



STATE OF WASHINGTON

DEPARTMENT OF HEALTH

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TO: Mary C. Selecky, Secretary of Health

FROM: Jude Van Buren, Assistant Secretary
Epidemiology, Health Statistics & Public Health Laboratories

SUBJECT: **Methicillin-Resistant *Staphylococcus Aureus* (MRSA) Final Report**

Here is the final report you requested about the pilot monitoring project for invasive methicillin-resistant *Staphylococcus Aureus* (MRSA) we conducted from December 2007 to April 2008.

Thank you.

Monitoring for Invasive Methicillin-Resistant *Staphylococcus Aureus* (MRSA)

The Washington State Department of Health conducted a pilot monitoring project from December 2007 through April 2008 to see if monitoring invasive methicillin-resistant *Staphylococcus aureus* (MRSA) infections statewide is practical and useful. We collected laboratory reports of positive MRSA cases for all cases that met the case definition of invasive MRSA. This report provides the background, findings, and a summary of the pilot project.

Summary

- Methicillin-resistant *Staphylococcus aureus* (MRSA) infections are increasing throughout the nation and in Washington, especially mild skin and soft tissue infections. The increase has been seen in health care settings and from community exposures.
- A MRSA monitoring feasibility project confirmed that severe invasive infections are occurring throughout the state, particularly in middle aged and older persons.
- Ongoing tracking of MRSA would require infection control programs within hospitals, voluntary monitoring (sentinel surveillance) through local or state public health agencies, and monitoring antibiotic resistance patterns from laboratory data.

Background – Staph Infections and MRSA

Staphylococcus aureus (“staph”) are among bacteria that commonly live on the skin and occasionally cause infections. Healthy people carry these bacteria in the nose, armpits, groin, and other skin areas. Staph can spread among people with crowded living conditions, poor health habits and hygiene, or frequent skin contact.

Most staph infections are minor (such as pimples and boils) and can be treated without antibiotics. Some staph infections are serious invasive infections (involving the blood or internal organs) that need antibiotic treatment. Penicillin and related antibiotics no longer work against MRSA, one of many emerging antibiotic-resistant organisms. The over-use of antibiotics has led to increasing numbers and types of bacterial infections that are resistant to commonly used antibiotics. While an infection caused by MRSA can be treated by (is “sensitive to”) other available antibiotics, the resistance of many bacterial infections has reduced the types of antibiotics that can be used effectively to combat those infections.

Starting in the 1960s the number of resistant MRSA infections acquired in health care facilities (such as hospitals, nursing homes, and dialysis centers) began to grow. Patients in these facilities often have damaged skin, surgical wounds, or immune system problems, putting them at greater risk for any skin infection. In the last decade, community-associated MRSA infections (not related to health care facilities) have been a growing problem. Such infections may be acquired in community settings such as schools, day cares, or the work place.

The same health measures will prevent all staph infections as well as many other health care associated or skin infections. Prevention measures include: good hygiene and health habits, proper hand washing, and care of skin wounds or infections.

MRSA Across the Nation

In fall 2007 an article in the *Journal of the American Medical Association (JAMA)* summarized reports from nine locations in the country that were tracking MRSA infections. During 2004-2005 most MRSA infections were associated with health care settings. The article also documented a well-recognized national trend of an increase in MRSA infections, particularly community-acquired infections. (Available at <http://jama.ama-assn.org/> “Invasive Methicillin-Resistant *Staphylococcus aureus* Infections in the United States” JAMA, October 17, 2007; 298:1763 – 1771).

Department of Health collected data about MRSA in Washington during 2002-2004. Hospitals and laboratories participating in Washington’s Antibiotic Resistance Sentinel Network voluntarily reported summary six month reports of antibiotic resistant infections. During these evaluation years there was a rapid increase in the percentage of MRSA among *S. aureus* cultures overall. The percentage of *S. aureus* cultures identified as MRSA went from 28 percent to 43 percent. At the same time, a similar increase occurred among specimens from laboratories serving outpatients only. The increase in the percentage of *S. aureus* cases that are MRSA and are considered community acquired infections climbed from 19 percent to 35 percent. (Available at <http://www.doh.wa.gov/Topics/Antibiotics/Documents/data2004MRSAupdate.pdf>).

Over the past several years, two Washington public health regions and a healthcare organization conducted MRSA tracking. During 2003-2006 the regions received voluntary reporting from hospitals, long term care facilities, outpatient clinics, and commercial laboratories. Rates of MRSA infections increased in both regions for all age groups, following the national trend. Invasive infections remained relatively stable with the increase due to minor skin and soft tissue infections treated primarily at ER and outpatient sites. These minor MRSA infections were most likely community acquired. (Available at <http://www.doh.wa.gov/EHSPHL/epitrends/08-epitrends/08-01-epitrends.pdf>).

Current Work to Address MRSA in Washington

The goals of any effort to reduce antibiotic resistance infections are to decrease the over-use of antibiotics; control hospital spread and outbreaks of MRSA; track MRSA through community-based monitoring; and to identify any new changes in MRSA resistance to antibiotics.

In response to national concerns about invasive MRSA, in November 2007, the governor asked the state Department of Health to:

- Convene a scientific panel to develop evidence-based recommendations for monitoring strategies and interventions for all antibiotic-resistant organisms.
- Work with partners to provide education about MRSA infections and their prevention.
- Monitor for invasive MRSA infections through voluntary laboratory reporting.

Scientific Panel

Governor Chris Gregoire directed the Department of Health to convene a Scientific Expert Panel to answer the following question: “*What are evidence-based recommendations for the most effective monitoring strategies and interventions for all antibiotic resistant*”

organisms, including MRSA?” This group found options for responding to MRSA and other multidrug-resistant organisms include effectively treating infections, preventing person-to-person transmission, and taking steps to prevent drug resistance. Monitoring multidrug-resistant organisms (MDROs) is required to successfully implement and measure any of these responses. Measures for MDRO control that have been successful in health care facilities include hand washing, monitoring, infection control measures, environmental cleaning, and restrictions on, or oversight of, antibiotic use in certain clinical settings.

Recommendations from the panel emphasized keeping patients and the public safe from infectious pathogens. The complete report is available at <http://www.doh.wa.gov/Topics/Antibiotics/Documents/MRSA-report-2008.pdf>. The expert panel recommended the following monitoring and intervention strategies to:

- Inform and support infection control measures to decrease and prevent transmission of MRSA
- Monitor trends in the incidence of MRSA infections in Washington
- Help guide the development of educational materials for the public and health care providers on ways to prevent and treat MRSA infections.

Educational Interventions

Since 1998, the state Department of Health has partnered with providers, local health agencies, and community organizations to provide education on selective antibiotic use. This work has included developing and distributing practice and prescribing guidelines to physicians; creating and maintaining educational materials; and sending letters to providers, pharmacies, local health and school nurses informing them of the availability of educational materials. The educational materials proved to be very popular and orders exceeded 500,000 in 2003-2004. Materials were translated into Spanish, Russian and Vietnamese. In 2006, the Department of Health collaborated with Tacoma-Pierce County Health Department, Group Health, and MultiCare to revise the “Living with MRSA” booklet. The Department of Health continues to maintain a web page on antibiotic resistance that provides current resources and publications.

Invasive MRSA Monitoring Feasibility Project

In answer to the governor’s request, the state health department began a feasibility project to monitor voluntary laboratory reporting of invasive MRSA cases. Health staff quickly contacted the commercial laboratories to ask them to voluntarily report directly to our Communicable Disease Epidemiology Section through existing data collection systems.

Invasive MRSA represents the most serious infections and was defined for this feasibility project as the first positive culture from a normally sterile site (e.g., taken from blood, bone, or internal organ) for a patient in a three month or quarterly interval. Pneumonias were not included because the lab reports did not show if a respiratory specimen was from a severe pneumonia or nasal specimen in a healthy person.

The goals of the monitoring project were to:

- Get a snapshot of the number of invasive MRSA cases and age groups affected.
- Confirm that invasive MRSA cases occur throughout the state.
- Evaluate the feasibility of conducting ongoing laboratory MRSA surveillance.

Lessons from the MRSA Monitoring Project

Response from laboratories was excellent. Almost all laboratories that provide testing for MRSA across the state agreed to participate in the voluntary reporting. The monitoring feasibility project confirmed that invasive MRSA infections are present throughout the state. We learned that infections are occurring primarily among middle aged and older persons. We expect people in these age groups to have a greater chance of having a weakened immune system or for being hospitalized for other medical conditions and acquiring MRSA infections.

Laboratory reporting for MRSA requires less involvement of staff from local and state public health agencies, laboratory personnel, and health care providers as the lab values are submitted either electronically or via a FAX to the state. As not all labs are able to analyze for MRSA, reporting is through a small number of laboratories. The reporting does not require time from health care providers, hospital infection control personnel, or public health investigators to investigate individual cases. However, we learned that laboratory monitoring has many challenges as a system used to understand the total numbers of cases of disease among a population. These include:

- No clear mechanism to determine if participating laboratories reported all cases.
- No method to tell from laboratory reports if a case was invasive (severe).
- Laboratory reports often lack age and residence information.
- Lab reports do not state whether the patient was hospitalized.
- It is impossible to tell if an infection was healthcare or community associated.
- It is impossible to calculate rates (total cases in a population) or compare to other data so the overall evaluation of how big the problem might be can be determined.

This project showed that MRSA monitoring requires additional approaches to support laboratory reporting so that results are meaningful. The Department of Health supports the recommendations of the Governor's MRSA Scientific Panel:

- Conduct standardized hospital-based monitoring to evaluate disease risks in a hospital so that transmission of multi-drug resistant organisms among high risk patients can be prevented in that hospital.
- Conduct voluntary sentinel (or selective) monitoring to include community-associated MRSA and reporting of results through local or state public health agencies.
- Monitor trends in antibiotic resistance patterns of infections using summary antibiotic resistance data from clinical laboratories.

These recommendations provide an efficient approach to tracking MRSA and other antibiotic resistant organisms among hospitals and communities.

The Department of Health is grateful to the many laboratories across this state that participated in the project. Their contribution to public health in Washington is sincerely appreciated.

APPENDIX

Detailed Findings of the Invasive MRSA Surveillance Feasibility Project

Of 110 eligible laboratories in Washington, 104 agreed to participate including hospital and other commercial laboratories. This is outstanding participation. In addition, 10 of 15 laboratories contacted in Oregon and Idaho agreed to report invasive MRSA cases that were collected for Washington residents.

From January 1 through March 30, 2008, 39 laboratories submitted 229 invasive MRSA reports. There were 148 males, 80 females, and one unknown gender. Patient ages ranged from less than one year to 95 years with a median of 58 years. Eight cases were under 18 years old. Residential zip code was available for only 73 cases (32 percent) from 17 counties, including five eastern and 12 western counties.

Almost all specimens (187) were from blood. There were 19 lung washings (bronchoalveolar lavage), eight from joint fluid, eight from pleural fluid (around the lungs), three from peritoneal fluid (around abdominal organs), two from cerebrospinal fluid (CSF), one from bone, and one from lung tissue.