A Study on the Prevalence and Treatment of Methicillin-Resistant Staphylococcus Aureus In the Native American Population of La Push, Washington

Alexaus Toland
Pacific University
A Study on the Prevalence and Treatment of Methicillin-Resistant Staphylococcus Aureus In the Native American Population of La Push, Washington

Abstract
Purpose: The purpose of this study was to determine the incidence of Methicillin Resistant Staph Aureus (MRSA) infections among the Native American populations of La Push Washington. The study also examined the treatment of these infections and assessed whether they were treated in accordance with national and state guidelines.

Methods: A chart review was done over all the cases of cellulitis and abscess recorded from 2003 until 2008. The charts were examined for cases of soft tissue Community Acquired MRSA (CA-MRSA). The data was then assessed for prevalence of CA-MRSA, its reoccurrence, treatment, and the effectiveness of treatment.

Results: The data revealed that there were 42 patients with soft tissue CA-MRSA. There appears to be a trend of increased cases which reflects the trend for the rest of the state of Washington. Most of these patients were treated by national standard with incision and drainage as well as with antimicrobial therapy when appropriate. The data also showed a great number of recurrent infections despite being treated appropriately.

Conclusion: CA-MRSA is an increasing problem in healthcare. Appropriate treatment and patient education are key factors in overcoming these infections. More research is needed to determine if there is a specific cause for the relatively high rate of reoccurrence in soft tissue MRSA infections in La Push Washington. The rate of original infection seems to follow the trend of the rest of the state, but a comparison of reinfection was not obtained from Washington State.

Degree Type
Capstone Project

Degree Name
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Keywords
MRSA, Methicillin-Resistant Staphylococcus Aureus, Native American, Quileute

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A Study on the Prevalence and Treatment of Methicillin-Resistant Staphylococcus Aureus
In the Native American Population of La Push, Washington.

By:

Alexaus Toland

A Clinical Research Project Submitted to the Faculty of the
School of Physician Assistant Studies
Pacific University, Hillsboro, OR
For the Masters of Science Degree August, 2008

Faculty Advisor: Clara LaBoy MS PA-C
Clinical Project Advisor: Jonathon W Gietzen MS PA-C
STATEMENT OF ACCEPTANCE:

This project is hereby accepted as a requirement for completion of the degree of: Masters of Science in Physician Assistant Studies at Pacific University School of Physician Assistant Studies on this day the sixteenth of August, 2008.

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Author

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Clinical Project Coordinator

H. F. Randolph III, PA-C, MPAS
Program Director

Date

Date

Date
Alexaus Toland grew up in the rural Uintah Mountains of North Eastern Utah. She grew up in a farming/ranching community with limited medical resources. It could take up to an hour’s drive to meet with a Doctor. When Alexaus was in high school the community received the help of a nurse practitioner, and a neighboring community brought in a physician assistant. She noted the great impact these professionals had in helping to meet the needs of her community; she found it inspiring and strongly considered becoming a PA. Her father was an active volunteer EMT in the community. She took the EMT courses and became an intermediate EMT. She became aware of the role respiratory therapists play in the ER during several medical emergencies and decided to pursue a career in respiratory therapy. She attended Weber State University and received a Bachelor’s degree in Respiratory Therapy. She worked at LDS hospital in Salt Lake City Utah for 5 years, where she worked in 5 different adult ICUs, the newborn ICU, and in hyperbaric medicine. She wanted to be able to do more for her patients and decided to attend school to become a physician assistant. She is currently enrolled at Pacific University and hopes to work in a rural setting when she is finished. Alexaus enjoys Scuba diving, reading, hiking, camping, and spending time with family, her family owns a bee farm and she enjoys helping out with those activities as well.
Abstract

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**Conclusion:** CA-MRSA is an increasing problem in healthcare. Appropriate treatment and patient education are key factors in overcoming these infections. More research is needed to determine if there is a specific cause for the relatively high rate of reoccurrence in soft tissue MRSA infections in La Push Washington. The rate of original infection seems to follow the trend of the rest of the state, but a comparison of reinfection was not obtained from Washington State.

**Keywords:** MRSA, Methicillin-Resistant Staphylococcus Aureus, Native American, Quileute.
Acknowledgements

A great big special thank you to the staff of the Quileute clinic: Veryl Garibay and Rosita Matson for putting up with me rummaging around their office looking at charts and helping me find the ones that seem to have dropped off the face of the earth. Terry Markistrum for helping me to navigate the clinic’s database. Pat Braithwaite for helping me find my way around the clinic and finding elusive documents. Thanks to Terri Demorest, Darla Schumack, Sandi Ward, Lesa Whorton and Bob Bouck for being friendly and their willingness to help. Thank you to Brad Krall for mentoring me as a student, and for being open, friendly, and willing to take the time to answer my questions. Thank you to Brenda Neilson, for allowing me to return to her facility and for helping me to get this project rolling - without their support I would not have been able to write this paper.

Thank you to Professor Jon Gietzen, for helping me to navigate the waters of research, and thank you to the faculty and staff of Pacific University’s Physician Assistant program and all their excellent teaching.

Thank you to my Mother and Father for teaching me to keep working no matter how hard it gets. Thanks to my Sister who’s always been there for me. Thanks to Barlow Hardy for letting me cry on his shoulder when I wanted to give up.

And thanks most of all to my Father in Heaven - with Him, all things are possible
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Figure 7………………………………………….Recurrence in association of treatment
### List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-MRSA</td>
<td>Community acquired Methicillin-Resistant Staphylococcus aureus</td>
</tr>
<tr>
<td>CDC</td>
<td>Center for Disease Control</td>
</tr>
<tr>
<td>FDA</td>
<td>Food and drug administration</td>
</tr>
<tr>
<td>I &amp; D</td>
<td>Incision and drainage</td>
</tr>
<tr>
<td>IRB</td>
<td>Institutional Review Board</td>
</tr>
<tr>
<td>MIC</td>
<td>Minimum inhibitory concentration</td>
</tr>
<tr>
<td>MRSA</td>
<td>Methicillin-Resistant Staphylococcus aureus</td>
</tr>
<tr>
<td>MSSA</td>
<td>Methicillin susceptible Staphylococcus aureus</td>
</tr>
<tr>
<td>S. aureus</td>
<td>Staphylococcus aureus</td>
</tr>
<tr>
<td>TMP-SMX</td>
<td>Trimethoprim/ sulfamethoxazole</td>
</tr>
</tbody>
</table>
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Appendix A................................................................. Criteria of chart review
Introduction and Background:

Methicillin-Resistant Staphylococcus aureus (MRSA) is a staph infection that is resistant to most of the broad spectrum antibiotics used to treat it. It is a gram positive cocci, appearing as a cluster of grapes beneath the microscope. Originally, infection with MRSA typically occurred in hospitalized patients, known as health care-associated MRSA infection (HC-MRSA). It has since spread to infect healthy individuals in the community and is known as community acquired-MRSA (CA-MRSA). The current definition of MRSA states that it must have an oxacillin minimum inhibitory concentration (MIC) >4mcg/ml. Isolates to oxacillin or methicillin are also resistant to all beta-lactam agents including oxacillin, dicloxacillin, and cefazolin. By the Center for Disease Control’s (CDC) definition, CA-MRSA infection is classified as community-associated in individuals who have not been hospitalized or undergone a medical procedure within the past 12 months.

Currently, MRSA accounts for 64 percent of *S. aureus* in American intensive care units. A recent national study estimated that 85 percent of serious invasive MRSA infections are hospital associated and 15 percent occur in the community.

The resistance of MRSA to beta-lactam antibiotics is due to the presence of the *mecA* gene sequence. The *mecA* gene produces transpeptidase PBP2a (penicillin-binding peptide) that decreases the bacterial affinity of the beta-lactam antibiotics. The *mecA* gene is a subset of a larger *SCCmec* gene that is responsible for the differences seen in HA-MRSA and CA-MRSA bacteria.
CA-MRSA has a propensity for skin and soft tissue (up to 96% of cases)\textsuperscript{3}, with furuncles (superficial skin abscesses arising from hair follicles) being by far the most common.\textsuperscript{10} CA-MRSA also causes folliculitis, impetigo, cellulitis, carbuncles, paronychia, deep subcutaneous abscesses and necrotizing fasciitis. Characteristics of MRSA-associated skin lesions include localized necrosis, which are often mistaken for spider bites\textsuperscript{9}. Skin infections associated with MRSA often have a ‘scalded skin appearance’, with the superficial layers of skin tending to flake away. These blistered appearing wounds often have a very tender base. Without other signs of infection, a biopsy is needed to determine the presence of a staph infection.

Special testing has been evolved to improve detection with cultures. An erythromycin-induction test, or D-test, should always be performed with staphylococcal sensitivities to reveal inducible clindamycin resistance among CA-MRSA.

In most cases, incision and drainage (I & D) is sufficient to treat lesions. These lesions should undergo I& D if there is fluctuant or purulent skin and/or soft tissue. Specimens from these wounds should then be sent for culture and susceptibility testing\textsuperscript{8}. Adjunctive antibiotics are recommended with: complicated abscesses (with fever, lymphangitis, or significant surrounding cellulitis), rapidly progressive or severe local disease, abscess diameter greater than 5 cm, comorbid conditions or immunosuppression\textsuperscript{9}.

The next area of concern in proper treatment of MRSA is associated with antimicrobial selection. Because the prevalence of CA-MRSA is so high, empirical treatment with
penicillins or cephalosporins are often insufficient. Baseline susceptibility testing is the most valuable tool in treating suspected MRSA infection. Other concerns would include individual patient circumstances, such as comorbid conditions and concurrent medications. Some antibiotics that may be useful in treatment include older agents such as clindamycin, trimethoprim-sulfamethozazole (TMP-SMX), and minocycline. New agents such as linezolid should be used only when an allergy to the older agents is present. The older agents have been rigorously tested in clinical trials and have been found to be effective. Fluoroquinolones are a poor choice since resistance develops rapidly. Follow-up re-evaluation after 24-48 hours is important after beginning empiric antibiotic therapy, as a culture may have been grown during that time interval. Patient response should be used to guide therapy. Patients with extensive systemic involvement or severe soft tissue infection may warrant parenteral therapy which would include Vancomycin. This antibiotic has been found effective, but should be reserved for use only in severe circumstances. In the event the patient is unable to tolerate vancomycin, the FDA has approved daptomycin, tigecycline, and quinupristin-dalfopristin.

Many patients who develop a MRSA infection will often harbor the bacteria in other areas of the body as well. Nasal application of mupirocin may be beneficial in some patients to prevent recurrence of infection, however, recolonization is still likely to occur shortly. Topical antiseptics such as chlorhexidine, povidone iodine (Hibicleans) can also be helpful in cleansing surface skin to prevent reinfection.
In an effort to better understand CA-MRSA, a study was done in a community which seemed to have a great number of soft tissue infections. Located in Clallam County, Washington, is a small rural clinic which serves the Native American Quileute tribe. The practitioners of this clinic felt they noticed an increased number of cases of CA-MRSA infections. The CDC reports that Native Americans are a group most commonly affected with CA-MRSA\(^5\). This study’s goal was to assess if the infection rate at this clinic is abnormally high and if it is being treated effectively.

**Methods:**

After acquiring approval from both the Quileute Tribal Clinic administration and the Pacific University Institutional Review Board for Protection of Human Subjects (IRB), a chart review was conducted at the Quileute tribal clinic in La Push, Washington. The tribal billing database was used to conduct a search of ICD-9 codes with a diagnosis of cellulitis or abscess. The charts were collected and examined for positive MRSA culture results. The search covered a time period from January 2003 until June 2008. From each of the charts the following data was collected: sex, age, site of infection, date of treatment, recurrent infections, and treatment results. Appendix A shows a copy of the IRB proposal as well as a sample of the collection form used. Upon collection of data, patient identifiers were removed. Data was also obtained from publications of the Washington State Health Department to serve as an indicator of the prevalence of CA-MRSA in other areas of Washington. The demographics of the patients were tabulated to investigate whether one population was being more strongly affected than any other. The data were categorized by treatment modality for analysis. The methods were examined to
see if the majority of patients were being treated appropriately as specified by the Washington State Health Department as well as CDC guidelines. A measurement of how effective these treatments were was attempted. Effectiveness was determined by patient recovery time as well as reduction or elimination of recurrent infections.

**Results:**

There were 82 patients with the diagnosis of cellulites and/or abscess which could be associated with CA-MRSA skin infections. Chart reviews for cellulitis revealed that of the 82 patients identified, 52 had skin lesions that were cultured, with 46 of these cultures being MRSA positive and the remaining 6 cultures revealing Methicillin susceptible Staphylococcus aureus (MSSA) (Table 1).

Table 2 shows the demographics of the patients treated for MRSA between 2003-2008. Figure 1, shows the distribution of CA-MRSA soft tissue infection by year. It demonstrates an increase in the number of patients infected from 2004 until 2007. Data for 2008 was only obtainable prior to the month of June, so the results were extrapolated for the entire year. It may be possible that there will be more cases of CA-MRSA later on in the year.

A collection of infection rates for the entire state of Washington was not available. However, the state has posted an estimate for the rates of infection for the central portion of the state (Figure 2). Figure 3, demonstrates the trends in the state of Washington for
2003-2004. Figure 4 shows the trends of infection for La Push, Washington from 2003 to 2007.

A list of treatment modalities utilized revealed that there were two antibiotics recorded for use in these CA-MRSA cases: cephalexin and TMP-SMX. Figure 5 shows the methods of treatment for soft tissue infections. Four cases were treated with cephalexin alone and one was treated with both cephalexin and incision and drainage (I & D). Eleven of these cases were treated with TMP-SMX alone, while the majority of cases - 23 - were treated with both TMP-SMX and I & D. There were no antibiotics charted for the remaining 7 cases. Six cases were treated with I & D only. There was only one case of MRSA that was not treated with I & D or antimicrobials, it was charted that the lesion was draining it seemed to be healing well on its own, and that it seemed to be healing without antibiotic treatment.

Table 3 was obtained from the state of Washington Health Department and depicts the percentages of infections within the state, distributed by region. Table 4 provides a similar comparison representing the percentages of infections for La Push Washington by itself.

Table 5 represents the frequency of infection by location as listed by body area.
Figure 6 shows the numbers of recurrent infection distributed by the number of isolated reinfection. To better appreciate the relationship between recurrence and treatments, Figure 7 was tabulated.

**Discussion:**

The data collected from the Quileute clinic reveal that there has been an increase in CA-MRSA soft tissue infections from 2003 through 2007. The data for 2008 was extrapolated to show a trend and should not be considered a true reporting for 2008. From 2003 to 2007, the infection rate in La Push jumped from 1.4 individuals per 1000 to 29 individuals per 1000. In the state of Washington, the infection rate jumped from 168 individuals per 1000 in 2000 to 326 individuals per 1000 in 2003. Although the time periods examined differed, the trends of the two populations demonstrate an increase in infected cases. Data from the state of Washington evidences a statewide increase in the number of CA-MRSA cases, suggesting that La Push is not the only community struggling with this health issue. Tables 3 and 4 compare the infection rates between La Push and the entire state of Washington in percentages of infections.

The number of infections relative to age and sex seem to be evenly dispersed. Although Table 2 shows that there are more individuals between the age of 18 and 50 with MRSA infections, this is to be expected because this age group makes up the greatest population in the area. The data does suggest that there are more women infected than men, but the reasons for this are speculative.
It was thought to be useful to examine how the current treatment of CA-MRSA at the tribal clinic compared to national and Washington State clinical guidelines.

According to the CDC, I & D must be emphasized as a primary treatment of fluctuant abscesses and should be performed whenever possible. For mild uncomplicated abscesses, I & D without the use of antimicrobials can be a reasonable treatment option. In this paper’s population, 6 cases were treated in this way.

Adjunctive antimicrobial therapy may be useful in decreasing spread by sterilizing ongoing wound drainage. This was the most practiced method at the clinic. Antimicrobial therapy alone (topical or oral) without I & D is not recommended for treatment of fluctuant abscesses. In recent studies, penicillin and cephalosporin medications (including cephalexin) have not been effective in treating CA-MRSA. The CDC has obtained reports that clindamycin has been effective in treating MRSA. If the infection does not improve with the use of clindamycin, then treatment should be reassessed as at times MRSA strains are resistant to this antibiotic.

While tetracycline derivatives are often effective in treatment of severe staph infections, they have not been found to be effective in the treatment of MRSA. And while TMP-SMX is not an FDA approved medication for treatment of CA-MRSA, clinical trials have found it to be the most effective medication at treating MRSA infections. A California study found that when combined with I & D, TMP-SMX was effective in 50% of its patients. The California study did not analyze, nor did it have appropriate resources to analyze whether a lesion was fluctuant or not, as this information was not recorded.
In reviewing Figure 5, eleven cases used TMP-SMX only, and 4 cases were treated with only cephalexin. The primary method of treatment of CA-MRSA used at the tribal clinic was a combination of TMP-SMX and I & D. Further analysis is required to determine if these cases were treated appropriately or not. The CDC and American Medical Association recommends I & D as the first line treatment for CA-MRSA soft tissue infection. In the data collected there were 6 patients treated by this method. Only one patient was treated without use of either antimicrobials or I & D.

After examining the number of recurrent infections (Figure 6) it was noted that there were a significant number of recurrent infections. Of the forty-six patients who had a MRSA soft tissue infection, over half (twenty-four) had a recurrent infection requiring another treatment.

Figure 7 indicates how the twenty-four individuals with recurrent soft tissue infections were treated upon their first diagnosis of CA-MRSA. The number of patients treated with TMP-SMX and I & D is highest, however, because this is also the most common method of treatment, it is unknown if this is due to ineffectiveness or simply a reflection of the number of patients treated with this method. The data shows that despite being treated by the recommended methods, these patients are still having recurrent infections with CA-MRSA. None of the treatments with recurrent infections stand out as being less effective when considering the initial number of patients treated by that method. To thoroughly evaluate the effectiveness of these treatments, an equal number of patients would need to be treated by each method and the results evaluated. Such research is outside the scope.
of this paper. There are many factors which may affect the ability of a patient to recover from a soft tissue MRSA infection including compliance to medications, level of hygiene, and appropriate dressing changes, to name a few. This study was not detailed enough to determine the effect of these variables on recurrence.

**Conclusion:**

CA-MRSA is an increasing problem in healthcare. Appropriate treatment and patient education are key factors in overcoming these infections. More research is needed to determine if there is a specific cause for the relatively high rate of reoccurrence in soft tissue MRSA infections in La Push, Washington.
Tables:

**Table 1.** Results of cultures from cellulitis or abscess.

<table>
<thead>
<tr>
<th>Age Years</th>
<th>&lt;18</th>
<th>19-50</th>
<th>&gt;51</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>6</td>
<td>10</td>
<td>3</td>
<td>19</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td>17</td>
<td>8</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>27</td>
<td>11</td>
<td>46</td>
</tr>
</tbody>
</table>

**Table 2.** Demographics of patients with CA-MRSA treated in the Quileute Clinic. 2004-June 2008.

**Table 3.** Data taken from Washington State Health Department Summary 2003.

<table>
<thead>
<tr>
<th>Year</th>
<th>East</th>
<th>Central</th>
<th>Northwest</th>
<th>King</th>
<th>Southwest</th>
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<tbody>
<tr>
<td>2000</td>
<td>1883</td>
<td>3387</td>
<td>2984</td>
<td>8520</td>
<td>7872</td>
</tr>
<tr>
<td>2001</td>
<td>1834</td>
<td>3480</td>
<td>3979</td>
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<td>2002</td>
<td>2122</td>
<td>1749</td>
<td>3566</td>
<td>14522</td>
<td>9481</td>
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<tr>
<td>2003</td>
<td>3340</td>
<td>3576</td>
<td>4549</td>
<td>10979</td>
<td>5832</td>
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<tr>
<td>Year</td>
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<td>%</td>
<td></td>
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<td>----</td>
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<td>2003</td>
<td>1</td>
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<tr>
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<td>4</td>
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<td>2005</td>
<td>6</td>
<td>.83</td>
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<td>2006</td>
<td>10</td>
<td>1.39</td>
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<td></td>
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<tr>
<td>2007</td>
<td>21</td>
<td>2.92</td>
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</table>

**Table 4.** Depiction of percentage of patients with CA-MRSA in La Push, WA.

<table>
<thead>
<tr>
<th>Location of Soft tissue infection</th>
<th>Number of infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face and Neck</td>
<td>4</td>
</tr>
<tr>
<td>Upper extremity (including fingers)</td>
<td>9</td>
</tr>
<tr>
<td>Lower extremity (including toes)</td>
<td>25</td>
</tr>
<tr>
<td>Trunk</td>
<td>25</td>
</tr>
<tr>
<td>Buttocks</td>
<td>11</td>
</tr>
<tr>
<td>Unspecified</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table 5.** Sites of Recorded CA-MRSA soft tissue infection (including recurrent infection) in La Push, WA.
Figures:

Figure 1. Number of cases of CA-MRSA Soft tissue infections, in the Quileute tribal clinic by year. (*2008 cases were extrapolated based on infection rate up until June of 2008)
Figure 2. Source: Washington State Department of Health. Region 7 Central Washington
Washington Two Year MRSA Trend

Antibiotic Resistance Sentinel Network 2003 - 2004

<table>
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<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>28%</td>
<td>33%</td>
<td>36%</td>
<td>43%</td>
</tr>
<tr>
<td>Outpatients</td>
<td>19%</td>
<td>28%</td>
<td>30%</td>
<td>35%</td>
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</table>

Figure 3. Washington two year trend. From Washington State Health department.\textsuperscript{11}

La Push Five Year MRSA Trend

<table>
<thead>
<tr>
<th>Year</th>
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<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentages</td>
<td>0.00%</td>
<td>0.50%</td>
<td>1.00%</td>
<td>1.50%</td>
<td>2.00%</td>
</tr>
</tbody>
</table>

Figure 4. La Push five year trend.
**Figure 5.** Treatment selected for patients with CA-MRSA soft tissue infections in La Push

**Figure 6.** Number of times patients in La Push that were treated for Soft tissue CA-MRSA.
Figure 7. Number of recurrent infections compared to initial treatment in La Push.
Appendix

Appendix A:
PACIFIC UNIVERSITY INSTITUTIONAL REVIEW BOARD PROPOSAL
For Faculty and Student Research

TITLE
A study on the prevalence of Methicillin-Resistant Staphylococcus Aureus in the Native American population of La Push, Washington.

INVESTIGATORS

Principal Investigator:
Alexaus Toland
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1. ABSTRACT AND PURPOSE

The purpose of this study to determine the incidence of MRSA infections among the Native American populations and then compare it to the national and, if available, state rates of infection. The study will also examine the treatment of these infections and assess whether they are treated in accordance with national guidelines.

2. PARTICIPANTS
Target Population. This study will target the Native Americans with MRSA within the population of La Push Washington. Anticipated sample size will be 50.

Recruitment
No recruitment is necessary for this study.

Exclusionary Criteria The data excluded would be patients that were not of the Native American population.

3. MATERIALS AND MEASURES

The Quileute clinic's database will be used to obtain a list of patients diagnosed with MRSA lesions within the last 4-5 years. The patient's charts will be used to collect data. The data assessed will be tabulated in Excel the name, sex, age, date of infection, site of infection, treatment and results of treatment. Effective treatment will be characterized by the resolution of MRSA infected lesion.

4. DESIGN AND PROCEDURE

A list of patients with positive MRSA wound cultures will be obtained from the clinic's existing database. Each of these charts will be examined for the following data; sex, age, site of infection, date of treatment, recurrent infections, and treatment results. The age, sex, and site of infection may affect the patient's ability to recover from infection. The date of treatment is relevant for the length of time the treatment was used. Recurrent infections may signify how effective treatment was. Upon successful collection of data patient identifiers will be removed. No patient identifiers of name or ID number will be used in the data presented, it is only used to ensure appropriate data gathering in providing complete collection of data and preventing duplicate data collection. The results of the collected data will be tabulated and will be compared to the infection rates of the nation and if available the infection rates of the state of Washington. Treatment methods will also be examined for effectiveness. Effectiveness will be determined the patient’s recovery time, and by lack of or decrease in recurrent infections. The treatments used will be compared to national guidelines for treating MRSA infections.

Location Data will be obtained at the Quileute clinic in La Push Washington

Resources It is not anticipated that there will be any funding required for this research.
**Dates of the Study** Data will be obtained via chart review from July 14, 2008 until Aug 8, 2008, using data from 2003 to 2008. The data from 2003 and 2004 will be compared to data collected by the state of Washington.

5. **RISKS TO PARTICIPANTS**

   This is a retrospective study. The subjects should not be exposed to any risk. Other than the risk of accidental breach of confidentiality of PHI.

6. **BENEFITS TO PARTICIPANTS**

   There is no direct benefit to any of the individuals tabulated in the study.

7. **COMPENSATION**

   The individuals included in this study will not be compensated in any way, they will not receive any monetary compensation for being included.

8. **CONFIDENTIALITY**

   While the information from the chart review is being gathered the patients will be identified by their clinic ID number. The chart reviews will be done only by the principle investigator who will also be responsible for ensuring patient confidentiality. This will be to prevent duplication or loss of information which may skew the study. The name and other private information will not be needed for this chart review. The age, gender, lab results, site of infection, date of service or treatment, duration of treatment, treatment received, recurrent infections and effectiveness of treatment will all be data used in the study but none of which will be linked with any patient identifiers once the information is gathered. To reduce the chance of a breach of confidentiality the clinic ID number will be separated from the data and deleted at the earliest possible time after the data has been collected.

9. **WITHDRAWAL FROM THE STUDY**

   This is not applicable since the study is archival.

**SIGNATURES OF INVESTIGATORS**

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Alexaus Toland PA-S
Principal Instigator
Pacific University
### Appendix A: Measures

<table>
<thead>
<tr>
<th>Patient ID number</th>
<th>Age</th>
<th>Gender</th>
<th>Lab result MRSA+</th>
<th>Date of Infection</th>
<th>Site of infection</th>
<th>Date of Treatment/Length of TX.</th>
<th>Treatment</th>
<th>Results of Treatment</th>
<th>Recurrent infections</th>
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### Appendix B: Recruitment Materials

Not applicable

### Appendix C: Approval Letter from Outside Agency
References

10. Taber’s cyclopedic Medical Dictionary.
12. Washington State Department of Health. Communicable Disease Epidemiology Section