Summary Report: Pilot Program to Require Reporting of Methicillin-resistant *Staphylococcus aureus* (MRSA)

Prepared by the Texas Department of State Health Services as required by House Bill 1362, 81st Regular Texas Legislative Session

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Introduction

Staphylococcus aureus is a bacteria and is a common cause of skin and soft tissue infections. Infections with this bacteria are often called "staph" infections. Staph skin infections generally start as small red bumps that resemble pimples, boils or spider bites. .These red bumps can quickly turn into more serious infections such as boils, (a bump or swelling under the skin), folliculitis (infections of the hair follicles), impetigo (pus-filled blisters on the skin) and cellulitis (flat red skin infections). At times the words abscess and carbuncle are interchangeably used to describe boils and impetigo. Most of the time the bacteria remain confined to the skin. However, staph bacteria can also penetrate into the body, causing potentially life-threatening infections in the bloodstream, bones, joints and lungs.

Staph infections are treated with antibiotics. Pencillin and cephalosporins are frequently used. Some *Staphylococcus aureus* are resistant to a large group of antibiotics called the beta-lactams, which include methicillins, penicillins and the cephalosporins. *Staphylococcus aureus* that are resistant to these beta-lactams are called methicillin-resistant *Staphylococcus aurues* (MRSA).

Staphylococcus aureus commonly colonizes the anterior nares (the nostrils), although the scalp, armpits and groin are also colonization sites. Colonization means that the staph bacteria are presents on the body but is not causing illness. Healthy individuals may carry MRSA asymptomatically for periods ranging from a few weeks to many years. Approximately 30% of the population is colonized with *S. aureus* at any given time. Only 1-2% of the population is colonized with methicillin-resistant *S. aureus*. This would mean 230,000 to 460,000 Texans may be colonized with MRSA. Persons colonized with staph can be a source of infections for themselves and for others.

MRSA is spread by direct skin-to-skin contact with a person who has an infections or who is colonized with MRSA. MRSA can be also spread by sharing contaminated items such as towel and clothing and touch surfaces contaminated with MRSA. Persons at risk of infections include: 1) persons with weaken immune systems (people living with HIV/AIDS, cancer patients, etc.), 2) persons with diabetes, 3) persons participating in contact sports, 4) persons staying in a health care facility for an extended period of time, and 5) persons with a history of jail or prison incarceration.

Ways to stop the spread of MRSA include 1) keeping infected areas covered, 2) washing hands, 3) avoiding contact with other persons with MRSA infections, 4) washing clothes and linens contaminated with MRSA and 5) avoiding sharing personal items such as towels.

A recent report estimated that the number of patients hospitalized with MRSA infections in the United States ranged from approximately 127,000 in 1999 to over 278,000 in 2005.[1] The number of MRSA-related deaths was estimated to average 5,500 per year.

Few studies have estimated the occurrence of MRSA infections in a specific city or county. A study performed in San Francisco, California estimated the annual occurrence of MRSA infections to be 532 infections per 100,000 population or about 5 infections annually for every 1,000 people.[2] Other studies in various city, counties or states have reported from 274 to 1,667 infections annually per 100,000 population[3] (Table 1).

Section 81.0445, Methicillin-resistant Reporting Procedures Pilot Program, Health & Safety Code, was amended during the 81st Regular Texas Legislative Session. This legislation stated that the program shall be administered locally and that health authorities shall not be required to participate in the program. Subsection (a) requires the establishment of a second pilot program for reporting methicillin-resistant *Staphylococcus aureus* (MRSA). The initial pilot program was conducted in 2009.

Subsections (b) and (c) require: 1) selection of a health authority to administer the program, 2) all clinical laboratories within the area served by the health authority to report all cases of MRSA, 3) the pilot program to track the prevalence of MRSA and study the cost and feasibility of adding MRSA to the reportable disease list, 4) collection of data regarding possible sources and prevention of MRSA, and 5) recommendations by the health authority to the Texas Department of State Health Services (DSHS) regarding data collection, data management and analysis.

Methodology

The Texas Association of Local Health Officials (TALHO) was consulted for identifying health authorities interested in conducting the pilot program. Three local health authorities expressed interest in participating in the pilot program. Selection of these three health authorities provided areas different in geographic location, population size and population characteristics compared with participating locations in 2009, i.e. Amarillo Bi-City-County Health District, Brazos County Health Department and the San Antonio Metropolitan Health District.

For the second pilot program, DSHS recruited three local health departments to participate. These departments included:

1. Angelina County and Cities Health District;
2. Waco-McLennan County Public Health District; and
3. Fort Bend County Health and Human Services.

This second pilot program was conducted during March 2011.

Data from only one health authority (Angelina County and Cities Health District) however is presented in this report. One of the interested local health authorities was unable to initiate the program due to the extended absence of an epidemiologist. The third interested local health authority was unable to provide the surveillance data for inclusion in this report.

Staff from the health districts participated in conference calls and other discussions on implementation of the pilot program, development of rules for methicillin-resistant *Staphylococcus aureus* (MRSA) reporting and development of a case reporting form. Demographic information, information on the MRSA culture and risk factor information was collected.

Clinical and hospital laboratories within the health districts were required to report all positive (MRSA) cultures from specimens collected during March 1, 2011 through March 31, 2011. Staff at the health district reviewed hospital and/or laboratory records to identify patients with physical addresses within the health authorities' jurisdictions (Angelina County). Interviews were attempted only on those patients residing within the health authorities' jurisdictions.

Results

A total of 40 persons with methicillin-resistant *Staphylococcus aureus* (MRSA) infections were reported from Angelina County during March 2011. Table 1 shows the number of reported MRSA infections by county, the projected annual number of cases and the projected annual incidence rate. The projected annually incidence rate was 578 cases per 100,000 population. This incidence rate was higher compared with the projected incidence rates of Bexar, Brazos and Potter/Randall counties determined by the March 2009 project[4].

Table 2 shows the number of cases by county and age groups. Persons with MRSA infections in Angeline County ranged in age from two months to 99 years, half were 50 years of age or older. Overall, a slight majority (55 percent of the persons with reported infections in Angelina Count were in males. A majority (87 percent) of persons with reported infections was White and 13 percent were African-American. Hispanics represented 31 percent of the persons with infections reporting white race.

Most of the persons with infections (69 percent) had wound, soft tissue or skin infections. The body site or source of the clinical specimen that grew methicillin-resistant *Staphylococcus aureus* is shown in Table 3. Wounds, abscesses or sores on the leg or hips were the most frequent (21 percent) site followed by wounds on the foot or trunk (3 percent). Small percentages of persons had MRSA isolated from a respiratory tract source (18 percent), urine (15 percent) or blood (3 percent). These persons had respiratory, urinary tract infections or bloodstream infections respectively, caused by MRSA.

Interviews were completed for of the 34 (85 percent) persons with MRSA infections in Angelina County. Risk factors for MRSA infections for these persons are summarized in Table 4. Hospitalization within the past 12 months was the most frequent (58 percent) reported risk factor followed by a history of previous MRSA infection within the past 12 months (34 percent). Ten persons (29 percent) reported being a resident of a long-term care facility. Eight persons (24 percent) reported contact with someone else with a MRSA infection.

Some persons had multiple MRSA risk factors. Nine persons reported a history of hospitalization and surgery within the past 12 months. Five persons reported hospitalization, surgery and residing in a long-term care facility with the past 12 months.

Discussion

The pilot program provided information related to the occurrence or incidence of MRSA infections in Angelina County, TX. The projected annual incidence of MRSA infections in Angelina County is 578 per 100,000 population. This annual incidence rate is similar to MRSA incidence rates determined in three other Texas communities. Extrapolating the Angelina County incidence rate to the Texas population, an estimated 144,000 MRSA infections may occur annually in Texas.

The number of MRSA infections in Angelina County is probably higher than the 40 infections reported. County residents may have medical providers that use clinical laboratories located in surrounding counties including Harris County (City of Houston). Clinical reference laboratories located outside Angelina County that tested specimens collected from Angelina County residents were not required to report. To contact clinical laboratories outside Angelina County would have been too burdensome for Angelina County & Cities Health District staff.

Staff from the Angelina County & Cities Health District reported the following experiences to DSHS:

1) collecting MRSA culture reports from clinical laboratories during March 2011 was laborious for local health department staff;
2) culture reports from laboratories frequently lacked pertinent patient information such as patient address and telephone number necessitating follow-up calls to the clinical laboratories, hospitals or patient's physician office;
3) attempting to interview persons with MRSA infections required multiple telephone calls; and
4) local health authority staff have little or no resources for reducing the number of MRSA infections with the community.

Adding MRSA infections to the reportable disease list would create challenges for local and regional health departments and DSHS to implement and sustain reporting for a disease with potentially over 144,000 reports annually. In addition, clinical and hospital laboratories may not have the capabilities and resources to report each person diagnosed with a MRSA infection. Without sufficient financial support for the clinical laboratories, hospitals and the local and regional health departments, it is unlikely these entities would be capable of conducting and sustaining activities related to MRSA surveillance and reporting.

References

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Table 1. Reported or estimated annual incidence rates by geographic locations in the United States.

Location	Study Time Period	Number of Identified Infections	Annual Incidence Rate per 100,000 Population	Reference
San Francisco, CA	2004-2005	3,826	532	2
Portland, OR	2005	4,357	290	3
Baltimore, MD	2005	10,600	1,667	3
Ramsey, MN	2005	1,357	274	3
Connecticut	2005	13,600	389	3
Veterans Affairs Maryland Health Care System	1999-2008	2,256	461	5
Bexar County, TX	March 2009	613	470	4
Brazos County, TX	March 2009	67	482	4
Potter/Randall Counties, TX	March 2009	95	480	4
Angelina County, TX	March 2011	40	578	N/A

Table 2. Number of reported MRSA infections during March 2009 and March 2011 by county and age group.

Age Group (in years)	Bexar County, March 2009	Brazos County, March 2009	Potter & Randall counties, March 2009	Angelina County, March 2011	Total
Less than 1	15	0	0	3	18
1-4 yrs	59	5	11	3	78
5-9 yrs	26	1	4	2	33
10-19	55	7	12	1	75
20-29	80	17	11	2	110
30-39	62	7	12	4	85
40-49	90	9	12	4	115
50-59	85	10	11	5	111
60-69	55	7	7	4	73
70 and older	85	4	15	12	116
Unk	1	0	0	0	1
Total	**613**	**67**	**95**	**40**	**815**

Table 3. Body site or source of clinical specimen for MRSA infections, Angelina County, March 2011

Body Site or Source	Number	Percentage
Leg or hip	7	21.2
Respiratory	6	18.2
Urine	5	15.2
Foot	3	9.1
Trunk	3	9.1
Face, head or neck	2	6.1
Genital	2	6.1
Arm	1	3.0
Buttocks	1	3.0
Blood	1	3.0
Hand	1	3.0
Groin	1	3.0
Not reported	7	-
Total	**40**	

Table 4. Risk factors presence within the 12 months prior to the MRSA infection, Angelina County, March 2011.

Risk Factor	Number	Percentage
Being a hospital inpatient	19	58
Previous MRSA infection	10	34
Being a resident of a long-term care facility	10	29
Having prior surgery	9	27
Contact with someone with a MRSA infection	8	24
Being a healthcare worker (HCW) or household member is a HCW	1	3
Working out in an athletic club or gym	0	-
Participating in team sports	0	-
Incarceration in a jail or prison	0	-
Receiving a new tattoo	0	-

Methicillin-resistant *Staphylococcus aureus*
Patient Investigation Form

Patient Name:_____
Last First

Address: _____
Street City Zip Code

Phone Number: _(_____)_____ Date of Birth: _____ Age: _____

Gender: Male or Female Race: _____ Ethnicity: _____

Date of MRSA Culture: _____

1. What was your occupation at the time you were cultured? _____

2. At the time you were cultured; did you live in a dormitory or barracks? Yes No

3. Have you ever had a previous culture positive for MRSA
   If yes, date _____

Within the past 12 months (from date of culture), have you:

4. Been an inpatient in a hospital: Yes No Don't remember

5. Had surgery: Yes No

6. Received kidney dialysis: Yes No

7. Lived in a long-term care facility or nursing home: Yes No

8. Had a catheter inserted into your body? Yes No

Within the past 12 months (from date of culture), have you:

9. Had intravenous, e.g. IV, therapy? Yes No

10. Had a feeding tube inserted into the abdomen? Yes No

11. Had a medical device, tube or needle that remained in your vein to administer any type of medicine or food? Yes No

12. Had contact with someone with MRSA: Yes No
    Relationship: _____

Patient Name:_____

Within the past 12 months (from date of culture), have you:

13. Had a skin infection? Yes No

14. Had a boil or sore with pus? Yes No

15. Been bitten by a spider? Yes No

16. Received a new tattoo? Yes No

17. Been told by a doctor that you had an infection called MRSA, "mersa," or antibiotic resistant Staph? Yes No

With in the past 12 months (from date of culture), have you:

18. Been incarcerated in any county jail? Yes No

19. Been incarcerated in a state prison? Yes No

20. Lacked access to stable housing (e.g. slept on the street, in a vehicle or in a homeless shelter? Yes No

21. Worked out in an athletic club or gym? Yes No

22. Participated in team sport? Yes No
    a. If Yes, note the team sport: wrestling football other _____

General questions.
At the time the patient was cultured:

23. Was a household member a health care worker? Yes No

24. If child, did they attend a day-care center? Yes No

25. If adult, did they work in a day-care center? Yes No

26. If adult, did they work in a detention center, jail or prison? Yes No