space buffs here in Clear Lake probably have an uneasy feeling in their stomachs.

**UPDATE:** Here are some comments made this morning by deputy space shuttle program manager LeRoy Cain on the effects of uncertainty on the space shuttle:

We're at a pivotal point. ... As we move forward in time it becomes more difficult from a funding standpoint because what we're doing is shaping the workforce and shaping the content of work for a completion of the shuttle mission in Sept. 2010. As we get closer and closer to the end it becomes more and more difficult, it requires more and more money to turn that around.

Since last Fall we have been asked through legislation to maintain the ability to continue and extend the shuttle through "Do Not Preclude" language through April of this year. We are coming to the end of that timeline.

In other words, April 30 looms as a very significant date.

April 22, 2009

**The obesity tax: Industry strikes back**

In a recent blog entry, I laid out the public health policy case for an obesity tax. In the comments of that entry, Kevin Keane, senior vice president of the **American Beverage Association**, responded.

I thought it only fair to re-publish that response as a counterpoint to the original blog entry. So here's the industry's argument against an "obesity tax" on sugary soft drinks.

Eric, there's some major flaws in the "case" for an obesity tax by these scientists.

First the data: regular soft drink sales have declined year over year throughout this decade including a 2.7 percent drop in 2008 -- obesity rates have risen for adults and children this decade though. So the CDC obesity data and Beverage Digest sales data show no causal relationship between regular soft drinks and obesity.

Secondly the science: the compendium of science shows that all calories count, regardless of the source. It's about calories consumed balanced with calories burned. This principle was again reinforced earlier this month in an NIH-funded study by Harvard scientists published in the New England Journal of Medicine.

So it's ridiculous to attribute one product as a unique or major cause to a problem as complex as obesity. Of course, it's a serious problem. We agree; and [www.ameribev.org](http://www.ameribev.org) will give you details on our policies and products that contribute to our part on this issue.

But to think an obesity tax is going to make a dent in the problem is fool-hardy and a distraction to the real solution: the hard work of teaching our kids how to balance the calories they consume with being physically active so they burn those calories off. Anything less, and the scales will remain tipped against our young people.

And you and your readers should know that Kelly Brownell is a longtime basher of our products and industry ... all the science he purports to conduct comes to the same conclusion. In fact, he makes his money and living off bashing food. It sells his books. It funds his job at the Rudd Center. It's how he eats.

Science is supposed to follow ALL the facts, not just the ones that support his predisposed biases. Please check out our blog, Sip & Savor, for more on Kelly and this issue. The bottom line: None of the data or balanced science support an obesity tax. And perhaps just as worrisome about such a tax is the feeding of a Nanny State that starts using taxes to tell people what they can eat or drink.

This is still America. Thanks for letting me respond to the question your blog posed.

So there you have it.

April 22, 2009

**Galveston's mayor heads to Cuba to talk hurricanes...**
As my colleague Harvey Rice reports today, Galveston mayor Lyda Ann Thomas is visiting Cuba to discuss hurricanes. From the story:

The four-day trip to Havana by Mayor Lyda Ann Thomas to exchange information with Cuban officials about hurricane preparedness was planned late last year, but it may take on added significance after signs last week that Cuba and the U.S. seek improved relations.

OK. Deep breath. Let me just say that I hope Galveston’s good mayor is doing a lot more listening than talking.

Let’s review the facts. It was clear 18 hours before Thomas called a mandatory evacuation that Galveston was likely to receive a significant surge from Hurricane Ike. Then, 12 hours before Thomas called an evacuation, it was clear that the island faced the worst case scenario: a hurricane striking just off its West End.

Here’s a comment from a story written at the time:

"Everybody is trying to act like this is a mistake, but what we are trying to do is the best for everyone," said Mary Jo Naschke, spokeswoman for the mayor.

Naschke said as late as Wednesday city officials were convinced that a mandatory evacuation would not be necessary because of Ike’s predicted path.

Wrong. Hurricanes are unpredictable. The only thing clear on the Wednesday before Ike struck is that Galveston faced a great risk from a storm capable of producing a surge greater than the island’s highest point of elevation.

The delayed evacuation order also prompted some businesses on the island to also delay their evacuations, which caused a lot of heartache for residents smart enough to leave but who could not get permission from their bosses.

If you know a hurricane forecaster, ask him or her what they thought about the island mayor’s decision. The forecasters I spoke with after Ike were mystified by her actions, but too polite to say anything publicly.

Contrast her actions with Cuba, which was struck with multiple major hurricanes last year and suffered few fatalities. There may be a lot of things Cuba does wrong, but hurricane preparation and evacuation is not one of them. They’re very good at it.

So I’m glad Thomas is going to Cuba. I hope she pays attention to what they have to say.

April 21, 2009

(The readers, sometimes they crack me up)

In the entry below regarding particle accelerators and terrestrial planet finders, Kris M. asks:

Concerning the Large Hadron Collider, don’t we have a collider in Houston? I think it’s called ALICE or something like that.

To which exdoublexx helpfully answered:

It’s called I-610.

It is indeed. Any way, in answer to the question, Houston does not have a collider. There is a collision detector at the Large Hadron Collider called ALICE, however. I may well be wrong about this, but I would guess that the largest particle accelerator in Houston is at M.D. Anderson’s Proton Therapy Center.

Anyway, I appreciate the efforts of readers to lighten things up around here.

The great international races: exoplanets and particles

At present there are two great competitions between American and European physicists and astronomers: the search for the Higgs boson, and the search for an Earth-like exoplanet.

In the latter contest, European astronomers announced this morning they have taken a step closer, finding an exoplanet of 1.9 Earth masses, making it the smallest exoplanet ever found.
Unfortunately the planet, Gliese 581 e, orbits its star every 3.15 days, making its surface incredibly hot and all but ensuring no life as we know it could exist there. The planet, however, probably is rocky like Earth, rather than gaseous like Jupiter.

The Holy Grail for scientists remains finding a planet with about the same mass as Earth, giving it an Earth-like gravity, in the habitable zone which is where water could exist on the surface as a liquid.

A big question is whether scientists using ground-based telescopes can find such a world before the first results start coming back from NASA’s recently launched Kepler mission, which should begin delivering results in a couple of years and almost certainly will find a host of Earth-like worlds.

The reverse is true with the search for the Higgs, a theoretical particle sought by particle physicists that underlies all mass in the universe. In this case time is against American scientists because the Europeans are getting close to powering up the Large Hadron Collider, a much more powerful instrument.

It’s worth noting that there are large, international collaborations on both sides of the Atlantic. So this is not the Cold War, to be sure, but you can bet that these battles are very real among the scientists, and there is an element of geographic pride.

April 20, 2009

The public policy case for an obesity tax

I’m going to guess there’s not a lot of support here for a tax on sugared beverages.

After all, a few months ago, New York Governor David Paterson had to back off a proposal to add an 18 percent tax on non-diet soda in the face of public, industry and legislative opposition. If New York objects to a tax, chances are pretty good that Texas will, as well.

Nevertheless, some health advocates are pushing ahead, and in a recent issue of the New England Journal of Medicine obesity expert Kelly Brownell and Dr. Thomas Frieden, New York City’s health commissioner make one of the most persuasive cases I have seen.

They’re calling for a penny-per-ounce tax on sugared beverages such as Coca Cola, or about 12 cents for that can you just purchased from a vending machine.

Here’s the essence of their case:

Sugar-sweetened beverages (soda sweetened with sugar, corn syrup, or other caloric sweeteners and other carbonated and uncarbonated drinks, such as sports and energy drinks) may be the single largest driver of the obesity epidemic.

A recent meta-analysis found that the intake of sugared beverages is associated with increased body weight, poor nutrition, and displacement of more healthful beverages; increasing consumption increases risk for obesity and diabetes; the strongest effects are seen in studies with the best methods (e.g., longitudinal and interventional vs. correlational studies); and interventional studies show that reduced intake of soft drinks improves health. Studies that do not support a relationship between consumption of sugared beverages and health outcomes tend to be conducted by authors supported by the beverage industry.

Sugared beverages are marketed extensively to children and adolescents, and in the mid-1990s, children's intake of sugared beverages surpassed that of milk. In the past decade, per capita intake of calories from sugar-sweetened beverages has increased by nearly 30%; beverages now account for 10 to 15% of the calories consumed by children and adolescents. For each extra can or glass of sugared beverage consumed per day, the likelihood of a child’s becoming obese increases by 60%.

I’m personally struck by the fact that kids today drink more sugar-sweetened beverages than milk. Parents? The article contains a graphic showing how the price of fruits and vegetables has risen relative to carbonated beverages since 1978.
The authors argue that proceeds from such a tax, an estimated $1.2 billion annually in the state of New York, could be used for education about obesity or to reduce the price of fruits and vegetables.

But is this the proper role for government, the authors ask?

Some argue that government should not interfere in the market and that products and prices will change as consumers demand more healthful food, but several considerations support government action. The first is externality -- costs to parties not directly involved in a transaction.

The contribution of unhealthful diets to health care costs is already high and is increasing -- an estimated $79 billion is spent annually for overweight and obesity alone -- and approximately half of these costs are paid by Medicare and Medicaid, at taxpayers' expense. Diet-related diseases also cost society in terms of decreased work productivity, increased absenteeism, poorer school performance, and reduced fitness on the part of military recruits, among other negative effects.

So, whaddya think? Bad policy? Good policy? Horrible policy?

What are the darkest nighttime skies you've ever seen?

Upon reading about Steve Clayworth's upcoming pilgrimage to the Texas Star Party I got to thinking about dark skies.

Steve's post brought out some great comments, and I was wondering if others would enjoy talking about the darkest skies they've ever seen.

When I was growing up I lived in rural areas of Michigan, so it was dark enough to make out the Milky Way Galaxy. That was always really cool.

But the darkest skies I've ever enjoyed came when my wife and I honeymooned in Kauai. One night I surprised my wife with a sunset dinner on the beach at Haena Park, where we lingered long after the sun set.

Haena Park sits at the isolated northern end of Kauai, a decent distance from any major town and more than 150 miles from Honolulu. The skies steadily darkened and as our eyes adapted to the dark we were treated to a marvelous stellar feast. No telescopes, just seeing the skies as our ancestors of long ago might have.
The area was so dark that we had trouble finding our way back to the car at the little parking lot near the beach. I'll never forget that night and I look forward to returning some day.

Your memories?

April 19, 2009

Rainfall totals from this week's "amazing" rain storm

**UPDATE:** Courtesy of n-g, here's an estimated precipitation map from the National Weather Service:

![Precipitation Map](image-url)

**ORIGINAL ENTRY:** Today the National Weather Service released preliminary estimates of rainfall totals on Friday and Saturday at some locations, compiled through official stations and volunteers. Forecasters described the event as "amazing."

Indeed, the event produced some Tropical Storm Allison-like rainfall rates, such as a Harris County Flood Control District gauge at Clear Creek and FM 528 (in Clear Lake) which recorded 6.02 inches in a single hour.

My wife was about 1 mile from there at the time, and got caught in the rainfall. (I'm happy to report that she heeded officials' advice and didn't drive into high water.)

Other locations also recorded exceptional rainfall rates. Clover Field in Pearland reported 1.33 inches of rain in 12 minutes, Hobby Airport reported 2.52 inches of rain in 35 minutes, and its 5.15 inches of rain marked the airport's fourth wettest day in April.
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Other locations reported one-day totals, such as Kingwood (3.32 inches, Saturday) League City (10.63 inches, Saturday), Bunker Hill Village (4.40 inches, Saturday), Wharton (5.83 inches, Saturday) and Bellville (6.19 inches, Friday).
Fortunately the area will now have a few beautiful days during which to dry out.

April 18, 2009

Today's weather probably a repeat of yesterday

Looks like another wet day is on tap.

The National Weather Service says to expect 1 to 3 inches of rainfall across the area, with isolated totals of 4 to 8 inches. The radar loop at 9:20 a.m. shows the storms now approaching the western edge of Harris County.

This should not be enough to produce substantial, widespread flooding in Harris County, but forecasters are concerned about a swath from Columbus to Conroe where up to 10 inches of rainfall has already come down during the two-day event.

You can check ongoing rainfall totals here, and most of Harris County has so far received less than 3 inches.

It's difficult to say when the heaviest rainfall will come today, but the quantitative precipitation forecasts suggest that the time period from about 1 p.m. to 7 p.m. presents the greatest threat. Here's the QPF for that time period today:

Forecasters say to expect a good chance of hail with today's heaviest storms, as well as a lesser chance of downbursts or even tornadoes.

In other words, it will probably be a lot like yesterday afternoon. The good news is that this time it will come to an end. Some time tonight these storms will clear out of here and we'll see the sun on Sunday.

April 17, 2009

How's that Saturday forecast looking?

5:30 p.m. UPDATE: As you may know, day one of the BP MS 150 has been canceled. If you're hoping to attend the iFest tomorrow night you might actually be in luck because there's a chance the showers will have moved on by then.

ORIGINAL ENTRY: Of all the days for lousy weather, Saturday is one of the lousiest. Besides the fact that it's one of the last weekends we can expect Spring-like weather, the following outdoor events are going on:
• iFest opens  
• The BP MS 150 begins  
• Hermann Park's Lake Plaza opens

So in light of this afternoon's deluges, what does it all mean for tomorrow's weather? Is there any reason to have a glimmer of hope? Well, maybe. But probably not.

The chance of rainfall on Saturday appears to be slightly lower (50 percent) tomorrow morning between sunrise and about noon, and then about 60 percent until sunset. So if you have outdoor activities tomorrow, morning might be best.

For the optimists, if you believe computerized rainfall forecasts, it appears the bulk of the rainfall may move east of the Houston area after sunrise tomorrow. So far the human forecasters don't seem to be buying this.

So what will happen? I think there's a decent chance that this afternoon's deluge will sap some of the atmosphere's energy, meaning the chances for widespread showers tomorrow will be lower.

Then there's the glass-half-empty outlook... (which really means, that if you leave your glass outside tomorrow, it will be more than half full by day's end)

Live coverage of today's severe weather
What's the theoretical limit of hurricane forecast accuracy?

As part of a story today about the hurricane center's record forecast accuracy last year, I delve into the question of a theoretical limit. That is, if we have perfect knowledge about position, atmospheric conditions and the physics of hurricanes, what is the ultimate limit on forecast accuracy due to chaos?

Not surprisingly, scientists aren't sure:

A study published a decade ago in Meteorology and Atmospheric Physics by Lance Leslie and others concluded the best forecast computers or humans could make was about 80 nautical miles for the average two-day forecast, and 120 nautical miles for the three-day forecast.

But modern hurricane center forecasts are now approaching these average errors, and last year the European computer model substantially surpassed these limits for the Atlantic basin.

"I am not sure we know what the limits are right now," said Fuqing Zhang, a professor of meteorology at Penn State University. "I think we will continue seeing improvements in track forecast, especially in extended range."

Here's the Leslie paper I refer to in the story.

The concept of a theoretical limit has significance for emergency planners. First they need to decide what forecast accuracy they need in forecasts before calling an evacuation. For example, if you know a storm's final landfall position within 100 miles, is that enough precision to call an evacuation?

If that's your target, then it's possible a four-day forecast may never be accurate within 100 miles due to chaos. Therefore, if you're building your plan, it had better be compressed into three days, or optimally even less.

Therefore I would submit that the biggest challenge for coastal emergency planners right now is to do everything they can to compress the main elements of their evacuation into the last 48 hours. Obviously that's a huge challenge for large metro areas like Houston.

But it should be the goal nonetheless.
April 16, 2009

What sci-fi invention do you want most?

While pondering the artificial intelligence blog entry this morning, Chronicle online guru Will Radcliffe asked, "If you could have flying cars, artificial intelligence or something else often described science fiction, what would it be?"

Good question, I said. Brainstorming, we came up with the following ideas:

• Faster-than-light travel
• Medical tricorders
• Farcasters
• Holodecks
• Laser guns
• Fembots
• Transporters
• X-wings

What's your preference, either from the list above or not? I'll share mine a bit later.

Dude, where's my artificial intelligence?

Most people wonder where the flying cars are. We were promised them, after all.

But along these lines, I would hazard that one of the second-most asked questions is: Where's the real artificial intelligence? I'm not talking about a brilliant, but single-minded computer like Deep Blue which can play chess really, really well.

Three or four decades ago AI researchers were making lots of promises about the potential for artificial intelligence, namely that a human-level artificial intelligence wasn't too far off. (Here's a taste of that optimism.)

Well, I've yet to meet a machine that outperforms humans in most or all intellectual tasks.

This disconnect isn't lost on artificial intelligence researchers, and during the last couple of years there's been an effort to infuse the newer generation of AI researchers with the grand goals of the field's pioneers in the 1950s and 1960s.

Researcher Ben Goertzel chaired a recent conference, AGI-09, which sought to plant the seeds for a return to the dream of human-level artificial intelligence. Afterward he authored this fine summary of the conference, which makes for interesting reading:

When I gave the introductory speech for the AGI conference this year, I began with the words: "I got into the AI field for one reason: I wanted to create thinking machines." Nearly everyone in the audience nodded their heads in empathy and agreement.

Most AI researchers start out in the field for precisely this reason, but they then experience strong pressure to orient their research efforts toward more specialized applied or theoretical issues. This pressure exists for a variety of reasons, but the biggest one is probably historical: AI researchers in the 1960s and 1970s made a lot of ambitious promises that they couldn't keep.

Human-level AI was always "a few years off," and eventually the world at large -- and even some members of the AI field -- stopped believing it would ever arrive. This skepticism propagated to funding sources, who became wary about supplying resources to anyone pursuing grand AI goals. But as I pointed out in my introductory talk, the world today is rather different from 30 years ago.

Our computer hardware is far better, our understanding of neuroscience and cognitive psychology is far better, and we have a huge array of newfangled reasoning, learning and data processing algorithms at our disposal. The time is ripe for a renewed attack on the problem of building a real thinking machine, an artificial general intelligence.

I wonder if words will become deeds...
April 15, 2009

**Why energy drinks work. (And it’s not the way you think.)**

Ok, let's begin this with a question: Why do energy drinks improve the performance of athletes, even if moderately? The sugar gives you a boost, right? (Wrong.) Must be the caffeine. (Nope.) The calories in the drink provide needed energy. (Uh-uh.)

A new study in the Journal of Physiology ([see abstract](#)) seeks to answer the question, and the answer is, well, pretty weird. Here's a summary of the results from a [news release](#) on the paper:

The researchers prepared drinks that contained either glucose (a sugar), maltodextrin (a tasteless carbohydrate) or neither, then carefully laced them with artificial sweeteners until they tasted identical. They asked endurance-trained athletes to complete a challenging time-trial, during which they rinsed their mouths with one of the three concoctions.

The results were striking. Athletes given the glucose or maltodextrin drinks outperformed those on 'disguised' water by 2-3% and sustained a higher average power output and pulse rate, even though didn't feel they were working any harder. The authors conclude that as-yet unidentified receptors in the mouth independent from the usual 'sweet' taste buds must be responsible. "Much of the benefit from carbohydrate in sports drinks is provided by signalling directly from mouth to brain rather than providing energy for the working muscles," explained Dr Chambers.

The team then used a neuro-imaging technique known as fMRI to monitor the athletes' brain activity shortly after giving them one of the three compounds. They found that both glucose and maltodextrin triggered specific areas of the brain associated with reward or pleasure, while the artificial sweetener did not. This acts to reduce the athletes' perception of their workload, suggest the authors, and hence enables them to sustain a higher average output.

The findings are intriguing because they support the idea that it is not your heart, lungs or muscles that limit athletic performance, but rather the brain itself. This supports the idea that there is a "central governor" in the brain ([see long-ish explanation](#)) that paces your muscles so they don't reach the state of exhaustion.

I'd be very interested to see a similar study done with steroids or similar performance-enhancing drugs, but alas this seems unlikely for obvious reasons.

The bottom line is that our minds and bodies still have many secrets they've yet to reveal to science.

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April 14, 2009

**LSU Hurricane scientist fired ... for being controversial?**

[NOLA.com reports](#) that [Ivor van Heerden](#), the scientist who led the state's independent investigation into Hurricane Katrina levee failures, will be fired next year. From the story:

Van Heerden, who is not a tenured professor, also has been stripped of his title as deputy director of the LSU Hurricane Center. Also, engineering professor Marc Levitan has stepped down as the center's director. University officials say they will reshape the center's research direction in the wake of the moves.

Van Heerden will remain director of the LSU Center for the Study of Public Health Impacts of Hurricanes, financed by a $3.65 million Louisiana Board of Regents Health Excellence Fund, until his LSU contract ends next year.

LSU officials have refused to address the van Heerden decision, citing the school's policy of not commenting about personnel matters.

"Legally, we're not allowed to comment on any kind of personnel action," said spokeswoman Kristine Calongne. "We're bound by confidentiality of our employees."

Van Heerden said the university would not give him a reason, either. David Constant, interim dean of LSU's College of Engineering, told him the decision "wasn't due to my performance. But he couldn't tell me why," van Heerden said.

Jeff Masters, of Weather Underground, has probably put his finger on precisely why this action is being taken
against Van Heerden when he writes.

It is no surprise that van Heerden has been fired, as he has also been very critical of the LSU administration. His May 2006 book, The Storm: What went wrong and why during Hurricane Katrina--the inside story from one Louisiana scientist, tells of a case in November 2005 after Katrina where two LSU assistant chancellors told him to stop talking to the press, because it was "hurting LSU's quest for federal funding across the board."

Jeff also notes that "less politics and better science would go a long ways towards reducing our vulnerability to hurricanes," and that in effect LSU has acted to silence a voice that's trying to cut through the politics on hurricanes and coastal policies. He's exactly right.

And this is a shame.

April 13, 2009

This summer: Extra hot, extra dry?

I don't have a whole lot of faith in seasonal weather outlooks, but I couldn't help passing along the following view of summer from the Commodity Weather Group.

The following map shows their temperature outlook for June through August, in Fahrenheit. They expect most of Texas to be at least 2 degrees above normal.

![Temperature Map](Commodity Weather Group)

Here's what forecaster Matt Rogers has to say about the summer outlook:

Like the last three summers, this upcoming one is expected to be cooler than its immediate predecessor nationally. Historically, achieving a sustained, hot Eastern summer is very difficult after a second winter of prevailing La Niña conditions. We examined various elements and angles to this summer outlook, and the answer of a close to seasonal or cooler than normal period consistently returned. Hot spots to watch are in the interior West and the dry sections of Texas. A majority of second-year La Niña summers aimed heat at Texas in August (most recently in 2000). My main worry is that parts of Texas will verify hotter than our current outlook.

I sure hope we don't get a repeat of the 2000 summer, which was quite dry and had a nearly-two week stretch in July when daily highs were 99 degrees or higher. Do not want.

This summer's precipitation outlook from the private forecasting service is similarly dry:
NOAA’s seasonal outlooks presently only run through June, so we don’t yet know what they’re forecasting for this summer. A hot, dry summer would only exacerbate an already terrible drought in Central Texas.

So at this time let’s take comfort in the knowledge that long-range forecasts are unreliable.

Could thorium power the United States into next century?

If you’re looking for an always-on, carbon-free, sustainable source of energy for which the reserves won’t run dry for more than a few centuries, there’s really only one choice.

Thorium.

According to a recent U.S. Geological Survey report on the abundance of thorium in the United States, thorium has the following advantages over conventional, uranium nuclear power:

1. Thorium is about three times more abundant in the Earth’s crust than uranium.

2. Many thorium deposits contain other mineral resources of value, such as rare earth elements.

3. The spent-fuel waste products of thorium fission are not the types used in nuclear weaponry (such as plutonium, a byproduct of uranium power generation).

4. The thorium-based spent fuels contain fewer radioactive elements and are smaller in volume and mass than conventional uranium-based nuclear wastes.

The report describes the various sources of thorium in the United States, the largest of which is the Lemhi Pass District in Montana and Idaho. And there finally is renewed political interest in thorium as an energy source for the United States, largely because India is moving forward aggressively as it has large thorium reserves.

One could imagine a world in which the United States spends five years developing thorium technology, a decade building pilot plants and making long-term plans for nuclear waste, and then five years building massive numbers of a single type of thorium power plant.

In two decades, then, much of our energy use could come from a home-grown source, would produce no carbon dioxide and we wouldn’t have to worry about cloudy or windless days.

The long-term alternatives to meeting world energy demands are: a) a miraculous breakthrough in solar energy, b) a miraculous development of a sense of conservation among developing nations, or c) increased reliance on coal and then oil shale.

I know environmentalists would prefer a) or b), but in a business-as-usual world by far the most likely outcome seems to be c).

April 11, 2009

Which computer model did best during '08 season?

Hail to the Europeans. Their model kicked tail last year when it came to forecasting Atlantic hurricanes.
is odd, of course, considering Europe isn't generally afflicted by hurricanes.

As part of their seasonal verification (see .pdf) the National Hurricane Center evaluates how every computer model handled each storm.

Below you'll find a table summarizing the dynamical models -- the ones to which forecasters pay the most attention -- and you can see that the European model was best at every forecast, from 24-hours out to 120-hours. Each number represents average error in nautical miles, so lower is better.

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OCD5 An early model shown for comparison  
GFDL NWS/Geophysical Fluid Dynamics Laboratory model  
HWRF NWS Hurricane Weather Research and Forecasting  
GFDN U.S. Navy version of GFDL  
EGRR United Kingdom Met Office (version of UKM)  
NGPS Navy Operational Global Prediction System  
GFSO NWS/Global Forecast System (formerly Aviation)  
EMX ECMWF (European) global model

You can find a similar table for 2007 here. What you'll notice is that the European model was not ever the best model last year, and often was among the worst.

I asked senior hurricane specialist Jack Beven at this week's National Hurricane Conference whether last year's performance of the European model will cause forecasters to pay more attention to it this year.

"We'll certainly be closely watching the ECMWF model this year to see if it maintains its good performance from last year. As I think I pointed out, there is considerable year-to-year variability in model performance, even amongst the high-quality models like the GFS and GFDL, and that we don't normally give any particular model more emphasis than the others. If the ECMWF model keeps a consistently high level of performance, we will add it to the core suite of models that we use the most in our forecasting."

The take-home message is that we should never focus on any single model, but rather view all of the models as a guide showing a range of possibilities.

April 10, 2009

**Hurricane center sets records for accuracy**

This week the National Hurricane Center released its verification report for the 2008 season, which is a fancy way of asking: How well did our forecasts and models perform? These reports provide a trove of information, and I'll discuss computer model performance in a subsequent post.

For now, upon reading the report, the first thing that jumped out to me is that the hurricane center set records across the board in its track forecasts, from the 1-day (24-hour) to 5-day forecasts.
In looking at the graphic above it's amazing to consider the fact that, since it first introduced 5-day track forecasts in 2001 the hurricane center has nearly halved its error, from 370 nautical miles to 190 nautical miles.

What's also notable is that the four-day forecast error has been dropped from about 280 nautical miles to about 160 nautical miles. The reason is that the computer models which track the large-scale atmospheric features guiding hurricanes have gotten better, and the hardware running them has improved dramatically.

These are significant drops, but they're not enough. This is because emergency planners begin making decisions about four days out, which is the time it takes to plan and execute a large-scale evacuation of a metro area as big as Houston.

Unfortunately there's not enough precision in modern forecasting to have any certainty with four-day forecasts.

"Critical decisions have to be made with less than 20 percent certainty," Bill Read, the National Hurricane Center director, said at the National Hurricane Conference this week.

Read said he spends a lot of time urging emergency planners to maximize public evacuation activities for inside of 36 hours to 48 hours when confidence in the forecast increases, and the chance of a hurricane impact exceeds 50 percent.

For large metro areas he acknowledges that's often not enough time for an evacuation. So the message for the hurricane center is: great job last year, now go back and do what you can to improve it for next year.

How can we improve science education in Texas?

Today I have a story on a key problem with science education, namely that standardized testing is forcing many teachers to teach science in a way that turns students off.

Across the land, students in science class diligently memorize human cell components like DNA, mitochondria and endoplasmic reticulum. They learn to rigidly order the natural world, from kingdom down to species.

And -- most disturbingly, say a growing number of scientists -- they learn to hate science.

Advocates cite many problems with science education, such as teachers lacking a science background. But perhaps the most critical issue, they say, is standardized testing that forces students to memorize and regurgitate.

"Students don't need to know what an endoplasmic reticulum is," said Bruce Alberts, editor of the journal Science and former president of the National Academies of Science, who has called for a
"revolution" in science education.

"Bad tests are forcing a trivialization of science education and drive most students away from science. Real science is exciting. It's completely different from these textbooks."

**TAKS testing** has demonstrable negative consequences, science teachers say:

One issue is the timing and subject matter of tests, said Michael Baldwin, a biology teacher at Hanna High School in Brownsville and president of the Science Teachers Association of Texas. The 11th-grade science test, which students must pass to graduate, covers a disparate amount of material, from biology to Earth sciences. Yet students often are taking physics during that year.

"So maybe a month before the test, or even as early as December, instead of teaching physics class, the teachers are reviewing biology and chemistry," Baldwin said. "It puts huge pressure on teachers to abandon their curriculum. The students pass the TAKS test, but then don't have enough physics for a proper foundation in college."

I am thinking about using the collective concern and resources of this blog's community of readers to generate ideas to address these issues, and then possibly drafting a collectively written opinion piece on the issue.

Please be thinking about the issue, and alert friends and colleagues on the subject, as we'll take it up next week.

**April 09, 2009**

**Blame misplaced for Ike forecast and evacuation**

So, you say, that track forecast for Hurricane Ike sure was lousy.

Apparently Bill Read, director of the National Hurricane Center, has heard it, because at the National Hurricane Conference this week he went out of his way to talk about the accuracy of Ike's forecast.

For the 96-hour forecast -- that is, four days before landfall -- the hurricane center's average error in nautical miles during the last five years has been 202 miles. For Ike, the hurricane center was off by 150 miles. The hurricane center did even better as the storm neared land:

**72-hour forecast**: avg. error 150 miles (Ike: 70 miles)

**48-hour forecast**: avg. error 99 miles (Ike: 35 miles)

"Everyone who talked to me after it thought it was a bad forecast," Read said. "Even a good forecast at 96 hours is perceived as bad, but within the science the forecast was actually pretty good."

I believe part of the confusion came from the decision by Galveston's Mayor Lyda Ann Thomas to delay a mandatory evacuation for the low-lying island.

The three-day forecast released Wednesday at 4 p.m. was plain enough even though the storm didn't come ashore over Galveston Island. It's arguable that this track would have been more devastating than Ike's eventual track over Galveston's East End.
Then, the **10 p.m. forecast** on Wednesday night showed the absolute worst-case scenario for Galveston. I **covered this** on the blog at the time.

And still Thomas **waited another 12 hours** before finally calling for a mandatory evacuation on Thursday morning.

This doesn't all need to fall upon Thomas, either. I plainly recall listening to a state conference call of emergency managers at 10 p.m. Wednesday night as the forecast was coming out. They were all chattering about Matagorda County and points south along the Texas coast.

At the time it was plain that Ike's major threat was going to come from storm surge, and everyone should know that the storm surge is worst well to the right of a hurricane's eye.

I'm not sure who was giving Thomas advice during the hurricane, but she needs to realize that a storm coming in right over Galveston Island is not close to being the worst thing for the island. It was obvious nearly a full day before the evacuation that the island was going to get slammed.

Instead of recognizing this, people seem to be blaming the National Hurricane Center for a bad forecast. That's a mistake. They gave out pretty good information. It appears to have been misinterpreted by some.

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**Some of you may want to check out today's editorial page**

For the first time, instead of excerpting editorials from other papers, the Chronicle **editorial board** chose responses from a blog entry and re-printed them in the same format.

Naturally they turned to the erudite readers of this blog to begin the experiment, and they chose the entry on the **Ike Dike**.

You can find the digital version of the excerpted "editorial" **right here**, which also appears in Thursday's paper.

This is a cool opportunity to have your voice heard on particular issues and I look forward to doing it again.

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**April 08, 2009**

**Half of recent arctic warming may not be due to greenhouse gases**

According to a new report, half of the recent Arctic warming is not due to greenhouse gases, but rather clean air policies.

That's the conclusion of two scientists in a new *Nature Geoscience* paper (**see abstract**), which is more deeply
Here’s a quote from lead author Drew Shindell of the NASA Goddard Institute for Space Studies:

"There’s a tendency to think of aerosols as small players, but they’re not," said Shindell. "Right now, in the mid-latitudes of the Northern Hemisphere and in the Arctic, the impact of aerosols is just as strong as that of the greenhouse gases."

"We will have very little leverage over climate in the next couple of decades if we’re just looking at carbon dioxide," Shindell said. "If we want to try to stop the Arctic summer sea ice from melting completely over the next few decades, we’re much better off looking at aerosols and ozone."

The following graphic shows how clean air regulations passed in the 1970s have likely accelerated warming by diminishing the cooling effect of sulfates:

I probably don’t need to tell you the implications of this study. For one, if the results are validated, the notion that global warming is causing an accelerating, headlong retreat of the Arctic sea ice and driving the polar bear to imminent death ... well, these notions just aren’t wholly correct anymore.

The study suggests that as much as half of the recent Arctic melting is not due to global warming, but rather to other factors. This report does not speak to global temperatures, but rather the Northern Hemisphere. And it does not suggest that global warming has played no role in the Arctic warming.

All the same, this is potentially a huge blow to those who advocate immediate action on controlling carbon dioxide.

Finally, for those of you who hate James Hansen: Please note that the author of this study works for Hansen.

The Ike Dike: A critical juncture in our coastal future

In today’s paper I have a story on a proposal by Texas A&M-Galveston’s William Merrell. He wants to build a massive system of seawalls and gates to protect the upper Texas coast from San Luis Pass to High Island from a 17-foot storm surge.

Here are the key components of Merrell’s "Ike Dike":

- Extension of the existing Galveston Seawall out to San Luis Pass (18 miles)
- Addition of a seawall on Bolivar Peninsula from Bolivar roads to High Island (35 miles)
- Construction of inland "wrap-arounds" or extensions to the Dike at both ends
- Construction of floodgates at Galveston Bay Entrance, San Luis Pass, and on the Intracoastal Waterway
I'm told this project (which would cost at least $2 billion and likely much more) has received serious consideration at the state level and that it will be part of a discussion going forward on how to manage flooding risks from hurricanes along the Texas coast.

What really intrigues me is what this project means. On one hand, it would be an incredible legacy to leave future residents. We could cut back evacuations from hurricanes significantly with such protections and save property from homes to billion-dollar refineries built along the Houston Ship Channel.

On the other hand, what kind of statement would such a project make, environmentally speaking? Building such a dike would essentially say that Texas is going to develop its coasts without regard to nature. The alternative is to step back, buy out at-risk properties along the coast, and build up reserves like those at McFaddin refuge which offer a natural buffer against hurricanes.

Thus the debate over how Texas will respond to Ike may come down to a choice for residents:

Do they favor protection and development that comes at a price of open beaches and ever dwindling natural reserves -- the Ike Dike? Or is there an appetite to pull back from the rampant upper Texas coast development that began long before Ike came crashing ashore, and return to nature?

Where are you on the issue?

Posted by Eric Berger at 07:36 AM | Comments (56)
An article in Discovery News quotes the study’s lead author, Craig Grimes:

"Right now there is lots of talk about burying carbon dioxide, which is ridiculous," said Craig Grimes of Penn State, who, along with Oommen Varghese, Maggie Paulose and Thomas LaTempa, co-authored a paper on the nanotubes in the journal Nano Letters. "Instead we can collect the waste out of the smoke stack, put it though a converter, and presto, use sunlight to change [CO2] back into fuel."

The nanotubes are arranged vertically, almost like empty honeycomb. Over the top of the nanotubes sits a thin, reddish-brown layer of copper oxide. Both the copper and titanium oxide act as catalysts, speeding up reactions that take place naturally.

When sunlight hits the copper oxide, carbon dioxide is converted into carbon monoxide. When sunlight hits the titanium oxide, water molecules split apart. The hydrogen freed from the water and the carbon freed from CO2 then recombine to create burnable methane, and the spare oxygen atoms pair up to create breathable oxygen.

According to the research paper, the materials Grimes and his colleagues tested in outdoor sunlight converted carbon dioxide to hydrocarbons at a rate 20 times greater than previously published reports.

Can we find NASA an administrator already, please?

Oh sure, the economy's imploding and President Obama has a lot of other matters on his plate right now. But the world's premiere space agency is a pretty big deal, and if perception is reality, the president seems content right now to let NASA dangle in the wind.

The Washington Post's Joel Achenbach has a nice piece summarizing the space agency's angst, anxiety and problems as it awaits a new administrator and, quite possibly, a new mission:

The White House declines to speak on the matter. NASA press officers and department heads say they do not have a clue when there will be someone new in charge. But the space community says Obama needs to nominate an administrator and a deputy administrator soon, because NASA faces tough decisions on big-ticket items -- space shuttles, moon rockets -- and needs political appointees on the ninth floor at headquarters.

NASA officials are hypersensitive to whatever the Obama administration might say about the agency's strategic direction. The president's initial budget moves seemed to affirm the status quo in a general sense, explicitly endorsing the goal of putting astronauts back on the moon circa 2020. But the budget did not say how that should be accomplished.

Then Obama fogged up the picture during a visit to Central Florida. The president said in an interview, "I think it's fair to say that there's been a sense of drift to our space program over the last several years."

Why the silence? Why the mystery?

It's clear Obama is unhappy with NASA's plan to rely on Russian support for five (or maybe even six) years while awaiting results from its work-in-progress Constellation program. He also just doesn't seem all that interested in space.

These are hard times for folks at Johnson Space Center. They support manned spaceflight. But the shuttle program is coming to an end in a couple of years and the new boss may not support a robust manned spaceflight program in the future. That's bad for Houston.

Perhaps even worse right now, NASA doesn't even have a new boss and the uncertainty over the future is palpable and damaging. The message to NASA from the President, whether intentional or not, is pretty much: "You're not a high priority."
April 06, 2009

Must-see photo of space shuttle Atlantis at launch pad

Space shuttle Atlantis has **reached the launch pad** at Kennedy Space Center in preparation for its upcoming mission to service the Hubble Space Telescope.

The following photo shows the spaceship in all of its glory:

OK ... did you really think that was Atlantis? It's actually a photo of a space shuttle reproduction made of 65,000 Legos by two Japanese men who each spent nearly 800 hours on the project. I can't even begin to figure out how much that many Legos would cost.

Found via **kirainet, Yahoo Japan** and **geekologie**.

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If you can stomach it, eat your broccoli

Oh, just great. There are two more new studies out this morning that praise the medicinal power of broccoli. Which I loathe. And probably haven't eaten for two decades without choking.

**Three-day-old broccoli sprouts suppress H. pylori infections in men and women**
This is the first study to show an effect of broccoli in humans on the bacterial infection that leads to stomach cancer. In this study, researchers enrolled 48 Helicobacter-infected Japanese men and women and randomly assigned them to eat 70 grams of fresh broccoli sprouts daily for eight weeks or an equivalent amount of alfalfa sprouts.

"Broccoli has recently entered the public awareness as a preventive dietary agent. This study supports the emerging evidence that broccoli sprouts may be able to prevent cancer in humans, not just in lab animals," said Jed Fahey, Sc.D., a faculty research associate in the Department of Pharmacology at Johns Hopkins School of Medicine.

Researchers assessed the severity of H. pylori infection at enrollment, and again at four and eight weeks using standard breath, serum and stool tests. H. pylori levels were significantly lower at eight weeks on all three measures among those patients who had eaten broccoli sprouts, while they remained the same for patients who had eaten alfalfa sprouts.

Broccoli sprouts protect against gastritis, ulcers and perhaps even stomach cancers

In the new report, the team also shows that when H. pylori-infected mice sipped broccoli-sprout smoothies for eight weeks, there was up to a fourfold increase in the activity of two of these key enzymes that protect cells against oxidative damage.

In addition, the number of Helicobacter bacteria in the mice's stomachs decreased by almost a hundredfold it did not change in infected control animals that drank plain water. The researchers also noted a greater than 50 percent reduction in inflammation of the primary target of this bacterium - the body of the stomach - in treated mice but not in controls.

Despite the health benefits, I don't think you'll find me drinking a broccoli smoothie anytime soon.

April 01, 2009

Hey folks, taking a break ...

As I like to do a couple of times a year, I'm going to unplug for a few days and enjoy some time with the wife and kids. I'll pop in once or twice a day to approve comments, but don't look for new posts until at least Sunday-ish.

Thanks for your patience while I recharge the batteries ...

Posted by Eric Berger at 06:48 AM | Comments (35)

April 01, 2009

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Posted by Eric Berger at 07:30 AM | Comments (9)