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# HPS Newsletter

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## Antibiotic Superbugs CRKP & MRSA: Who's at Risk?

By Lisa Collier Cook  
Apr 07, 2011



Misuse of antibiotics has led to a global health threat: the rise of dangerous—or even fatal—superbugs. *Methicillin-resistant staphylococcus aureus* (MRSA) is now attacking both patients in hospitals and also in the community and a deadly new multi-drug resistant bacterium called carbapenem-resistant *Klebsiella pneumoniae*, or CRKP, is now in the headlines.

Unless steps are taken to address this crisis, the cures doctors have counted on to battle bacteria will soon be useless. CRKP has now been reported in 36 U.S. states—and health officials suspect that CRKP may also be triggering infections in the other 14 states where reporting isn't required. High rates have been found in long-term care facilities in Los Angeles County, where the superbug was previously believed to be rare, according to a study presented earlier this month. CRKP is even scarier than MRSA because the new superbug is resistant to almost all antibiotics, while a few types of antibiotics still work on MRSA. Who's at risk for superbugs—and what can you do to protect yourself and family members? Here's a guide to these dangerous bacteria.

*Understanding different types of bacteria.*

**What is antibiotic resistance?** Almost every type of bacteria has evolved and mutated to become less and less responsive to common

antibiotics, largely due to overuse of these medications. Because superbugs are resistant to these drugs, they can quickly spread in hospitals and the community, causing infections that are hard or even impossible to cure. Doctors are forced to turn to more expensive and sometimes more toxic drugs of last resort. The problem is that every time antibiotics are used, some bacteria survive, giving rise to dangerous new strains like MRSA and CRKP, the CDC reports.

**What are CRKP and MRSA?** *Klebsiella* is a common type of gram-negative bacteria that are found in our intestines. The CRKP strain is resistant to almost all antibiotics, including carbapenems, the so-called "antibiotics of last resort."

MRSA is a type of bacteria that live on the skin and can burrow deep into the body if someone has cuts or wounds, including those from surgery.

**Who is at risk?** CRKP and MRSA infect patients, usually the elderly—who are already ill and living in long-term healthcare facilities, such as nursing homes. People who are on ventilators, require IVs, or have undergone prolonged treatment with certain antibiotics face the greatest threat of CRKP infection. Healthy people are at very low risk for CRKP. There are two types of MRSA, a form that affects hospital patients with similar risk factors to CRKP, and another even more frightening strain found in communities, attacking people of all ages who have not been in medical facilities, including athletes, weekend warriors who use locker rooms, kids in daycare centers, soldiers, and people who get tattoos. Nearly 500,000 people a year are hospitalized with MRSA.

Keeping hospital patients safe.

**How likely is it to be fatal?** In earlier outbreaks, 35% of CRKP-infected patients died, Journal of the American Medical Association (JAMA) reported in 2008. The death rate among those affected by the current outbreak isn't yet known. About 19,000 deaths a year are linked to MRSA in the U.S. and the rates of the disease has rise 10-fold, with most infections found in the community.

**How does it spread?** Both MRSA and CRKP are mainly transmitted by person-to-person contact, such as the infected hands of a healthcare provider. They can enter the lungs through a ventilator, causing pneumonia, the bloodstream through an IV catheter, causing bloodstream infection (sepsis), or the urinary tract through a catheter, causing a urinary tract infection. Both can also cause surgical wounds to become infected. MRSA can also be spread by contact with infected items, such as sharing razors, clothing, and sports equipment. These superbugs are not spread through the air.

**What are the symptoms?** Since CRKP presents itself as a variety of illnesses, most commonly pneumonia, meningitis, urinary tract infections, wound (or surgical site) infections, and blood infections, symptoms reflect those illnesses, most often pneumonia. MRSA typically causes boils and abscesses that resemble infected bug bites, but can also present as pneumonia or flu-like symptoms.

**How are superbugs related?** The only drug that still works against the CRKP is colistin, a toxic antibiotic that can damage the kidneys. Several drugs, such as vancomycin, may still work against MRSA.

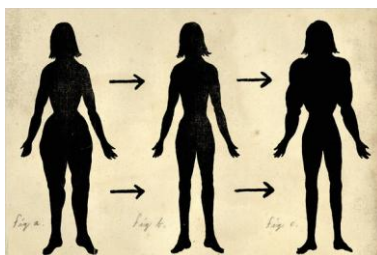
**What's the best protection against superbugs?** Healthcare providers are prescribing fewer antibiotics, to help prevent CRKP, MRSA and other superbugs from developing resistance to even more antibiotics. The best way to stop bacteria from spreading is simple hygiene. If



someone you know is in a nursing home or hospital, make sure doctors and staff wash their hands *in front of you*. Also wash your own hands frequently, with soap and water or an alcohol-based hand sanitizer, avoid sharing personal items, and shower after using gym equipment. The CDC has reports on *Klebsiella* bacteria and MRSA, discussing how to prevent their spread and has just issued a new report on preventing bloodstream infections.

### With Liposuction, the Belly Finds What the Thighs Lose

By Gina Kolata  
The New York Times



The woman's hips bulged in unsightly saddlebags. Then she had liposuction and, presto, those photo after photo on plastic surgery Web sites make liposuction look easy, the results transformative. Liposuction has become the most popular plastic surgery, with more than 450,000 operations a year, each costing a few thousand dollars.

But does the fat come back? And if it does, where does it show up?

Until now, no one knew for sure. But a new study, led by Drs. Teri L. Hernandez and Robert H. Eckel of the University of Colorado, has answered those questions. And what was found is not good news.

In the study, the researchers randomly assigned non-obese women to have liposuction on their protuberant thighs and lower abdomen or to refrain from having the procedure, serving as controls. As compensation, the women who were control subjects were told that when the study was over, after they learned the results, they could get liposuction if they still wanted it. For them, the price would also be reduced from the going rate.

The result, published in the latest issue of *Obesity*, **was that fat came back after it was**

**suctioned out.** It took a year, but it all returned. But it did not reappear in the women's thighs. Instead, Dr. Eckel said, "it was redistributed upstairs," mostly in the upper abdomen, but also around the shoulders and triceps of the arms.

Dr. Felmont Eaves III, a plastic surgeon in Charlotte, N.C., and president of the American Society for Aesthetic Plastic Surgery, said the study was "very well done," and the results were surprising. He said he would mention it to his patients in the context of other information on liposuction.

The finding raises many questions about plastic surgery. Liposuction has been around since 1974 and is heavily advertised. Why did it take so long for anyone to do this study?

Maybe it's because such a study is very difficult, said Dr. Samuel Klein, director of the Center for Human Nutrition at the Washington University School of Medicine. It takes a team of researchers and money. Fat must be measured precisely, with scans.

And surgery, said Jonathan Moreno, an ethicist at the University of Pennsylvania who has studied the field, is not like other areas of medicine. "A lot of it has to do with the culture of surgery, which is literally hands-on," he said. Surgeons, he added, often feel a deep connection to their patients that makes it difficult for them to agree to clinical trials that involve randomizing patients. Another problem, Dr. Moreno said, is that different surgeons have different skills and different techniques. Surgery is not like taking a drug, where one pill is just like every other.

So instead of doing rigorous studies, surgeons tend to innovate, inventing their own procedures and publishing anecdotes about patients, a practice that can be misleading.

But in this case, the outcome did not depend on the surgeon. It depended on the biology of fat; and obesity researchers say they are not surprised that the women's fat came back. The body, they say "defends" its fat. If you lose weight, even by dieting, it comes back. And, the study showed, if you suck

out the fat with liposuction, even if it's only a pound, as it was for subjects in the study, it still comes back.

"It's another chapter in the 'You can't fool Mother Nature' story," said Dr. Rudolph Leibel, an obesity researcher at Columbia University.

Some researchers have their own anecdotes. Dr. George Bray, a professor of medicine at Louisiana State University, once saw a young woman who was so distraught by her protruding abdomen that she had an operation to slice off some of her abdominal fat. "Her lower abdomen was considerably thinner," Dr. Bray said. "But the areas above it picked up the extra fat."

Then there are the studies with laboratory rodents that had fat surgically removed. The fat always came back. And, like the women in the new study, the rodents got their fat back in places other than the place where it was removed, Dr. Klein reported. They grow new fat cells to replace the ones that were lost.

The same thing happened to the women who had liposuction. It turns out, Dr. Leibel said, that the body controls the number of its fat cells as carefully as it controls the amount of its fat. Fat cells die and new ones are born throughout life. Scientists have found that fat cells live for only about seven years and that every time a fat cell dies, another is formed to take its place.

But why wouldn't the women grow new fat cells in their thighs? The answer, Dr. Klein said, may be that liposuction violently destroys the fishnet structure under the skin where fat cells live.

Nonetheless, the women in the study who had liposuction were happy, Dr. Eckel said. They had hated their hips and thighs and just wanted that fat gone.

As for the women in the control group, when the study ended and they knew the results, more than half still chose to have liposuction.

## 20 Worst Drinks in America

By: *Mens Health Magazine*  
[www.menshealth.com](http://www.menshealth.com)

Over the past 50 years or so, we Americans have developed a severe drinking problem.

We stopped making our own iced teas and lemonades (recipe: water, lemon, sugar) and started buying them in bottles or mixes, with ingredients like "high-fructose corn syrup" and "ascorbic acid" on the labels. We stopped thinking of a soda as a treat - akin to an ice cream or a candy bar - and started seeing it as the equivalent of a glass of water, drinking two, three, four, or more a day. Then we stopped drinking water out of the tap and started demanding that it be artificially flavored and put into bottles with the words "vitamin" or "energy" stamped on the labels. And, in just the last decade or so, many of us stopped brewing our own coffee and started buying things with vaguely European names, like "mocha latte." And the result of all this beverage evolution is that, today, walking into a convenience store or a beverage distributorship has become dangerous to our health.

### 20. Worst Water

**Snapple Agave Melon Antioxidant Water**  
(1 bottle, 20 fl oz)

150 calories, 0 g fat, 33 g sugars

Sugar Equivalent: 2 Good Humor Chocolate Éclair Bars



While "Worst Water" may sound like an oxymoron, the devious minds in the bottled beverage industry have even found a way to besmirch the sterling reputation of the world's most essential compound. Sure, you may get a few extra vitamins, but ultimately, you're paying a premium price for gussied-up sugar water.

### 19. Worst Bottled Tea

**SoBe Green Tea**  
(1 bottle, 20 fl oz)

240 calories, 0 g fat, 61 g sugars

Sugar Equivalent: 4 slices Sara Lee Cherry Pie



Leave it to SoBe to take an otherwise healthy bottle of tea and inject it with enough sugar to turn it into dessert. The Pepsi-owned company's flagship line, composed of 11 flavors with names like "Nirvana" and "Cranberry Grapefruit Elixir," is marketed to give consumers the impression that it can cleanse the body, mind, and spirit.

### 18. Worst Energy Drink

**Rockstar Energy Drink**

(1 can, 16 fl oz)

280 calories, 0 g fat, 62 g sugars

Sugar Equivalent: 6 Krispy Kreme Original Glazed Doughnuts



None of the energy provided by these full-sugar drinks could ever justify the caloric load, but Rockstar's take is especially frightening. One can provides nearly as much sugar as half a box of Nilla Wafers. In fact, it has 60 more calories than the same amount of Red Bull and 80 more than a can of Monster.

### 17. Worst Bottled Coffee

**Starbucks Vanilla Frappuccino**

(1 bottle, 13.7 fl oz)

290 calories, 4.5 g fat (2.5 g saturated), 45 g sugars

Sugar Equivalent: 32 Nilla Wafers



With an unreasonable number of calorie landmines peppered across Starbucks' in-store menu, you'd think the company would want to use its grocery line to restore faith in its ability to provide caffeine without testing the limits of your belt buckle. Guess not. This drink has been on our radar for years, and we still haven't managed to find a bottled coffee with more sugar.

### 16. Worst Soda

**Sunkist**

(1 bottle, 20 fl oz)

320 calories, 0 g fat, 84 g sugars

Sugar Equivalent: 6 Breyers Oreo Ice Cream Sandwiches



Wait . . . but aren't all sodas equally terrible? It's true they all earn 100% of calories from sugar, but that doesn't mean there aren't still varying levels of atrocity. Despite the perception of healthfulness, fruity sodas tend to carry more sugar than their cola counterparts, and none make that more apparent than the tooth-achingly sweet Sunkist. But what seals the orange soda's fate on our list of worsts is its reliance on the artificial colors yellow 6 and red 40—two chemicals that may be linked to behavioral and concentration problems in children.

### 15. Worst Beer

**Sierra Nevada Bigfoot**  
(1 bottle, 12 fl oz)

330 calories, 0 g fat, 32.1 g carbohydrates, 9.6% alcohol

Carbohydrate Equivalent: 12-pack of Michelob Ultra



Most beers carry fewer than 175 calories, but even your average extra-heady brew rarely eclipses 250. That makes Sierra's Bigfoot the undisputed beast of the beer jungle. Granted, the alcohol itself provides most of the calories, but it's the extra heft of carbohydrates that helps stuff nearly 2,000 calories into each six-pack. For comparison, Budweiser has 10.6 grams of carbs, Blue Moon has 13, and Guinness Draught has 10.

#### 14. Worst Kids' Drink Tropicana Tropical Fruit Fury Twister (1 bottle, 20 fl oz)



**340 calories, 0 g fat, 60 g sugars**  
Sugar Equivalent: Two 7-ounce  
canisters Reddi-Wip

Don't let Tropicana's reputation for unadulterated OJ lead you to believe that the company is capable of doing no wrong. As a Pepsi subsidiary, it's inevitable that they'll occasionally delve into soda-like territory. The Twister line is just that: a drink with 10% juice and 90% sugar laced with a glut of artificial flavors and coloring. You could actually save 200 calories by choosing a can of Pepsi instead.

#### 13. Worst Functional Beverage

Arizona Rx Energy  
(1 can, 23 fl oz)



**345 calories, 0 g fat, 83 g  
sugars**

Sugar Equivalent: 6 Cinnamon Roll  
Pop-Tarts

Obviously Arizona took great pains in making sure this can came out looking like something you'd find in a pharmacy. But if your pharmacist ever tries to sell you this much sugar, he should have his license revoked. And if it's energy you're after, this isn't your best vehicle. Caffeine is the only compound in the bottle that's been proven to provide energy, and the amount found within is about what you'd get from a weak cup of coffee.

#### 12. Worst Juice Imposter

Arizona Kiwi  
Strawberry  
(1 can, 23 fl oz)



**345 calories, 0 g fat, 81 g sugars**  
Sugar Equivalent: 7 bowls of  
Froot Loops

The twisted minds at the Arizona factory outdid themselves with this nefarious concoction, a can the size of a bazooka loaded with enough of the sweet stuff to blast your belly with 42 sugar cubes. The most disturbing part isn't that it masks itself as some sort of healthy juice product (after all, hundreds of products

are guilty of the same crime), but that this behemoth serving size costs just \$.99, making its contents some of the cheapest calories we've ever stumbled across.

#### 11. Worst Espresso Drink Starbucks Peppermint White Chocolate Mocha with Whipped Cream (venti, 20 fl oz)



**660 calories, 22 g fat (15 g saturated), 95  
g sugars**

Sugar Equivalent: 8½ scoops Edy's  
Slow Churned Rich and Creamy Coffee  
Ice Cream

Hopefully this will dispel any lingering fragments of the "health halo" that still exists in coffee shops—that misguided belief that espresso-based beverages can't do much damage. In this 20-ounce cup, Starbucks manages to pack in more calories and saturated fat than two slices of deep-dish sausage and pepperoni pizza from Domino's. That makes it the equivalent of dinner and dessert disguised as a cup of coffee.

#### 10. Worst Lemonade

Auntie Anne's Wild  
Cherry Lemonade Mixer  
(32 fl oz)



**470 calories, 0 g fat, 110 g  
sugars**

Sugar Equivalent: 11 bowls of  
Cookie Crisp cereal

There is no such thing as healthy lemonade, but Auntie's line of Lemonade Mixers takes the concept of hyper-sweetened juice and stretches it to dangerous new levels. See, sugar digests faster than good-for-you nutrients like protein and fiber, which means it's in your blood almost immediately after you swallow it. Drinking the 3 or 4 days' worth of added sugar found here jacks your blood sugar and results in strain to your kidneys, the creation of new fat molecules, and the desire to eat more.

#### 9. Worst Hot Chocolate

Starbucks White Hot  
Chocolate with Whipped  
Cream (venti, 20 fl oz)



**520 calories, 16 g fat (11g  
saturated) 75 g sugars**

Sugar Equivalent: 9 Strawberry  
Rice Krispie Treats

See that stack of Rice Krispie Treats? It's just three treats shy of two full boxes. Unless you were a contestant on Fear Factor—and there was a sizeable monetary prize on the line—you'd never even consider noshing down that much sugar at once. But here's what's interesting: While that stack is the sugar counterpart to this atrocity from Starbucks, it still has 40 percent less

saturated fat. Makes us wonder what's going on in the hot chocolate.

#### 8. Worst Frozen Mocha

Così Double Oh! Arctic  
Mocha (gigante, 23 fl oz)  
**662 calories, 26 g fat (15 g  
saturated), 88 g sugars**



Sugar Equivalent: 19 Oreo Cookies

The good news here is that this drink used to be twice as bad - and used to contain as much sugar as in 41 Oreo Cookies. The bad news is that even though it's halved the calories, it's still a piece of work. A frozen mocha will never be a stellar option, but we've still never come across anything that competes with this cookie-coffee-milkshake hybrid from Così. Essentially it's a mocha Blizzard made with Oreo cookies and topped with whipped cream and an oversize Oreo. The result is a beverage with more calories than two Big Macs and more sugar than any other drink in America.

#### 7. Worst Frozen Coffee Drink

Dairy Queen Caramel  
MooLatte  
(24 fl oz)



**870 calories, 24 g fat (19 g saturated, 1 g  
trans), 112 g sugars**

Sugar Equivalent: 12 Dunkin' Donuts  
Bavaria Kreme Doughnuts

Coffee-dessert hybrids are among the worst breed of beverages. This one delivers 1 gram of fat and 4.6 grams of sugar in every ounce, making even Starbucks' over-the-top line of Frappuccinos look like decent options. Maybe that's why DQ decided to give it a name that alludes to the animal it promises to turn you into. If you can bring yourself to skip DQ and head to a coffee shop instead, order a large iced latte with a couple shots of flavored syrup and save some 600 calories

#### 6. Worst Margarita

Traditional Red  
Lobster Lobsterita  
(24 fl oz)



**890 calories, 0 g fat, 183  
g carbohydrates**

Carbohydrate Equivalent: 7 Almond  
Joy candy bars

Of all the egregious beverages we've analyzed, the Lobsterita surprised us the most. The nation's biggest fish purveyor is one of the few big players in the restaurant biz to provide its customers with a wide selection of truly healthy food options. We would hope they'd do the same with the beverages, but obviously not. Drink one of these every Friday night and you'll put on more than a pound of flab each month. Downgrade

to a regular margarita on the rocks and pocket the remaining 640 calories.

**5. Worst Float**

**Baskin-Robbins Ice Cream Soda (vanilla ice cream and cola) (large, 28.6 fl oz)**

**960 calories, 40 g fat (25 g saturated, 1.5 g trans), 136 g sugars**

**Sugar Equivalent: 9.7 Fudgsicle fudge bars**



Done right, an ice cream float can be a decent route to indulgence. Go to A&W and you'll land a medium for fewer than 400 calories. Order it with diet soda and you've dropped below 200 calories. So why can't Baskin-Robbins make even a small float with fewer than 470 calories? Because apparently the chain approaches the art of beverage-crafting as a challenge to squeeze in as much fat and sugar as possible.

**4. Worst Frozen Fruit Drink**

**Krispy Kreme Lemon Sherbet Chiller (20 fl oz)**

**980 calories, 40 g fat (36 g saturated) 115 g sugars**

**Sugar Equivalent: 16 medium-size chocolate éclairs**



Imagine taking a regular can of soda, pouring in 18 extra teaspoons of sugar, and then swirling in half a cup of heavy cream. Nutritionally speaking, that's exactly what this is, which is how it manages to marry nearly 2 days' worth of saturated fat with enough sugar to leave you with a serious sucrose hangover. Do your heart a favor and avoid any of Krispy Kreme's "Kremey" beverages. The basic Chillers aren't the safest of sippables either, but they'll save you up to 880 calories.

**3. Worst Drive-Thru Shake**

**McDonald's Triple Thick Chocolate Shake (large, 32 fl oz)**

**1,160 calories, 27 g fat (16 g saturated, 2 g trans), 168 g sugars**

**Sugar Equivalent: 13 McDonald's Baked Hot Apple Pies**



There are very few milk shakes in America worthy of your hard-earned calories, but few will punish you as thoroughly as this Mickey D's drive-thru disaster. Not only does it have more than half your day's caloric and saturated fat allotment and more sugar than you'd find in Willy Wonka's candy lab, but Ronald even finds a way to sneak in a full day of cholesterol-spiking trans fat. The scariest part about this drink is that

it's most likely America's most popular milk shake.

**2. Worst Smoothie**

**Smoothie King Peanut Power Plus Grape (large, 40 fl oz)**

**1,498 calories, 44 g fat (8g saturated) 214 g sugars**

**Sugar Equivalent: 20 Reese's Peanut Butter Cups**



If Smoothie King wants someone to blame for landing this high on our worst beverages roundup (and truth be told, its entire menu is riddled with contenders), the chain should point the smoothie straw at whichever executive came up with the cup-sizing structure. Sending someone out the door with a 40-ounce cup should be a criminal offense. Who really needs a third of a gallon of sweetened peanut butter blended with grape juice, milk, and bananas? Sugar-and-fat-loaded smoothies like this should be served from 12-ounce cups, not mini cups.

**1. Worst Beverage in America**

**Cold Stone PB&C (Gotta Have It size, 24 fl oz)**

**2,010 calories, 131 g fat (68 g saturated), 153 g sugars**

**Sugar Equivalent: 30 Chewy Chips Ahoy Cookies**



In terms of saturated fat, drinking this Cold Stone catastrophe is like slurping up 68 strips of bacon. Health experts recommend capping your saturated fat intake at about 20 grams per day, yet this beverage packs more than three times that into a cup the size of a Chipotle burrito. But here's what's worse: No regular shake at Cold Stone, no matter what the size, has fewer than 1,000 calories. If you must drink your ice cream, make it one of the creamery's "Sinless" options. Otherwise you'd better plan on buying some bigger pants on the way home.



**MEDICAL UPDATE:  
New Wisdom For Strong Hearts**

By: Amanda Schupak

The American [Heart Association](#) recently updated its guidelines to help women prevent heart disease and stroke. We asked lead author Dr. Lori Mosca to talk us through some of the changes.

**OLD ADVICE:** Many women with high cholesterol should take statins to help prevent heart disease.

**NEW ADVICE:** Recent research suggests that cholesterol-lowering statins are most effective for women who already have heart disease or are at increased risk for getting it. The higher your risk, the more likely you are to benefit from statins.

**OLD ADVICE:** Thirty minutes of daily [exercise](#) is enough to keep your heart healthy.

**NEW ADVICE:** Women need a full hour of moderate [activity](#) each day to reduce their risk of heart disease. This doesn't have to mean logging time at the gym—it could include doing yard work, washing the car, or taking a brisk walk.

**Quiz: Are You Heart Health Savvy?**

**OLD ADVICE:** All adults should take a daily aspirin to prevent heart attack.

**NEW ADVICE:** Take daily aspirin only if you're over 65, have had a heart attack, or are at high risk for heart disease. Otherwise, the risks from taking too much aspirin (like gastrointestinal bleeding) likely outweigh the benefits.

**OLD ADVICE:** You're probably not at significant risk for heart disease unless you smoke, are obese, or have a history of diabetes, high cholesterol, or hypertension.

**NEW ADVICE:** Be aware of other health problems that increase the risk of heart disease. These include -preeclampsia (high blood pressure during pregnancy), lupus, and rheumatoid arthritis. —

**Get Smart About Vitamin D**



For bone health, vitamin D and calcium go hand in hand; the vitamin must be present for calcium to be absorbed from the digestive

tract. But more D isn't necessarily better. In fact, research has determined that consuming very high levels of Vitamin D through supplement can lead to an increased risk of fractures. A committee of specialists recently concluded that most adults get sufficient D from sunlight and their regular diets.



**Small**

## Doses.....

By Mike Petry, MS, RPh  
Clinical Pharmacist

### Jet Lag - Current and Potential Therapies

Jet lag, also known as circadian desynchrony, is a sleep disorder where there is a mismatch with the body's natural circadian rhythm and the external environment, which is usually due to rapid travel across multiple time zones. This common problem affects all age groups, but may have more pronounced effects on the elderly whose recovery rate may be more prolonged than that in young adults.

A multitude of factors, such as the number of time zones crossed, the time of travel, and the direction traveled play a role in the severity of symptoms experienced by travelers. Travelers usually experience symptoms after crossing at least two time zones. Symptoms may include disturbed sleep, daytime fatigue, decreased ability to perform mental and physical tasks, reduced alertness, and headaches. Sleep disturbances typically last for a few days, but they can persist for as long as a week if the change in

time is greater than eight hours. Eastbound travel is associated with a longer duration of jet lag than westbound travel.

### Role of the Internal Circadian Clock

To appreciate the factors associated with jet lag, it is helpful to understand the basic properties of the body's internal clock. The central circadian clock is located in the hypothalamus, where light signals from the retina are received. It is responsible for adapting the circadian rhythm according to the light-dark cycles of the environment and for generating neuronal and hormonal activities that regulate various body functions in a 24-hour cycle.

*Zeitgebers* (time-givers, or synchronizers) are rhythmic cues in the environment that synchronize the internal body clock to the earth's 24-hour light-dark cycle. Light is the strongest *zeitgeber*; other non-photic *zeitgebers* include temperature, social interaction, pharmacological manipulation, exercise, and meal timing. It is easiest to initiate sleep when the body temperature is at its lowest, coupled with an increase in melatonin secretion. When the body clock is inappropriately phased, sleep is difficult to initiate and maintain.

### Prevention and Management of Jet Lag

The goal of prevention and treatment of jet lag is to achieve circadian realignment in the most rapid and efficient way possible while minimizing the symptoms. The aggressiveness of treatment often depends on the length of stay in the new time zone. For example, business travelers, pilots, and flight attendants may experience frequent but brief shifts in time zones, and it may be practical for them to just remain on their normal sleep/wake schedule.

### Light Therapy

Sunlight has a major influence on the internal circadian clock. Traveling across several time zones necessitates resetting and adjusting to a new daylight schedule. Natural light exposure is the ideal mechanism for counteracting jet lag. For those who travel frequently or are unable to have exposure to natural sunlight, exposure to bright artificial light may be of benefit.

### Melatonin

In the human body, sleep is initiated during a rise in the concentration of melatonin and during the declining phase of body temperature. Synthesized from serotonin in the pineal gland, melatonin helps shift human circadian rhythms. An increase in melatonin alerts the body that "biological night" is starting, whereas a decline in melatonin alerts the human body that biological night is ending. Administering exogenous melatonin in the afternoon to evening hours of a 24-hour day promotes an advance in circadian rhythm, which may help travelers overcome symptoms.

### Ramelteon

Ramelteon (Rozerem®), a melatonin receptor agonist, has been approved by the FDA for insomnia. The dose is usually 8 mg, taken one half-hour before bedtime. The selectivity of ramelteon for melatonin receptors, normally acted upon by endogenous melatonin, induces sleep and can help maintain the circadian rhythm underlying the normal sleep-wake cycle. Adverse effects of ramelteon are similar to those of melatonin. It does not appear that ramelteon leads to dependence or withdrawal effects after discontinuation.

### Zolpidem

Zolpidem (Ambien®), a non-benzodiazepine hypnotic, binds the benzodiazepine receptor subunit of the GABA-A receptor complex. It has a strong hypnotic effect with weak anticonvulsant and muscle-relaxant

properties. Although the FDA has not approved this drug for jet lag, the use of zolpidem as a way to cope with symptoms might be suitable for those who travel often for work and who are required to be active and alert as soon as they arrive in the new time zone. It is effective because of its rapid absorption, short half-life, and inactive metabolites. Adverse effects include dizziness, somnolence, memory loss, headache, and nausea. When low doses recommended for initiating sleep are used, carryover effects should be minimal the next day.

### Caffeine

Caffeine is a common remedy for treating sleepiness induced by jet lag. Studies have shown that it can be an effective way to reduce or overcome symptoms of jet lag. One study found that caffeine led to an objective decrease in daytime sleepiness compared with melatonin and placebo, as assessed by multiple sleep latency tests.

### Diphenhydramine

(Benadryl®) is the most common nonprescription antihistamine prescribed for insomnia. Side effects can include daytime sleepiness, cognitive impairment, dizziness, blurred vision, and dry mouth. Self-medication is a common problem that can result in adverse outcomes, especially in older adults. The use of diphenhydramine should be avoided in elderly persons who are often sensitive to its anticholinergic properties.

**Armodafinil** (Nuvigil®), a central nervous system (CNS) stimulant, is used to improve wakefulness in adults who experience excessive sleepiness because of obstructive sleep apnea, shift-work disorder, and narcolepsy. Most adverse effects are mild to moderate and include headache, nausea, diarrhea, circadian rhythm sleep disorder, and palpitations. The FDA has refused to approve the use of armodafinil for the treatment of jet lag, and the manufacturer has withdrawn its request for FDA approval.

### Conclusion

Jet lag is a sleep disorder common to travelers of all age groups. The disorder is caused by rapid travel across multiple time zones in which the circadian system is not able to adjust to the rapid shift. The speed of resynchronization of circadian rhythm to the new time zone depends on multiple factors. Jet-lagged travelers may experience disturbed sleep, daytime fatigue, poor performance in mental and physical tasks, decreased alertness, and headache. Several prescription and over-the-counter (OTC) products are used in the management of jet lag. Pharmacists can aid patients in selecting an appropriate, effective treatment.

Sign for pharmacy nursing in-service:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## The New Rules of Sun Safety

By Llana Blitzer  
[www.health.com](http://www.health.com)  
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You've been following the rules when it comes to sunscreen for how long now? At this point, you're a diligent daily sunscreen wearer, and you know to reapply every few hours when you're at the beach or pool. But, hey, it's 2011—some of the old thinking no longer applies. So update your sun-safety habits, and keep your skin healthy long-term with these thoroughly modern strategies.

**Old rule:** Apply a broad-spectrum UVA/UVB sunscreen with SPF 15 a half-hour before leaving the house.

**New rule:** Sunscreen alone is not enough: Wear an SPF 15 (at least) plus an antioxidant-enriched moisturizer.

"It's no longer just about UV damage," says Fredric Brandt, MD, a dermatologist in New York City and Miami. "The sun also generates free radicals that break down your collagen and elastin fibers." Antioxidants in ingredients like soy, green tea, and vitamin C prevent free radicals from attacking, and they boost your protection level, too. Use a sunscreen that contains the powerful antioxidant idebenone or make sure your daily moisturizer has antioxidants in it so you're covered from the start, then apply sunscreen as usual.

If you're going to the beach, go higher than SPF 15, Dr. Brandt says. Most people don't apply enough, so they may end up getting a protection level of 7 out of their 15. But if you're slathering on 70 you'll probably get at least a 30, so you're good.

**Old rule:** Throw on a T-shirt or cover-up when you're in direct sunlight.

**New rule:** If you're not into sun protective clothing, wear dark colors and tightly woven fabrics at peak hours. You can't get away with any ol' thing (donning a breezy sarong is like wearing nothing at all). Fabrics have UPF ratings that measure their level of UV protection; a 30 is necessary to be awarded the Skin Cancer Foundation's Seal of Recommendation. (FYI: A plain white tee comes in under 10.) If you're up for a quick extra step, check out **SunGuard Sun Protection**, a clear dye you can add to your laundry for an immediate UPF 30 that will last through 20 washings.

**Old rule:** Use a teaspoon of sunscreen for your face, a shot-glass-worth for your body.

**New rule:** Layer on your protection to make sure you are covered.

Because nobody actually measures out their dose, here's how to stay



safe. First, err on the side of over applying. Pay attention to commonly missed spots like your neck, chest, and the backs of your hands, particularly when you're driving. "Most people don't realize that the neck and the V of the chest are directly exposed to sunlight due to the angle of the windshield, which offers no protection from UVA rays," says Alysa Herman, MD, a Miami dermatologist specializing in skin cancer treatment. "The backs of hands also get a lot of damage from holding the steering wheel." A nonstick spray-on sunscreen is an easy way to cover all those spots without getting your hands tacky. To max out your face coverage, apply a sunscreen lotion and follow up by dusting on a powder-based mineral blocker. It has the added benefit of de-slicking post-sunscreen shine. A skin-win!

**Old rule:** A little sun is healthy—20 minutes three times a week allows your body to produce vitamin D.

**New rule:** It's not smart to go out-of-doors unprotected.

Here's the deal: Your body does need vitamin D to keep bones healthy and support your immune system, but supplements are the safest way to get your dose of [vitamin] D—without the scary side effects of sun exposure. "Even a little bit of sun causes cellular damage that can lead to aging and cancer," says Francesca Fusco, MD, a dermatologist in New York City. Have your doctor check your [vitamin] D level; if it's low, discuss taking a daily supplement containing 400 to 1,000 IU.

**Old rule:** Never, ever go tanning.

**New rule:** Still, never, ever go tanning—indoors or outdoors.



Using a tanning bed increases your risk for melanoma by up to 75%, according to the International Agency for Research on Cancer. And 90% of the signs of aging (wrinkles, brown spots) are caused

by UV radiation, the Skin Cancer Foundation reports.

But there's one tan that is safe: the kind you slather on. According to a study in *Archives of Dermatology*, when women are taught to use self-tanners, they spend less time in the sun because they aren't longing to bake for the tan. Try one that gives a gradual tint and help fade existing sun spots. Now that's a healthy glow.

## SCUBA DIVING

Daniel A. Nord  
CDC 2011

Scuba diving can present a variety of unique medical challenges for the traveling diver. Because diving injuries are generally rare, few health-care providers are trained in their diagnosis and treatment. Thus, the recreational diver must be able to recognize the signs of injury and ensure the availability of dive medicine help when needed.

### Fitness to Dive

Planning for dive-related travel should take into account any changes in health status, recent injuries, or surgery. In general, respiratory disorders, as well as any disorders affecting higher function and consciousness (e.g., diabetes mellitus or seizures), respiratory function (e.g., asthma), psychological problems (e.g., anxiety), and pregnancy raise special concerns about diving fitness.

### Diving Disorders

#### Barotrauma

##### Ear and Sinus

Ear barotrauma is the most common injury in divers. On descent, failure to equalize pressure changes within the middle ear space creates a pressure gradient across the eardrum, which can cause bleeding or fluid accumulation in the middle ear, as well as stretching or rupture of the eardrum and the membranes covering the windows of the inner ear. Symptoms can include—

- pain
- tinnitus (ringing in the ears)
- vertigo (dizziness or sensation of spinning)
- sensation of fullness
- effusion (fluid accumulation in the ear)
- decreased hearing

Paranasal sinuses, because of their relatively narrow connecting passageways, are uniquely susceptible to barotraumas, generally on descent. With small changes in pressure (depth), symptoms are usually mild and short lived, but can be exacerbated by continued diving. Larger pressure changes, especially with forceful attempts at equilibration (e.g., valsalva maneuver), can be more injurious. Additional risk factors for ear and sinus barotrauma include—

- earplugs
- medications
- ear and/or sinus surgery
- nasal deformity
- disease

A diver who may have sustained ear or sinus barotrauma should discontinue diving and seek medical attention.

### Pulmonary

It is critical for a scuba diver to exhale (or breathe normally) while ascending slowly. Over inflation of the lungs, which usually happens when a novice diver panics, can result as a scuba diver ascends toward the surface without exhaling. During ascent, compressed gas trapped in the lung increases in volume until the expansion exceeds the elastic limit of lung tissue, causing damage and allowing gas bubbles to escape into one or more of three possible locations, as follows:

- Gas entering the pleural space can cause lung collapse or pneumothorax.
- Gas entering the mediastinum (space around the heart, trachea and esophagus) causes mediastinal emphysema and frequently tracks under the skin (subcutaneous emphysema) or into the tissue around the larynx, sometimes precipitating a change in the voice characteristics.
- Gas rupturing the alveolar walls can dissect into the pulmonary capillaries and pass via the pulmonary veins to the left side of the heart, where it is distributed according to relative blood flow, resulting in arterial gas embolism (AGE).

While mediastinal or subcutaneous emphysema usually resolves spontaneously, pneumothorax generally requires specific treatment to remove the air and reinflate the lung. AGE is a medical emergency requiring appropriate intervention, which includes recompression treatment with hyperbaric oxygen.

Lung overinflation injuries from scuba diving can range from dramatic and life threatening to mild symptoms of chest pain and dyspnea. Although pulmonary barotrauma is relatively uncommon in divers, prompt medical evaluation is necessary, and evidence for this condition should always be considered in the presence of respiratory or neurologic symptoms following a dive.

#### Decompression Illness

Decompression illness (DCI) is an all-inclusive term that describes the dysbaric injuries, AGE, and decompression sickness (DCS). Because the two diseases are considered to result from separate causes, they are described here separately. However, from a clinical and practical standpoint, distinguishing between them in the field may be impossible—and unnecessary, since the initial treatment is the same for both. DCI can occur even in divers who have carefully followed the standard decompression tables and the principles of safe diving.

#### Arterial Gas Embolism (AGE)

Gas entering the arterial blood through ruptured pulmonary vessels can distribute bubbles into the body tissues, including the heart and brain, where they disrupt circulation. AGE may cause minimal neurologic symptoms or dramatic symptoms that require immediate attention. These signs and symptoms include—

- numbness
- weakness
- tingling
- dizziness
- visual blurring
- chest pain
- personality change
- paralysis or seizures
- loss of consciousness
- death

In general, any scuba diver who surfaces unconscious or loses consciousness within 10 minutes after surfacing should be assumed to have AGE. Intervention with basic life support is indicated, including the administration of 100% oxygen, followed by rapid evacuation to a hyperbaric oxygen treatment facility.

#### Decompression Sickness

Breathing air under pressure causes excess inert gas (usually nitrogen) to dissolve in body tissues. The amount dissolved is proportional to and increases with depth and time. As the diver ascends to the surface, the excess dissolved gas must be cleared through respiration via the bloodstream. Depending on the amount dissolved and the rate of ascent, some gas can

supersaturate tissues, where it separates from solution to form bubbles, interfering with blood flow and tissue oxygenation and causing signs and symptoms of decompression sickness. These symptoms include—

- joint aches or pain
- numbness and/or tingling
- mottling or marbling of skin
- coughing spasms or shortness of breath
- itching
- unusual fatigue
- dizziness
- weakness
- personality changes
- loss of bowel or bladder function
- staggering, loss of coordination, and/or tremors
- paralysis
- collapse or unconsciousness

Serious permanent injury may result from either AGE or DCS.

#### Flying after Diving

The risk of developing decompression sickness is increased when divers are exposed to increased altitude too soon following a dive. The cabin pressure of commercial aircraft may be the equivalent of 8,000 ft (2,438 m). Thus, divers should avoid flying or an altitude exposure >2,000 ft (610 m) for—

- a minimum of 12 hours after surfacing from a single no-decompression dive, or
- after repetitive dives and/or multiple days of diving, wait a minimum of 18 hours before ascending to altitude, to reduce the risk of decompression sickness.

These recommended preflight surface intervals do not guarantee avoidance of DCS. Longer surface intervals will further reduce DCS risk.

#### Prevention of Diving Disorders

Recreational divers should dive conservatively and well within the limits of their dive tables or computers. Risk factors for DCI are primarily dive depth and bottom time; however, factors such as rapid ascent, repetitive dives, strenuous exercise, dives >60 feet, altitude exposure soon after a dive, and physiological variability also increase risk. Divers should be cautioned to stay well hydrated and rested, dive within the limits of their training, and follow established guidelines for dives unique to their travel destination. Diving is a skill that requires appropriate training and

certification and should be done with a companion.

#### Treatment of Diving Disorders

Definitive treatment of DCI begins with early recognition of symptoms, followed by recompression with hyperbaric oxygen. A high concentration (100%) of supplemental oxygen is considered effective first aid in relieving the signs and symptoms of decompression illness and should be administered as soon as possible. Divers are often dehydrated, either because of incidental causes, immersion, or DCI itself, which can cause a capillary leak. Administration of isotonic glucose-free intravenous fluid is recommended in most cases. Oral rehydration fluids may also be helpful, provided they can be safely administered (e.g., if the diver is conscious). The definitive treatment of DCI is recompression and oxygen administration in a hyperbaric chamber.

The Divers Alert Network (DAN) maintains a 24-hour emergency consultation and evacuation assistance at 919-684-8111 or 919-684-4326 (collect calls are accepted). DAN will provide assistance with management of the injured diver, help in deciding if recompression is needed, the location of the closest recompression facility, and assistance in arranging patient transport. DAN can also be contacted for routine nonemergency consultation by telephone at 919-684-2948, ext. 222, or by accessing the website [www.diversalertnetwork.org](http://www.diversalertnetwork.org).

Travelers who plan to scuba dive may want to ascertain whether there are recompression facilities at their destination prior to embarking on their trip.

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