

How MRSA Impacts Your Practice

By

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MRSA

You may have heard of MRSA. You may know that this pretty word is the name of the potentially deadly staph bacterium being talked about on the news. But what you may not have heard is that MRSA has reached epidemic proportions, or that MRSA is currently killing more people annually than AIDS, or that MRSA can live on a surface for months. We of the massage and bodywork profession run a greater risk of contracting illness from our clients than most other professions. In fact, because of the close contact and closed quarters of the treatment setting, it is a wonder we are not all constantly ill. Understanding how MRSA behaves will help us protect ourselves, our families and our clients from the disease.

Chapter 1:

What is MRSA?

MRSA is a bacterium. Bacteria are one of the earliest life forms, billions of years old. They are said to be the precursor of the oxygenating plant and algae which without it, more complex life forms could not exist. Our ecological balance depends on bacteria. We even depend on intestinal bacteria to help us digest our food and produce vitamin k. However, bacteria can also be very harmful. For example, tuberculosis is a bacterial infection.¹

Many years ago we were warned about the indiscriminate use of antibiotics. We were told it would create antibiotic resistant diseases. Now MRSA has fulfilled that prophesy in a big way. MRSA (pronounced "Mursa" in the US) is a bacterium which causes infections in humans that are very difficult to treat.² MRSA is resistant to many antibiotics, including penicillin;³ the most widely used antibiotic and the grandfather of many antibiotics such as ampicillin and Oxacillin.⁴

Penicillin went into mass production in 1943.⁵ Within four years, microbes appeared which were resistant to penicillin.⁶ MRSA, first identified in 1961 in Great Britain by bacteriologist Patricia Jevons (1921-2005), is a mutation of those first resistant microbes.⁷ In fact, in 1964, it was discovered antibiotics enhance "the acquisition of new, resistant strains."⁸ MRSA was first

noted in the United States in 1968⁹ (in Boston¹⁰) and is now found around the world.¹¹

MRSA has the ability, unlike humans, one scientist explains, to change its genetic make up.¹² MRSA is aided by transduction. Transduction is when DNA from one bacterium is installed in another bacterium with the help of a virus that can siphon DNA from one germ into another, even the DNA of dead germs. This allows MRSA to mutate rapidly, building in resistance to the antibiotics.¹³ When MRSA's ancestors resisted penicillin using an enzyme, methicillin debuted in 1959 to stop its spread.¹⁴ Within a year it was noted, MRSA used a gene called *mecA* to survive methicillin.¹⁵ In more recent times, a variant of MRSA lives inside the very cells the body normally uses to kill the intruder—rather like having the hit man to dinner.¹⁶

MRSA's ability to adapt to new defenses may be very rapid. Observers at Rockefeller University saw MRSA mutate 35 times in 12 weeks to defeat successive antibiotics given to a patient.¹⁷

The infection, when it develops, will look like a pimple, boil, rash or spider bite.¹⁸ Pus or other drainage may be present.¹⁹ People may carry the disease for many years without showing symptoms and nevertheless be contagious.²⁰

Medical care should be sought if the infection persists or returns or is accompanied by any of the following: "fever, pain, spreading redness, local swelling or heat, or drainage that contains pus or blood."²¹ The attending medical person should be

asked to run a MRSA test before any antibiotics are prescribed; if it were MRSA and that strain were resistant to the prescribed antibiotic, it may do more harm than good.

If high fever appears rapidly, if there is severe pain or if swelling of an arm, leg or foot makes bearing weight impossible, immediate medical evaluation should be sought.²²

Why is MRSA a concern? In 2005 MRSA killed more people in the United States than AIDS did (19,000 deaths from MRSA, 17,011 from AIDS).²³ There were twice as many new cases of MRSA than AIDS in 2005--while more than 94,000 people contracted MRSA, only 45,669 caught AIDS.²⁴ 2.5 million to 3 million people in the United States are thought to carry MRSA,²⁵ about two and a half to three times more than people with HIV.²⁶

(However, a South Texas study in 2004 suggested a MRSA rate of 360 people per 100,000, which, if true across the country, would mean 11 million people are infected.²⁷ That figure represented a seventy-two fold increase over the number five years previously.²⁸ In a Nashville study, 9% of the children tested had MRSA.²⁹ If that number carried over to the general population, the number of infected people would be twenty-seven million.)

MRSA may be easier to catch than AIDS. There are three main ways to transfer HIV—through a contaminated needle, unprotected sex or mother to child (today typically through breastfeeding).³⁰

The MRSA bacteria, on the other hand, can live on a common surface for weeks³¹ or months.³² Anyone who touches that surface (such as a table) may acquire the bacteria.³³ If the bacteria-carrying skin touches another person, MRSA can be transferred to a new carrier.³⁴

People shed an entire layer of superficial skin every 24 to 48 hours.³⁵ If these skin particles contain MRSA, they can contaminate surfaces which the person never touched.³⁶ Dust is reported to include large numbers of skin particles.³⁷

MRSA can live harmlessly on the skin “but even tiny openings, such as a scratched knee or shaving cut, allows it to enter the bloodstream and wreak havoc.”³⁸ Even a tiny hair shaft can provide entry for the bacteria.³⁹ Even a bruise, with its collection of blood, is an invitation to MRSA. Or the skin can be brushed against the nose and the bacteria may enter the body through the nasal cavity.⁴⁰ A person carrying MRSA in the nose with no symptoms might allow the bacteria to enter the body simply by picking the nose, if doing so damaged nasal cavities.⁴¹

To appreciate the dimensions of how MRSA can spread, it is useful to compare it to two other diseases. On December 13, 2007, a female passenger with infectious tuberculosis traveled on a commercial airline flight from New Delhi to Chicago.⁴² Health authorities are trying to reach the 44 other passengers, scattered over 18 states to urge them to be tested for the disease.⁴³ The concern is that every time she opened

her mouth (whether to cough, sneeze, or talk), tuberculosis-laden droplets were expelled into the air.⁴⁴

MRSA, on the other hand, does not require the mouth to open to be transmitted (though coughing can transmit MRSA if the infection is in the lungs).⁴⁵ Any surface touched by the carrier (or upon which the carrier's skin particles have fallen⁴⁶) can pass the germ to a new person as soon as it is touched. The arm rests in the airplane cabin could contain the germ if a MRSA carrier sat in the seat.⁴⁷

Similarly the armrests of movie theater seats may provide a resting spot for the germ. Athletic equipment can be a source.⁴⁸ Shopping cart handles, cans or boxes in grocery stores, used books, library books, magazines in doctors' offices and money are all potential carriers. As the epidemic becomes better known, handshaking may well fall out of favor.

Pets have been known to acquire CA-MRSA and pass it along to humans who pet them.⁴⁹ A collie being used for pet therapy with the elderly in a British hospital was found to have MRSA but though the bacteria was not passed to any of the patients.⁵⁰

The point is a person with tuberculosis sets in a plane and everyone goes crazy looking for the 44 other passengers who may have caught it by breathing the same air. MRSA can live on practically any surface and even infect your pet.

The second example is the stomach flu. Particularly prevalent in winter, it can be passed to computer keys

and mice by a carrier.⁵¹ The next person touching those surfaces can acquire the germ.⁵² In February 2007 of 380 people in a Washington, DC school, 27% came down with the stomach flu.⁵³ In a first grade classroom, a computer keyboard and mouse tested positive for the virus, providing a possible vector for the disease.⁵⁴

While this method of transmitting the stomach flu is similar to how MRSA is transferred, MRSA is hardier. The stomach flu virus can survive on a surface for several days⁵⁵ whereas the MRSA germ can survive for weeks⁵⁶ or months.⁵⁷ The flu usually results in several uncomfortable days of severe vomiting and diarrhea.⁵⁸ MRSA can be fatal.⁵⁹

To summarize the differences:

MRSA vs. AIDS in United States

- MRSA kills more people per year
- MRSA has more new cases per year
- MRSA is carried by more people
- MRSA is easier to catch
- MRSA survives longer on environmental surfaces

Despite MRSA being worse than AIDS in these five categories, the therapist may never have heard of the disease. A Google search turns up 10 times as many hits for AIDS in the United States as for MRSA.

What information is available on MRSA may be inaccurate. The well-regarded *60 Minutes* television news show broadcast an episode which said MRSA is “easily treated with antibiotics” in its early stages.⁶⁰ In actuality, MRSA is resistant to most antibiotics and if treated with them, thrives into new strains.⁶¹

The same show emphasized at least twice the “only way you can really get it is through physical contact” with another person.⁶² Strikingly, the US Centers for Disease Control disagree with CBS News and assert that MRSA can be transferred through contaminated surfaces and shared items.⁶³

MRSA, which looks to be a bigger problem than the well-known AIDS, used to be pretty much limited to hospitals. But in the next chapter, MRSA's escape into the rest of the world will be examined.

Chapter Summary

- ✚ MRSA is resistant to antibiotics
- ✚ MRSA kills more people a year than AIDS does.
- ✚ MRSA may be easier to catch than AIDS.

Chapter 2:

MRSA Spreads into the Community

For many years MRSA was seen as a hospital-related disease.⁶⁴ The first reported outbreak outside a hospital occurred in Detroit in 1982.⁶⁵ Four children acquired the bacteria in a non-hospital situation and died in 1999.⁶⁶ The variant of the disease which has spread into the community is called CA-MRSA⁶⁷ (sometimes spelled without the hyphen or with a blank space instead of the hyphen.)

In the 20s and 30s, hospitals use to be scrubbed continuously by then affordable cheap labor. As these costs went up diligence went down and hospitals began to rely heavily on antibiotics to control infections.⁶⁸ What they didn't anticipate was that the hospital would become a boot camp for germs to become antibiotic resistant. About 10% to 20% of MRSA infections are now seen outside of hospitals; of these, about twenty percent require hospitalization.⁶⁹ The Alliance for the Prudent Use of Antibiotics characterizes CA-MRSA as "now epidemic within certain community populations."⁷⁰ The journal of the Canadian Medical Association called it the "superbug at our doorstep."⁷¹

Why MRSA has moved outside the hospital is not understood, according to the Centers for Disease Control.⁷² CA-MRSA did not originate from the hospital variety of MRSA (HA-MRSA) and is in fact genetically

distinct.⁷³ CA-MRSA is not only in communities—it's invading hospitals too.⁷⁴

CA-MRSA differs significantly from the hospital variety (HA-MRSA). CA-MRSA, though more virulent than the hospital variety, is not as resistant to drug therapy and thus is more easily treated.⁷⁵ On the bad side, CA-MRSA can spread more rapidly and cause much more severe illness than HA-MRSA.⁷⁶ The community variety contains a toxin which fights white blood cells, lowering the body's infection fighting abilities.⁷⁷

A limited number of antibiotics, such as Vancomycin and teicoplanin, and more recent developments, like linezolid, are effective against MRSA.⁷⁸ It is presumed that MRSA will eventually find a way around any drugs which are invented to combat it, as the bacterium's historical character has proven.⁷⁹ (Several new strains of MRSA have already appeared which are resistant to Vancomycin and teicoplanin.)⁸⁰

CA-MRSA can cause necrotizing fasciitis or necrotizing soft tissue infection (NSTI).⁸¹ Without treatment, NSTI can rapidly degenerate into death.⁸² Even with medical care, NSTI "fatalities are high."⁸³ Sepsis, toxic shock syndrome and fatal pneumonia are also possible from CA-MRSA.⁸⁴ Sepsis is the tenth leading cause of death in the U.S..⁸⁵ Toxic shock syndrome (TSS) is a much rarer disease which can be fatal (in 1980 and 1981 women died of TSS associated with the use of super-absorbent tampons).⁸⁶

Particularly high risk locations for CA-MRSA are correctional facilities, daycare centers, dormitories, gyms, locker rooms, military barracks and public schools.⁸⁷ Persons most at risk for MRSA are Alaskan Natives, athletes, Blacks, children, daycare attendees, elderly people, injection drug users, , gay men, military recruits, Native Americans, Pacific Islanders, people who live in crowded situations, postpartum women, pregnant women and prisoners.⁸⁸

The California Health and Human Services Agency demonstrates how easily CA-MRSA can spread by noting “A single infected athlete can quickly become the source of an outbreak that can affect the entire team.”⁸⁹ Scientists, however, are working on innovative ways to outwit the diseases. Additionally, there are specific steps a person can take to diminish the chance of harboring MRSA. These measures are discussed in the next two chapters.

Chapter Summary

- ✚ In the last 25 years, a variety of MRSA (CA-MRSA) has moved outside the hospitals.
- ✚ Up to 20% of MRSA infections are now seen outside of hospitals.
- ✚ CA-MRSA can spread more rapidly and cause much more severe illness than HA-MRSA.

Chapter 3:

New Ways Doctors Fight MRSA

Just as MRSA is aided by a virus, it might also be destroyed by one. A non-antibiotic treatment for MRSA is phage therapy.⁹⁰ Bacteriophage is part of phage therapy. A Bacteriophage is a virus that only infects bacteria. The virus can invade the bacterium inserting its own DNA code. The bacterium then continuously reproduces the virus until the bacterium bursts.⁹¹

The technique has been used for 90 years in the former Soviet Union but is not approved for medical use in the United States (though the Food and Drug Administration has approved the spraying of meat with phages).⁹² Phage therapy involves the use of viruses to combat specific infections.⁹³ Research in Georgia, formerly a part of the Soviet Union, shows phage therapy effective against up to 95% of staph isolates.⁹⁴

In 2007, maggots were used to eat the dead flesh surrounding MRSA infections, preventing further infection without antibiotics.⁹⁵ This is not a new therapy. It is known as Maggot Debridement. It has been used throughout history but fell into disfavor with the advent of penicillin.

Stories of maggot therapy came out of World War II because it was difficult to acquire antibiotics in some situations. For example, in prisoner of war camps often the camp doctor or medic would examine the wounds

of unsuspecting soldiers near the latrine. The resulting maggots would consume the dead infected flesh only, thus promoting healing; all without the patients being any the wiser as to the activities that were going on beneath their bandages.⁹⁶

In 2006, doctors at the University of Chicago and Rockefeller University (New York) reported a successful test of a vaccine using mice.⁹⁷ This could protect against several forms of MRSA, including one type of CA-MRSA.⁹⁸

The University of Chicago is also working on a way to turn off the protein that warns MRSA antibiotics are on the way.⁹⁹ This would render the germ blind to the defender's attack.¹⁰⁰ Such a scheme might allow conventional antibiotics to once again be used to fight MRSA.¹⁰¹

While scientists work on the big picture, the next chapter describes everyday steps people can take to reduce the possibility of personally harboring MRSA today.

Chapter Summary

- ✚ Scientists are working on several ways to defeat MRSA.

Chapter 4:

Prevention

The most basic step in preventing MRSA is washing hands, wrists¹⁰² and for most massage therapists, forearms. After achieving a lather, the following areas should be included in the hand washing: palms, back of hands up to the wrists, the areas between the fingers, around the thumbs, underneath the fingernails¹⁰³ and forearms just above the elbows. According to the New York State Department of Health, washing should take at least 15 seconds,¹⁰⁴ about the time it takes to say the alphabet.¹⁰⁵ You may want to take a little longer after giving a treatment. Hands should then be dried.¹⁰⁶

Hand washing is particularly important before touching the eye, mouth, nose or abraded skin.¹⁰⁷ Other “wash immediately” events are: contact with bodily fluids, sneezing, blowing nose, *touching nose*, using toilet, any bare skin contact with another person or with shared equipment.¹⁰⁸

Wounds should be covered (properly bandaged).¹⁰⁹

Personal items (towels, razors, soap) should not be shared.¹¹⁰ Bathrooms shared by various people should

have individual towels¹¹¹ and soap.¹¹² In the massage setting, this may already be required by the local licensing law.

For items that must be shared, they should be wiped down before being given to a new person¹¹³ “with commercial disinfectants or a 1:100 solution of diluted bleach (one tablespoon bleach in one quart water).”¹¹⁴ If a commercial disinfectant is used, its label should specify it is effective for *Staphylococcus aureus*.¹¹⁵ “For disinfection to occur, the surface must be clean, and there must be 10 minutes wet contact time.”¹¹⁶

There are precautions to observe when disinfecting with a diluted bleach solution:

“• Bleach is inactivated when it comes in contact with organic material such as dirt, blood, and other body fluids. These materials must either be removed first before bleach is applied, or a higher concentration of bleach solution (1:10 dilution) should be used to disinfect surfaces contaminated with organic material.

“• Bleach must not be used with ammonia-containing compounds that are found in household cleaners, detergents, and disinfectants. The combination of chlorine and ammonia creates chloramine gas, which is hazardous to humans.

“• Bleach can potentially damage or discolor fabrics and synthetic materials such as carpet and upholstery, especially at high concentrations (1:10 dilution).

“• Bleach can also damage metal items. Concentrations of bleach stronger than the 1:100 dilution recommended for nonporous surfaces are corrosive to most metals.”¹¹⁷

¹¹⁸Soiled towels and linen should be held away from the body to avoid contaminating the handler's clothes.¹¹⁹ Wearing gloves while handling laundry is a reasonable precaution.¹²⁰ Laundry should be washed in hot water and with bleach.¹²¹ (Naturally, you cannot apply bleach to colored fabrics.) The water should be at least 160 degrees Fahrenheit for 25 minutes.¹²² Laundry should be dried completely in a hot dryer¹²³ at the highest setting the fabric will tolerate.¹²⁴ If laundry is taken to another location to be washed, it should be carried in an impervious container or plastic bag.¹²⁵

You should avoid treating someone with an obvious suspect wound and other signs of MRSA, however, any linen which has touched a wound should be separated from other used linen and washed separately.¹²⁶ If not washed immediately, such linen should be stored in a plastic bag.¹²⁷ Disposable items which have come in contact with a wound should be separately bagged in plastic before being placed with other trash.¹²⁸

Communal showers should be cleaned frequently.¹²⁹ Benches in hot tubs and saunas ought to be treated as shared items (discussed above) and wiped with disinfectant after each use.¹³⁰ Persons with open wounds (whether covered or not) should not be

allowed to use hot tubs or whirlpools.¹³¹ If they do, the hot tub must be disinfected immediately after use.¹³²

Patrons in steam rooms and saunas should be encouraged to place a towel between themselves and the bench.¹³³ Steam rooms and saunas should be allowed to dry once daily.¹³⁴ If they are cleaned with a bleach solution, surfaces should be rinsed well with water before heat is reactivated.¹³⁵ Spa pools should contain an appropriate level of chlorine.¹³⁶

Consider painting wooden benches with a waterproof paint to promote cleaning.¹³⁷ Wood surfaces require a different concentration of disinfectant than listed above: a 1:10 dilution of household chlorine bleach.¹³⁸ Again, ten minutes is required for disinfection to occur.¹³⁹

Floors should be cleaned daily with an EPA-approved disinfectant.¹⁴⁰

There are reports that cases of MRSA have come from eating pork in the Netherlands.¹⁴¹ The cautious person might want to avoid the meat.

Getting a flu shot is considered by some to be a good prevention. A body weakened by flu is an excellent target for CA-MRSA.¹⁴²

Chapter Summary:

- ✚ The most basic step in preventing MRSA is washing hands.
- ✚ Personal items (towels, razors, soap) should not be shared.
- ✚ Laundry should be washed in hot water and with bleach.

Chapter 5:

What This Means for a Massage Practice

Massage involves significant skin to skin contact between the therapist's hands, wrists and possibly forearms and the client's body. This is a high risk behavior for CA-MRSA. As the County of Los Angeles puts it, "Proprietors of facilities in which patrons and staff have bare skin contact with others or with shared equipment or surfaces ... should be concerned about the potential transmission of CAMRSA."¹⁴³

Precautions should become a routine part of the massage practice. These will assist the therapist in meeting the NCBTMB's Standard of Practice I (g): "use standard precautions to insure professional hygienic practices ..."¹⁴⁴

The strategy involves 3 steps (WAS):

1. **Wash:** washing off any possible MRSA bacteria contamination.
2. **Avoid:** seriously avoiding touching areas with high MRSA potential (broken skin)
3. **Swab:** Seriously swab with disinfectant, sanitizer or dust cloth areas of possible MRSA contamination

Step 1: Wash

Frequent hand, wrist and forearm washing is the most basic step, particularly after finishing a massage. The proper way to wash hands includes:¹⁴⁵

- Removing jewelry
- Washing jewelry with warm soap and water
- Using warm, soapy water to wash between the fingers, under the nails, forearms and wrists
- Washing for 15 seconds to 20 seconds (it takes about 20 seconds to sing the “Happy birthday” song twice)
- Thoroughly drying
- Turning faucets off *using paper towels*

Hand wash Before These Activities¹⁴⁶

Drinking
Eating
Giving massage
Handling clean equipment or utensils
Handling contact lenses
Handling food
Smoking
Touching the eye, mouth or nose
Using cosmetics
Using protective clothing or equipment
Using the bathroom

Hand wash After These Activities¹⁴⁷

Blowing nose
Contact with any body fluids
Coughing
Drinking
Eating
Giving massage
Handling food
Playing with or handling an animal
Rubbing eyes
Shaking client's hand
Sharing equipment
Smoking
Sneezing
Touching the nose (the nose is a top area for harboring
MRSA)
Using protective equipment or clothing
Using the restroom

Hand washing is a relatively new technique. In the late 1840s, medical students in a Vienna hospital were walking from autopsy practice to delivering babies without stopping by the sink.¹⁴⁸ Dr. Semmelweis instituted hand washing and many fewer patients in the maternity ward died.¹⁴⁹ The doctor was derided.¹⁵⁰ Fifteen years later, when he died, hand washing was still regarded as a crackpot idea, even though it worked.¹⁵¹

Today the federal Centers for Disease Control quote hand washing as “the single most effective way to prevent the transmission of disease.”¹⁵² Still, *about a third of Americans leave public restrooms without washing their hands.*¹⁵³ If they had the MRSA bacteria on their hands they could have easily washed it off. It is a simple way to avoid a health hazard.

Wash hands before touching cleaning equipment to avoid cross-contamination.¹⁵⁴ Gloves should be worn while disinfecting. Wash hands after removing gloves.¹⁵⁵

(Therapists with active MRSA infections should desist from giving massages until the infection is healed, both to aid in their recovery and to protect others.¹⁵⁶)

While massage therapists do not treat people who have a cough, sometimes we do not know they are ill until the massage is in progress. If the client coughs on the therapist's skin, it may be appropriate to interrupt

the massage to wash the skin.¹⁵⁷ If the cough hits the therapist's clothes, the material should be regarded as possibly contaminated and removed for washing at the earliest opportunity.¹⁵⁸

Client Preparation

Health departments are urging athletes participating in sports with close personal contact (wrestling, football) to shower (and presumably change clothes) afterwards, partially to reduce the possibility of MRSA.¹⁵⁹ It may seem overkill to request of your clients who are coming from the gym or a contact sport to shower before arriving. However it is worth considering as you would not want a client dragging MRSA into your establishment.

Clients should be encouraged to shower before treatment. In some establishments it is a standard requirement. This will help remove any CA-MRSA germs residing on the client's skin, resulting in a safer surface for the therapist to work on.

Washing Linen

There are specific recommendations for washing linen (in water of at least 160 degrees Fahrenheit, with bleach, for minimally 25 minutes)¹⁶⁰ and drying it. If the shop's linen is outsourced, it may be worthwhile to determine if the linen service is meeting the standards to kill CA-MRSA. Linen companies that handle hospital laundry have to comply with rigid temperature standards. Laundry services that only handle beauty

salons and so forth do not always have to meet those standards depending on regulations usually monitored by the county health department. When handling laundry, the therapist should hold dirty linen away from the body to avoid contaminating clothes¹⁶¹ and wash hands immediately afterwards. Hands should always be washed after handling used linen (even if gloves were worn) but particularly so when moving from that activity to the food area.

CA-MRSA has the potential for contaminating food.¹⁶² So the food storage or food preparation area should not be located near where dirty linen is stored.

Step 2: Avoid

Never touch broken skin,¹⁶³ pimples, boils, rashes or what appear to be spider bites. If the therapist suspects the client has a staph skin infection, it may be appropriate to terminate the massage and suggest they have it checked by their doctor.¹⁶⁴ Asking the client beforehand if they have any of the symptoms would save the therapist the awkwardness of terminating the treatment or, even worse, continuing. This can be done either vocally or in a questionnaire,

The therapist is required to “refer to other professionals when in the best interest of the client and practitioner” by the NCBTMB’s Standard I (m).¹⁶⁵ (Remember that in a medical setting, personnel treating a known MRSA patient would be gowned and gloved¹⁶⁶—that is the level of seriousness with MRSA.)

Step 3: Swab

The massage table should be seriously swabbed with a disinfectant after each use.¹⁶⁷ (There are products on the market that can safely be used on vinyl.) When removing the used sheet, avoid waving it in the air as this could spread MRSA germs if any are present.

Since disinfection requires five to ten minutes, it will probably not be possible to disinfect all the surfaces a client touches—doorknobs, doors, chairs, walls, light switches, toilet, toilet handle, faucet and shower knobs, and benches before someone else uses them. Still, it would be wise to swab all these surfaces with a disinfectant before the next client or, next best, frequently. Showers, too, should be cleaned often¹⁶⁸ and disinfected daily, if that isn't already being done.

K.T. Berger in 1988 wrote a book called *Zen Driving*, advocating being very aware of one's *now* while driving. Therapists might do well to become especially conscious of everywhere a client touches so these areas can be kept germ free.

Surfaces which require daily disinfecting include floors, steam rooms and saunas (which must also be dried daily),¹⁶⁹ hot tubs and benches. (If the therapist inadvertently allows a person with a wound—whether or covered not—to use the hot tub, the tub must be closed to further use until disinfected.)¹⁷⁰

Surfaces which might not ordinarily be disinfected, such as desks or lobby counters, should at least be sanitized or dusted, even if they are not touched by other people. This is because people shed skin which can contain CA-MRSA.¹⁷¹ Sanitizing is not as effective as disinfecting, however not everything can withstand disinfectant products. Dust contains many skin particles.¹⁷² Dust with a swab that captures the dust rather than sends it floating into the air.

In this book, the development of MRSA from its fighting antibiotics in the early 1960s to the emergence outside hospitals 20 years later has been traced. While CA-MRSA represents only 1/5 of MRSA cases, its numbers are growing, it spreads very easily and it is potentially more deadly than the previous kind (HA-MRSA). Nonetheless, there are steps which can be taken to thwart CA-MRSA. By exercising these precautions, the therapist will help protect clients, co-workers, self and ultimately others from these serious germs.

Chapter Summary

- ✚ Massage is a high risk environment for CA-MRSA.
- ✚ Precautions should become a routine part of the massage practice.
- ✚ The precautionary strategy involves 3 steps (WAS): wash hands, wrists and forearms, make sure the client has bathed and that the linen has been washed properly. Avoid areas of contamination, treating a client who shows symptoms or touching a break in the client's skin. Swab possible contaminated areas with disinfectant, sanitizer or dust cloth.

Test

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If you have any questions, I am available. Please e-mail me at go@apollo123.com.

Best of fortune to you in your future in this exciting career!

Easiest: Take the test online

<http://mansfieldfc.com/massage/1/mrsa/test.html>

14 correct answers are required to pass.

Congratulations!

Test

1. **MRSA is**

- 1. easily treated with antibiotics
- 2. resistant to antibiotics
- 3. impossible to treat
- 4. a species of cat

2. MRSA currently kills

- 1. more people a year than AIDS does
- 2. only those with aids
- 3. nobody
- 4. only the elderly

3. MRSA may be

- 1. not contagious at all
- 2. harder to catch than AIDS
- 3. easier to catch than AIDS
- 4. unseen yet in the United States

4. The longest MRSA can last on a common surface is

- 1. months
- 2. weeks
- 3. days
- 4. hours

5. MRSA gets

- 1. news coverage only during flu season
- 2. more news than AIDS does
- 3. less news than AIDS does
- 4. coverage only in medical journals

6. CA-MRSA means

- 1. the name of a European flu
- 2. the name of a federal drug program
- 3. an approval status conferred by the FDA
- 4. a variant of MRSA that is not hospital related

7. What percent of MRSA cases arise outside the hospital?

- 1. 60%
- 2. 40%
- 3. up to 20%
- 4. 80%

8. How does CA-MRSA compare to HA-MRSA?

- 1. harder to spread and its effects are milder
- 2. spreads more easily and can cause much more severe illness
- 3. they are really the same thing
- 4. only dogs get CA-MRSA

9. CA-MRSA can cause

- 1. a fatal disease such as necrotizing fasciitis
- 2. acne
- 3. cramps
- 4. water retention

10. A particularly high risk location for getting CA-MRSA is

- 1. the desert
- 2. one with crowded living conditions such as correctional facilities, daycare centers, dormitories
- 3. a bank
- 4. a park

11. The most basic step in preventing CA-MRSA is

- 1. staying out of the sun
- 2. taking antibiotics
- 3. washing hands
- 4. keeping informed

12. To prevent CA-MRSA, personal items such as soap

- 1. should not be shared
- 2. may be exchanged freely as they are not a vector for passing CA-MRSA

- 3. should be run under hot water before sharing
- 4. should be the bar type only

13. Soiled laundry should be

- 1. shaken to free germs
- 2.. held close to the body to avoid spreading contamination
- 3. burned
- 4. held away from the body to avoid contaminating the handler's clothes

14. Laundry should be

- 1. done only by commercial laundry people
- 2. washed only in cold water
- 3. washed in hot water with bleach
- 4. washed in lukewarm water

15. Communal showers should be

- 1. cleaned weekly
- 2. cleaned frequently
- 3. restricted to employees' use only
- 4. cleaned only when they look dirty

16. The risk of CA-MRSA in a massage therapy setting is

- 1. high
- 2. low
- 3. CA-MRSA has only been found in Great Britain
- 4. impossible

17. Precautions in the massage therapy practice should become

- 1. given high priority once CA-MRSA is discovered in the U.S.
- 2. practiced monthly
- 3. routine
- 4. practiced whenever you're feeling spooked

18. The 3 step prevention process involves

- 1. Washing, avoiding, and swabbing
- 2. setting aside 10 minutes a day to dust the 3 most highly trafficked areas in the office
- 3. mingling, confronting and swabbing
- 4. washing, mixing and sorting

19. After giving a massage treatment

--1. if the sheet looks clean smooth out the wrinkles to save laundry

--2. remove the sheet to laundry and disinfect the table top

--3. disinfect the table top with plain water

--4. use another treatment room so the other worker is forced to change the linen

20. If using a laundry service, make certain the water they use is

--1. lukewarm

--2. hot

--3. soft

--4. compounded

¹ Anonymous, *Meet the Microbes*, <http://www.microbeworld.org/microbes/bacteria/default.aspx>, 2006.

² Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.

³ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.

⁴ Wikipedia, *Penicillin*, <http://en.wikipedia.org/wiki/Penicillin>, 2008.

⁵ Anonymous, *MRSA*, <http://home.satx.rr.com/gonavy/Disease.htm>

⁶ Anonymous, *MRSA*, <http://home.satx.rr.com/gonavy/Disease.htm>

⁷ Anonymous, *MRSA*, <http://home.satx.rr.com/gonavy/Disease.htm>. *The Journal of Clinical Microbiology* gives the date of discovery as 1960 (<http://jcm.asm.org/cgi/content/full/43/7/3364>). Jevons: Jeremy Maniers, "How staph becaem drug-resistant threat," *Chicagotribune.com*, 11-4-07 & Anonymous, "Recollections of M Patricia Jevons FRCPATH 1921 – 2005", *Communicable Disease and Public Health*, http://www.hpa.org.uk/cdph/issues/CDPHvol7/No4/obit_4_04.pdf, December 2004.

⁸ Anonymous, *MRSA*, <http://home.satx.rr.com/gonavy/Disease.htm>

-
- ⁹ Susan C. Ball, *Methicillin-Resistant Staphylococcus aureus Infection in a Man With HIV Disease*, http://www.medscape.com/viewarticle/513276_print, 2005.
- ¹⁰ Jeremy Maniers, "How staph became drug-resistant threat," *Chicagotribune.com*, 11-4-07.
- ¹¹ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007. One of the few countries not to be overwhelmed by MRSA is the Netherlands (same source).
- ¹² Jeremy Maniers, "How staph became drug-resistant threat," *Chicagotribune.com*, 11-4-07.
- ¹³ Jeremy Maniers, "How staph became drug-resistant threat," *Chicagotribune.com*, 11-4-07.
- ¹⁴ Jeremy Maniers, "How staph became drug-resistant threat," *Chicagotribune.com*, 11-4-07.
- ¹⁵ Jeremy Maniers, "How staph became drug-resistant threat," *Chicagotribune.com*, 11-4-07.
- ¹⁶ Jeremy Maniers, "How staph became drug-resistant threat," *Chicagotribune.com*, 11-4-07.
- ¹⁷ Diana, *Fragments of Memories*, <http://dianarn.wordpress.com/2007/11/11/ca-mrsa-natural-or-engineered/>, 2007.
- ¹⁸ Centers for Disease Control and Prevention, *Community-Associated MRSA Information for the Public*, http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca_public.html, 2005; ABC News, *That's No Spider Bite: Antibiotic Resistant Staph Infections Now Very Common*, <http://abcnews.go.com/Health/Story?id=2320020&page=2>, 2007; Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.
- ¹⁹ Centers for Disease Control and Prevention, *Community-Associated MRSA Information for the Public*, http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca_public.html, 2005.
- ²⁰ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.
- ²¹ Spokane Regional Health District, *Living with MRSA*, <http://www.unc.edu/depts/spice/LivingWithMRSA.pdf>
- ²² National Foundation for Infectious Diseases, *Fact Sheet*, <http://www.nfid.org/pdf/factsheets/mrsa.pdf>
- ²³ Judith Graham, *Deaths from drug-resistant bacteria top those from AIDS*, *Chicago Tribune*, http://www.chicagotribune.com/features/lifestyle/health/chi-mrsa17oct17.1.5132805_story?ctrack=1&cset=true, October 17, 2007; AVERT, *United States AIDS Cases and Deaths by Year*, <http://www.avert.org/usastatv.htm>, January 23, 2007. The mortalities for MRSA in United Kingdom in 2005 were 1/6 that of those United States figure--
- Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007. Given the difference in population, the UK's fatality rate from MRSA was possibly 79% of that in the US.
- ²⁴ Judith Graham, *Deaths from drug-resistant bacteria top those from AIDS*, *Chicago Tribune*, http://www.chicagotribune.com/features/lifestyle/health/chi-mrsa17oct17.1.5132805_story?ctrack=1&cset=true, October 17, 2007; AVERT, *United States AIDS Cases and Deaths by Year*, <http://www.avert.org/usastatv.htm>, January 23, 2007. A Youtube video at http://youtube.com/watch?v=w_kBGjQTDLE states that 5,000,000 people caught MRSA in 2005, up from 100,000 in 2000; these figures seem to be inaccurate. The *Chicago Tribune* reports that the 94,000 figure was for severe cases (Jeremy Maniers, "How staph became drug-resistant threat," *Chicagotribune.com*, 11-4-07.); therefore, there may be additional persons who had mild cases.
- ²⁵ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007. The Rhode Island Department of Health puts the number at 3,000,000: Rhode Island Department of Health, *Community Acquired MRSA*, http://www.health.ri.gov/disease/communicable/providers_mrsa060705.php, 2005. 1% of the population: Wisconsin Department of Health, *Guidelines for Controlling Transmission*, http://dhfs.wisconsin.gov/communicable/resources/pdffiles/CAMRSA_SchoolGuidePPH42179_1007.pdf, 2007 (since the US population is 303,181,000 (http://dhfs.wisconsin.gov/communicable/resources/pdffiles/CAMRSA_SchoolGuidePPH42179_1007.pdf), this would produce a figure closely agreeing with Rhode Island's calculation.
- ²⁶ AVERT, *United States Statistic Summary*, <http://www.avert.org/statsum.htm>, 2007.
- ²⁷ Disease/Infection News, *Community superbug a growing menace*, <http://www.news-medical.net/?id=29676>, 2007.
- ²⁸ Disease/Infection News, *Community superbug a growing menace*, <http://www.news-medical.net/?id=29676>, 2007.
- ²⁹ ABC News, *That's No Spider Bite: Antibiotic Resistant Staph Infections Now Very Common*, <http://abcnews.go.com/Health/Story?id=2320020&page=2>, 2007.
- ³⁰ Shirley Henderson, *AIDS, HIV, and Other Contagious Disease Prevention: Modes of Transmission*, <http://mansfieldfc.com/massage/1/HIV/chapters/1.html>, 2006.
- ³¹ Judith Graham, "Deaths from drug-resistant bacteria top those from AIDS," *Chicago Tribune*, http://www.chicagotribune.com/features/lifestyle/health/chi-mrsa17oct17.1.5132805_story?ctrack=1&cset=true, October 17, 2007.
- ³² Timothy Dellit, MD, et al, *Guidelines*, <http://www.tpchd.org/files/library/d380703780a24627.pdf>, 2007.
- ³³ Judith Graham, "Deaths from drug-resistant bacteria top those from AIDS," *Chicago Tribune*, http://www.chicagotribune.com/features/lifestyle/health/chi-mrsa17oct17.1.5132805_story?ctrack=1&cset=true, October 17, 2007.
- ³⁴ Anita, *Understanding MRSA Prevention*, http://blog.360.yahoo.com/blog-6Zk7wQ4wda_sXwzHrhtiOOwn, October 26, 2007.
- ³⁵ Dr. Norman Simmons, *MRSA—What Can We Do Now?*, http://www.doctors.net.uk/_datastore/pdf/mrsa_news.pdf
- ³⁶ Dr. Norman Simmons, *MRSA—What Can We Do Now?*, http://www.doctors.net.uk/_datastore/pdf/mrsa_news.pdf
- ³⁷ Dr. Norman Simmons, *MRSA—What Can We Do Now?*, http://www.doctors.net.uk/_datastore/pdf/mrsa_news.pdf

- ³⁸ Michael Fumento, "Hysteria Drives Government Disease Spending – and It's Killing Us," *The New York Sun*, <http://www.fumento.com/disease/mrsa.html>, November 7, 2007.
- ³⁹ Spokane Regional Health District, *Living with MRSA*, <http://www.unc.edu/depts/spice/LivingWithMRSA.pdf>
- ⁴⁰ Monte Kline, *MRSA, The Superbug*, <http://www.pacifichealthcenter.com/updates/76.asp>, 2005.
- ⁴¹ Lisa Collier Cool, "Deadly Superbugs," *Reader's Digest*, <http://www.rd.com/content/methicillin-resistant-staphylococcus-aureus/1/>, August 2007.
- ⁴² Jia-Rui Chong, "Airline passengers exposed to multi-drug-resistant TB," *Los Angeles Times*, http://www.latimes.com/news/nationworld/nation/la-sci-tb3jan03.1.1724955_story?coll=la-headlines-nation&ctrack=3&cset=true. 1-3-08.
- ⁴³ Jia-Rui Chong, "Airline passengers exposed to multi-drug-resistant TB," *Los Angeles Times*, http://www.latimes.com/news/nationworld/nation/la-sci-tb3jan03.1.1724955_story?coll=la-headlines-nation&ctrack=3&cset=true. 1-3-08.
- ⁴⁴ Wikipedia, *Tuberculosis*, <http://en.wikipedia.org/wiki/Tuberculosis>, 2007.
- ⁴⁵ Spokane Regional Health District, *Living with MRSA*, <http://www.unc.edu/depts/spice/LivingWithMRSA.pdf>
- ⁴⁶ Dr. Norman Simmons, *MRSA—What Can We Do Now?*, http://www.doctors.net.uk/_datastore/pdf/mrsa_news.pdf
- ⁴⁷ The author has not determined if the cleaning procedures between flights includes cleaning the arm rests and whether that cleaning, if done, would be sufficient to remove MRSA germs.
- ⁴⁸ New York State Department of Health, *Community-Associated Methicillin-Resistant Staphylococcus Aureus (CA-MRSA) - Fact Sheet*, http://www.health.state.ny.us/diseases/communicable/staphylococcus_aureus/methicillin_resistant/community_associated/fact_sheet.htm, 2007.
- ⁴⁹ Michael Hawkes et al, *Community-associated MRSA: Superbug at our doorstep*, <http://www.cmaj.ca/cgi/content/full/176/1/54>, 2007.
- ⁵⁰ PetsMRSA.com, *Information for those who care about animal welfare and MRSA infection*, http://tahilla.typepad.com/petsmrsa/academic_articles/index.html, 2006.
- ⁵¹ Steven Reinberg, "Stomach Flu Spread By Contaminated Computer Keyboards," Yahoo News, http://news.yahoo.com/s/hsn/20080103/hl_hsn/stomachfluspreadbycontaminatedcomputerkeyboards, January 3, 2008.
- ⁵² Steven Reinberg, "Stomach Flu Spread By Contaminated Computer Keyboards," Yahoo News, http://news.yahoo.com/s/hsn/20080103/hl_hsn/stomachfluspreadbycontaminatedcomputerkeyboards, January 3, 2008.
- ⁵³ Steven Reinberg, "Stomach Flu Spread By Contaminated Computer Keyboards," Yahoo News, http://news.yahoo.com/s/hsn/20080103/hl_hsn/stomachfluspreadbycontaminatedcomputerkeyboards, January 3, 2008.
- ⁵⁴ Steven Reinberg, "Stomach Flu Spread By Contaminated Computer Keyboards," Yahoo News, http://news.yahoo.com/s/hsn/20080103/hl_hsn/stomachfluspreadbycontaminatedcomputerkeyboards, January 3, 2008.
- ⁵⁵ Steven Reinberg, "Stomach Flu Spread By Contaminated Computer Keyboards," Yahoo News, http://news.yahoo.com/s/hsn/20080103/hl_hsn/stomachfluspreadbycontaminatedcomputerkeyboards, January 3, 2008.
- ⁵⁶ Judith Graham, "Deaths from drug-resistant bacteria top those from AIDS," *Chicago Tribune*, http://www.chicagotribune.com/features/lifestyle/health/chi-mrsa17oct17.1.5132805_story?ctrack=1&cset=true, October 17, 2007.
- ⁵⁷ Timothy Dellit, MD, et al, *Guidelines*, <http://www.tpchd.org/files/library/d380703780a24627.pdf>, 2007
- ⁵⁸ Steven Reinberg, "Stomach Flu Spread By Contaminated Computer Keyboards," Yahoo News, http://news.yahoo.com/s/hsn/20080103/hl_hsn/stomachfluspreadbycontaminatedcomputerkeyboards, January 3, 2008.
- ⁵⁹ The stomach flu can be fatal to the young, aged or those with compromised immune systems: Steven Reinberg, "Stomach Flu Spread By Contaminated Computer Keyboards," Yahoo News, http://news.yahoo.com/s/hsn/20080103/hl_hsn/stomachfluspreadbycontaminatedcomputerkeyboards, January 3, 2008.
- ⁶⁰ CBS News, *Outbreak!*, <http://60minutes.yahoo.com/segment/120/superbug>, 12-5-07.
- ⁶¹ Anonymous, *MRSA*, <http://home.satx.rr.com/gonavy/Disease.htm>.
- ⁶² CBS News, *Outbreak!*, <http://60minutes.yahoo.com/segment/120/superbug>, 12-5-07.
- ⁶³ Centers for Disease Control and Prevention, *Methicillin-Resistant Staphylococcus aureus (MRSA) in Schools*, http://www.cdc.gov/ncidod/dhqp/ar_mrsa_in_schools.html, 2007.
- ⁶⁴ Minnesota Department of Health, *Community-Associated Methicillin-resistant Staphylococcus aureus (CA-MRSA) Basics*, <http://www.health.state.mn.us/divs/idepc/diseases/mrsa/camrsa/basics.html>, 2007.
- ⁶⁵ 10th National Symposium, *MRSA*, http://www.kplearning.com/10_national_site/uploads/B1S2.pdf, 2006. The *Chicago Tribune* says the first CA-MRSA occurred in 1981: Jeremy Maniers, "How staph became drug-resistant threat," *Chicagotribune.com*, 11-4-07.
- ⁶⁶ Edward Bell, *Treatment options exist for CA-MRSA infection*, <http://www.idinchildren.com/200511/pharmconsult.asp>, 2005.
- ⁶⁷ APUA, *Update on antibiotic-resistant Staph aureus*, <http://www.tufts.edu/med/apua/mrsa/mrsa.html>. CA-MRSA is genetically different from HA-MRSA: County of Los Angeles Public Health, "Staph" or Community-Associated Methicillin-Resistant Staphylococcus aureus (CA-MRSA) Information, <http://www.lapublichealth.org/acd/MRSA.htm>, 2006. The State of California says CA-MRSA did not originate from HA-MRSA: Health and Human Services Agency,

-
- Community-associated (CAMRSA)/Staph Infections: A Guideline for Athletic Departments, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>.
- ⁶⁸ http://www.hospitalinfection.org/press/022507washington_times.pdf
- ⁶⁹ 10%: APUA, *Update on antibiotic-resistant Staph aureus*, <http://www.tufts.edu/med/apua/mrsa/mrsa.html>. 12%: PandemicFlu, *CA-MRSA In Community Settings*, http://www.pandemicflu.ca/m_34.asp, 2005. 20%: JAAPA, “CA-MRSA skin infections: Coming to a patient near you,” *Journal of the American Academy of Physician Assistants*, <http://jaapa.com/issues/j20070107/articles/watch0107.htm>, 2007. 8 to 20%: Clinical and Scientific Affairs Council of the AAPA, “CA-MRSA skin infections: Coming to a patient near you,” *Journal of the American Academy of Physician Assistants*, <http://jaapa.com/issues/j20070107/articles/watch0107.htm>, 2007.
- ⁷⁰ APUA, *Update on antibiotic-resistant Staph aureus*, <http://www.tufts.edu/med/apua/mrsa/mrsa.html>.
- ⁷¹ Michael Hawkes et al, *Community-associated MRSA: Superbug at our doorstep*, <http://www.cmaj.ca/cgi/content/full/176/1/54>, 2007.
- ⁷² Mecklenburg, NC Health Department, *Let's Talk About ...*, <http://www.charmeck.org/Departments/Health+Department/Top+News/MRSA.htm>, 2008.
- ⁷³ HA-MRSA: Health and Human Services Agency, *Community-associated (CAMRSA)/Staph Infections: A Guideline for Athletic Departments*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>.
- ⁷⁴ JournalWatch, *CA-MRSA: Now in the Hospital*, <http://infectious-diseases.jwatch.org/cgi/content/full/2006/324/1>, 2006.
- ⁷⁵ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.
- ⁷⁶ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.
- ⁷⁷ APUA, *Update on antibiotic-resistant Staph aureus*, <http://www.tufts.edu/med/apua/mrsa/mrsa.html>.
- ⁷⁸ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.
- ⁷⁹ Dr. Norman Simmons, *MRSA—What Can We Do Now?*, http://www.doctors.net.uk/_datastore/pdf/mrsa_news.pdf
- ⁸⁰ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.
- ⁸¹ National Institutes of Health, *Necrotizing soft tissue infection*, <http://www.nlm.nih.gov/medlineplus/ency/article/001443.htm#Alternative%20Names>, 2008.
- ⁸² National Institutes of Health, *Necrotizing soft tissue infection*, <http://www.nlm.nih.gov/medlineplus/ency/article/001443.htm#Alternative%20Names>, 2008.
- ⁸³ National Institutes of Health, *Necrotizing soft tissue infection*, <http://www.nlm.nih.gov/medlineplus/ency/article/001443.htm#Alternative%20Names>, 2008.
- ⁸⁴ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.
- ⁸⁵ Wikipedia, *Sepsis*, <http://en.wikipedia.org/wiki/Sepsis>, 1-11-2008.
- ⁸⁶ Wikipedia, *Toxic shock syndrome*, http://en.wikipedia.org/wiki/Toxic_shock_syndrome, 1-6-08.
- ⁸⁷ Wikipedia, *Methicillin-Resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007; Centers for Disease Control and Prevention, *Methicillin-Resistant Staphylococcus aureus (MRSA) in Schools*, http://www.cdc.gov/ncidod/dhqp/ar_mrsa_in_schools.html, 2007.
- ⁸⁸ APUA, *Update on antibiotic-resistant Staph aureus*, <http://www.tufts.edu/med/apua/mrsa/mrsa.html>; : JAAPA, “CA-MRSA skin infections: Coming to a patient near you,” *Journal of the American Academy of Physician Assistants*, <http://jaapa.com/issues/j20070107/articles/watch0107.htm>, 2007; New York State Department of Health, *Community-Associated Methicillin-Resistant Staphylococcus Aureus (CA-MRSA) - Fact Sheet*, http://www.health.state.ny.us/diseases/communicable/staphylococcus_aureus/methicillin_resistant/community_associated/fact_sheet.htm, 2007; Judith Graham, *Deaths from drug-resistant bacteria top those from AIDS*, *Chicago Tribune*, http://www.chicagotribune.com/features/lifestyle/health/chi-mrsa17oct17.1.5132805_story?ctrack=1&csset=true, October 17, 2007.
- ⁸⁹ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>.
- ⁹⁰ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.
- ⁹¹ <http://genomics.weblog.glam.ac.uk/2007/8/13/new-mrsa-treatment>
- ⁹² Wikipedia, *Phage therapy*, http://en.wikipedia.org/wiki/Phage_therapy, 1-1-08.
- ⁹³ Wikipedia, *Phage therapy*, http://en.wikipedia.org/wiki/Phage_therapy, 1-1-08.
- ⁹⁴ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.
- ⁹⁵ Wikipedia, *Maggot therapy*, http://en.wikipedia.org/wiki/Maggot_therapy, 1-11-08.
- ⁹⁶ http://en.wikipedia.org/wiki/Maggot_therapy
- ⁹⁷ Jeremy Maniers, “How staph became drug-resistant threat,” *Chicagotribune.com*, 11-4-07.
- ⁹⁸ Jeremy Maniers, “How staph became drug-resistant threat,” *Chicagotribune.com*, 11-4-07.
- ⁹⁹ Jeremy Maniers, “How staph became drug-resistant threat,” *Chicagotribune.com*, 11-4-07.
- ¹⁰⁰ Jeremy Maniers, “How staph became drug-resistant threat,” *Chicagotribune.com*, 11-4-07.
- ¹⁰¹ Jeremy Maniers, “How staph became drug-resistant threat,” *Chicagotribune.com*, 11-4-07.
- ¹⁰² APUA, *Update on antibiotic-resistant Staph aureus*, <http://www.tufts.edu/med/apua/mrsa/mrsa.html>.

- ¹⁰³ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>.
- ¹⁰⁴ New York State Department of Health, *Community-Associated Methicillin-Resistant Staphylococcus Aureus (CA-MRSA) - Fact Sheet*, http://www.health.state.ny.us/diseases/communicable/staphylococcus_aureus/methicillin_resistant/community_associated/fact_sheet.htm, 2007; California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>.
- ¹⁰⁵ Lisa Collier Cool, "Deadly Superbugs, *Reader's Digest*, <http://www.rd.com/content/methicillin-resistant-staphylococcus-aureus/1/>, August 2007.
- ¹⁰⁶ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>.
- ¹⁰⁷ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>.
- ¹⁰⁸ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>.
- ¹⁰⁹ APUA, *Update on antibiotic-resistant Staph aureus*, <http://www.tufts.edu/med/apua/mrsa/mrsa.html>
- ¹¹⁰ APUA, *Update on antibiotic-resistant Staph aureus*, <http://www.tufts.edu/med/apua/mrsa/mrsa.html> California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹¹¹ Minnesota Department of Health, *MRSA: Antibiotic-resistant "Staph" Skin Infections*, <http://www.health.state.mn.us/divs/idepc/diseases/mrsa/mrsacommunity.html>, 2007.
- ¹¹² California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹¹³ APUA, *Update on antibiotic-resistant Staph aureus*, <http://www.tufts.edu/med/apua/mrsa/mrsa.html>.
- ¹¹⁴ New York State Department of Health, *Community-Associated Methicillin-Resistant Staphylococcus Aureus (CA-MRSA) - Fact Sheet*, http://www.health.state.ny.us/diseases/communicable/staphylococcus_aureus/methicillin_resistant/community_associated/fact_sheet.htm, 2007.
- ¹¹⁵ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹¹⁶ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹¹⁷ Wisconsin Department of Health, *Guidelines for Controlling Transmission*, http://dhfs.wisconsin.gov/communicable/resources/pdffiles/CAMRSA_SchoolGuidePPH42179_1007.pdf, 2007
- ¹¹⁸
- ¹¹⁹ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹²⁰ Spokane Regional Health District, *Living with MRSA*, <http://www.unc.edu/depts/spice/LivingWithMRSA.pdf>
- ¹²¹ Minnesota Department of Health, *MRSA: Antibiotic-resistant "Staph" Skin Infections*, <http://www.health.state.mn.us/divs/idepc/diseases/mrsa/mrsacommunity.html>, 2007.
- ¹²² California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹²³ Minnesota Department of Health, *MRSA: Antibiotic-resistant "Staph" Skin Infections*, <http://www.health.state.mn.us/divs/idepc/diseases/mrsa/mrsacommunity.html>, 2007.
- ¹²⁴ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>; County of Los Angeles Department of Health Services, *Los Angeles County Department of Health Services Guidelines for Reducing the Spread of Staph/CAMRSA in Non-Healthcare Settings*, http://www.lapublichealth.org/acd/docs/MRSA/MRSA_Guideline_12_20_04.pdf, 2004.
- ¹²⁵ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹²⁶ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹²⁷ Spokane Regional Health District, *Living with MRSA*, <http://www.unc.edu/depts/spice/LivingWithMRSA.pdf>
- ¹²⁸ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹²⁹ Michael Hawkes et al, *Community-associated MRSA: Superbug at our doorstep*, <http://www.cmaj.ca/cgi/content/full/176/1/54>, 2007.
- ¹³⁰ Minnesota Department of Health, *MRSA: Antibiotic-resistant "Staph" Skin Infections*, <http://www.health.state.mn.us/divs/idepc/diseases/mrsa/mrsacommunity.html>, 2007.

- ¹³¹ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹³² California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>.
Disinfect according to the manufacturer's instructions.
- ¹³³ County of Los Angeles Department of Health Services, *Los Angeles County Department of Health Services Guidelines for Reducing the Spread of Staph/CAMRSA in Non-Healthcare Settings*, http://www.lapublichealth.org/acd/docs/MRSA/MRSA_Guideline_12_20_04.pdf, 2004.
- ¹³⁴ County of Los Angeles Department of Health Services, *Los Angeles County Department of Health Services Guidelines for Reducing the Spread of Staph/CAMRSA in Non-Healthcare Settings*, http://www.lapublichealth.org/acd/docs/MRSA/MRSA_Guideline_12_20_04.pdf, 2004.
- ¹³⁵ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹³⁶ County of Los Angeles Department of Health Services, *Los Angeles County Department of Health Services Guidelines for Reducing the Spread of Staph/CAMRSA in Non-Healthcare Settings*, http://www.lapublichealth.org/acd/docs/MRSA/MRSA_Guideline_12_20_04.pdf, 2004.
- ¹³⁷ County of Los Angeles Department of Health Services, *Los Angeles County Department of Health Services Guidelines for Reducing the Spread of Staph/CAMRSA in Non-Healthcare Settings*, http://www.lapublichealth.org/acd/docs/MRSA/MRSA_Guideline_12_20_04.pdf, 2004.
- ¹³⁸ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹³⁹ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹⁴⁰ County of Los Angeles Department of Health Services, *Los Angeles County Department of Health Services Guidelines for Reducing the Spread of Staph/CAMRSA in Non-Healthcare Settings*, http://www.lapublichealth.org/acd/docs/MRSA/MRSA_Guideline_12_20_04.pdf, 2004.
- ¹⁴¹ Monte Kline, *MRSA, The Superbug*, <http://www.pacifichealthcenter.com/updates/76.asp>, 2005. See also Andrew Watts, *MRSA superbug on pork and chicken raises health fears*, <http://www.fwi.co.uk/Articles/2007/06/25/104664/mrsa-superbug-on-pork-and-chicken-raises-health-fears.html>, 2007.
- ¹⁴² Lisa Collier Cool, "Deadly Superbugs, *Reader's Digest*, <http://www.rd.com/content/methicillin-resistant-staphylococcus-aureus/1/>, August 2007.
- ¹⁴³ County of Los Angeles Department of Health Services, *Los Angeles County Department of Health Services Guidelines for Reducing the Spread of Staph/CAMRSA in Non-Healthcare Settings*, http://www.lapublichealth.org/acd/docs/MRSA/MRSA_Guideline_12_20_04.pdf, 2004.
- ¹⁴⁴ National Certification Board for Therapeutic Massage and Bodywork, *Standards of Practice*, http://www.ncbtmb.com/about_standards_of_practice.php, 2007.
- ¹⁴⁵ Maryland State Department of Education and others, *Management of Communicable Diseases In a School Setting* (2002), <http://www.marylandpublicschools.org/NR/rdonlyres/6561B955-9B4A-4924-90AE-F95662804D90/3284/CommunicableDiseaseFINAL.pdf%23search='maryland%2520department%2520of%2520health%2520and%2520mental%2520hygiene'>; National Health Museum, *NHM Health Focus: Hand washing*, http://www.accessexcellence.org/HHO/HRC/HF/handwashing_2006.html, 2006.
- ¹⁴⁶ Centers for Disease Control, *Why is hand washing important?*, <http://www.cdc.gov/od/oc/media/pressrel/r2k0306c.htm>, 2002; Epidemiology & Disease Control Program (Maryland), *Preventing Infectious Diseases Fact Sheet* (2002) http://www.cha.state.md.us/edcp/pdf_factsheets/PREVENTING%20INFECTIOUS%20DISEASE.pdf; California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹⁴⁷ Centers for Disease Control, *Why is hand washing important?*, <http://www.cdc.gov/od/oc/media/pressrel/r2k0306c.htm>, 2002; Epidemiology & Disease Control Program (Maryland), *Preventing Infectious Diseases Fact Sheet* (2002) http://www.cha.state.md.us/edcp/pdf_factsheets/PREVENTING%20INFECTIOUS%20DISEASE.pdf; California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹⁴⁸ Christine Case, Ed.D., *Hand Washing*, http://www.accessexcellence.org/AE/AEC/CC/hand_background.html. Dr. Semmelweis' students washed in a chlorinated solution.
- ¹⁴⁹ Christine Case, Ed.D., *Hand Washing*, http://www.accessexcellence.org/AE/AEC/CC/hand_background.html
- ¹⁵⁰ Christine Case, Ed.D., *Hand Washing*, http://www.accessexcellence.org/AE/AEC/CC/hand_background.html
- ¹⁵¹ Christine Case, Ed.D., *Hand Washing*, http://www.accessexcellence.org/AE/AEC/CC/hand_background.html
- ¹⁵² Centers for Disease Control, *Why is hand washing important?*, <http://www.cdc.gov/od/oc/media/pressrel/r2k0306c.htm>

-
- ¹⁵³ Microbe World, *Caught Dirty-Handed*, http://www.microbeworld.org/resources/experiment/experiment_caught_dirty_handed.aspx, 2006.
- ¹⁵⁴ Timothy Dellit, MD, et al, *Guidelines*, <http://www.tpchd.org/files/library/d380703780a24627.pdf>, 2007.
- ¹⁵⁵ Timothy Dellit, MD, et al, *Guidelines*, <http://www.tpchd.org/files/library/d380703780a24627.pdf>, 2007.
- ¹⁵⁶ Wikipedia, *Methicillin-resistant Staphylococcus aureus*, <http://en.wikipedia.org/wiki/Mrsa>, 2007.
- ¹⁵⁷ Timothy Dellit, MD, et al, *Guidelines*, <http://www.tpchd.org/files/library/d380703780a24627.pdf>, 2007.
- ¹⁵⁸ Timothy Dellit, MD, et al, *Guidelines*, <http://www.tpchd.org/files/library/d380703780a24627.pdf>, 2007.
- ¹⁵⁹ Mecklenburg, NC Health Department, *Let's Talk About ...*, <http://www.charmeck.org/Departments/Health+Department/Top+News/MRSA.htm>, 2008.
- ¹⁶⁰ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>; Minnesota Department of Health, *MRSA: Antibiotic-resistant "Staph" Skin Infections*, <http://www.health.state.mn.us/divs/idepc/diseases/mrsa/mrsacommunity.html>, 2007.
- ¹⁶¹ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>.
- ¹⁶² Dr. Dean Rieger, et al, *Spotlight: So Your Facility Has CA-MRSA*, <http://www.thebody.com/content/art12990.html>, 2004.
- ¹⁶³ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹⁶⁴ Minnesota Department of Health, *MRSA: Antibiotic-resistant "Staph" Skin Infections*, <http://www.health.state.mn.us/divs/idepc/diseases/mrsa/mrsacommunity.html>, 2007.
- ¹⁶⁵ National Certification Board for Therapeutic Massage and Bodywork, *Standards of Practice*, http://www.ncbtmb.com/about_standards_of_practice.php, 2007.
- ¹⁶⁶ Spokane Regional Health District, *Living with MRSA*, <http://www.unc.edu/depts/spice/LivingWithMRSA.pdf>
- ¹⁶⁷ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹⁶⁸ Michael Hawkes et al, *Community-associated MRSA: Superbug at our doorstep*, <http://www.cmaj.ca/cgi/content/full/176/1/54>, 2007.
- ¹⁶⁹ County of Los Angeles Department of Health Services, *Los Angeles County Department of Health Services Guidelines for Reducing the Spread of Staph/CAMRSA in Non-Healthcare Settings*, http://www.lapublichealth.org/acd/docs/MRSA/MRSA_Guideline_12_20_04.pdf, 2004.
- ¹⁷⁰ California Health and Human Services Agency, *Prevention and Management of CAMRSA Infections*, <http://www.cdph.ca.gov/healthinfo/discond/Documents/CAMRSAInfectionsGuidelineAthleticsDepartment.pdf>
- ¹⁷¹ Dr. Norman Simmons, *MRSA—What Can We Do Now?*, http://www.doctors.net.uk/_datastore/pdf/mrsa_news.pdf
- ¹⁷² Dr. Norman Simmons, *MRSA—What Can We Do Now?*, http://www.doctors.net.uk/_datastore/pdf/mrsa_news.pdf