# Report on a QI Project Eligible for Part IV MOC:

## Improving the Management of *Staphylococcus aureus* bacteremia in Adult Hospitalized Patients

## Instructions

**Determine eligibility.** Before starting to complete this report, go to the UMHS MOC website [ocpd.med.umich.edu], click on "Part IV Credit Designation," and review sections 1 and 2. Complete and submit a "QI Project Preliminary Worksheet for Part IV Eligibility." Staff from the UMHS Part IV MOC Program will review the worksheet with you to explain any adjustments needed to be eligible. (The approved Worksheet provides an outline to complete this report.)

**Completing the report.** The report documents completion of each phase of the QI project. Final confirmation of Part IV MOC for a project occurs when the full report is submitted and approved.

An option for preliminary review (recommended) is to complete a description of activities through the intervention phase and submit the partially completed report. (Complete at least items 1-16 and 27a-b.) Staff from the UMHS Part IV MOC Program will provide a preliminary review, checking that the information is sufficiently clear, but not overly detailed. This simplifies completion and review of descriptions of remaining activities.

Questions are in bold font and answers should be in regular font (generally immediately below the questions). To check boxes electronically, either put an "X" in front of a box or copy and paste "☒" over the blank box.

For further information and to submit completed applications, contact either:
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## Report Outline

| Section | Items | |
|---|---|---|
| **A. Introduction** | 1-6. | Current date, title, time frame, project leader, specialties/subspecialties involved, funding |
| **B. Plan** | 7-10. | General goal, patient population, IOM quality dimensions addressed, experimental design |
| | 11-12. | Baseline measures of performance, specific performance objectives |
| | 13. | Data review and identifying underlying (root) causes |
| **C. Do** | 14-16. | Intervention(s), who is involved, initiated when |
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| **E. Adjust – Replan** | 19. | Review, continuing/new underlying causes, |
| **F. Redo** | 20. | Second intervention |
| **G. Recheck** | 21-22. | Post-adjustment performance measurement, data collection, performance level |
| **H. Readjust plan** | 23. | Review, continuing/new underlying causes to address |
| **I. Future plans** | 24-26. | Subsequent PDCA cycles, standardize processes, "spread" to other areas |
| **J. Physician involvement** | 27-30. | Physician's role, requirements, reports, reflections, participation, number |
| **K. Project Organization** | 31-33. | Part of larger initiative, organizational structure, resources, oversight, Part IV opportunity |

# QI Project Report for Part IV MOC Eligibility

## A. Introduction

1. **Date** *(this version of the report):* 4/20/2015

**2. Title of QI project:** Improving the management of *Staphylococcus aureus* bacteremia in adult hospitalized patients/

**3. Time frame**

a. **Date physicians begin participating (may be in design phase):** 9/1/2013
b. **End date**: 3/31/15

**4. Key individuals**

a. **QI project leader**
**Name**: Tejal Gandhi, MD
**Title**: Assistant Professor of Medicine
**Organizational unit**: Division of Infectious Diseases
**Phone number**: 936-3927
**Email address**: tgandhi@umich.edu
**Mailing address**: 3214K TC

a. **Clinical leader to whom the project leader reports regarding the project** *[responsible for overseeing/"sponsoring" the project within the specific clinical setting]*
**Name**: Powel Kazanjian, MD
**Title**: ID Division Chief
**Organizational unit**: Division of Infectious Diseases
**Phone number**: 936-5208
**Email address**: pkazanji@umich.edu
**Mailing address**: 3119 TC

**5. Approximately how many physicians were involved in this project categorized by specialty and/or subspecialty?** 15 infectious disease physicians

**6. Will the funding and resources for the project come only from internal UMHS sources?**

☒ Yes, only internal UMHS sources
☐ No, funding and/or resources will come in part from sources outside UMHS, which are: _____

*The Multi-Specialty Part IV MOC Program requires that projects engage in change efforts over time, including at least three cycles of data collection with feedback to physicians and review of project results. Some projects may have only three cycles while others, particularly those involving rapid cycle improvement, may have several more cycles. The items below are intended to provide some flexibility in describing project methods. If the items do not allow you to reasonably describe the methods of your specific project, please contact the UMHS Part IV MOC Program office.*

## B. Plan

**7. General goal**

**a. Problem/need. What is the "gap" in quality that resulted in the development of this project? Why is this project being undertaken?**

*Staphylococcus aureus* bacteremia (SAB) is associated with significant morbidity and mortality. Standard of care guidelines call for prolonged courses of antibiotics, documented clearance of bacteremia and source control when possible. Informal observations indicate that these guidelines are not always followed.

**b. Project goal. What outcome regarding the problem should result from this project?**

This project was designed to assess the level of compliance with these guidelines and then to optimize care in hospitalized patients with SAB. We expect to see a significant improvement in appropriate utilization of diagnostic studies and appropriate duration of antibiotic therapy in patients with SAB

**8. Patient population. What patient population does this project address?**

Adults with SAB (methicillin-sensitive *Staph. aureus* (MSSA) or methicillin-resistant *Staph. aureus* (MRSA)) admitted to any UMHS medical or surgical inpatient service.

**9. Which Institute of Medicine Quality Dimensions are addressed?** *[Check all that apply.]*

| | | |
|---|---|---|
| ☒ Safety | ☐ Equity | ☒ Timeliness |
| ☒ Effectiveness | ☒ Efficiency | ☒ Patient-Centeredness |

**10. What is the experimental design for the project?**

- ☐ Pre-post comparisons (baseline period plus two or more follow-up measurement periods)
- ☒ Pre-post comparisons with control group
- ☐ Other: _____

**11. Baseline measures of performance:**

**a. What measures of quality are used? If rate or %, what are the denominator and numerator?**

1. Percent of cases with appropriate duration of antibiotic therapy
    a. # of SAB cases that received appropriate duration of antibiotics / total # of cases of SAB
2. Percent of cases with repeat blood cultures (until documented clearance of bacteremia)
    a. # of SAB cases with documented clearance of antibiotics / total # of cases of SAB
3. Percent of cases with foci of infection eliminated or debrided (source control)
    a. # of SAB cases with documented source control / total # of cases of SAB with an identifiable source

**b. Are the measures nationally endorsed? If not, why were they chosen?**

These measures are endorsed by the Infectious Disease Society of America clinical practice guidelines for MRSA infection. These measures have been shown in the published scientific literature to be appropriate for the diagnosis and treatment of MSSA infections, as well.

**c. What is the source of data for the measure (e.g., medical records, billings, patient surveys)?**

Medical records.

**c. What methods were used to collect the data (e.g., abstraction, data analyst)?**

Data abstraction from the medical records. Alerts for SAB were sent through Theradoc (a clinical surveillance software system) to the investigators.

**e. How reliable are the data being collected for the purpose of this project?**

These data are very reliable as they rely on objective information (lab results, study results) and are not dependent upon patient or provider assessment or opinion.

**f. How are data to be analyzed over time, e.g., simple comparison of means, statistical test(s)?**
Comparison of adherence to bundle elements pre and post-intervention.

1. Appropriate duration of antibiotic therapy: A categorical variable were compared using the Chi-squared test.
2. Repeat Blood Cultures: A categorical variable were compared using the Chi-squared test
3. Eliminate and or Debride Foci of Infection (source control): A categorical variable were compared using the Chi-squared test

**g. To whom are data reported?**

To physicians in the Division of Infectious Diseases, the Division Chief, and the UM Hospitals' Executive Committee for Clinical Affairs

**h. For what time period was the sample collected for baseline data?**

9/1/2011-8/31/2013. The two-year retrospective baseline data collection was purposely unusually long to understand types of problems observed and their frequency of occurrence. (Seven aspects of care were initially measured, with the three most important reported here.)

**12. Specific performance objectives**

**a. What was the overall performance level(s) at baseline?** *(E.g., for each measure: number of observations or denominator, numerator, percent. Can display in a data table, bar graph, run chart, or other method. Can show here or refer to attachment with data.)*

| Performance measure | Baseline % (N*) 9/1/11 – 8/31/13 |
|---|---|
| **Appropriate duration of antibiotics** | 84% (108/128) |
| **Repeat blood cultures** | 86% (126/147) |
| **Eliminate and or Debride Foci of Infection** | 86% (55/64) |

*Number of events (denominator) for each performance measure differ due to censoring of cases (i.e. if patient expired prior to completing duration of antibiotics or if there was not an identifiable focus of infection requiring source control)

**b. Specific aim: What was the target for performance on the measure(s) and the timeframe for achieving the target?**

>90% over 6 months

**d. How were the performance targets determined, e.g., regional or national benchmarks?**

There are no benchmarks. The ID division determined that these targets would be realistic and appropriate based on experience and expertise

**13. Data review and identifying underlying (root) causes.**

**a. Who was involved in reviewing the baseline data, identifying underlying (root) causes of the problem(s), and considering possible interventions ("countermeasures") to address the causes? Briefly describe:**

- **Who was involved?** Dr. Gandhi, the antimicrobial stewardship team (AST), and ID physicians.
- **How?** Dr. Gandhi and the antimicrobial stewardship team (AST) developed the protocol and reviewed cases of SAB in the pre-intervention period to determine baseline compliance with these measures of care. The protocol and data were reviewed at Infectious Diseases Grand Rounds, at which time root causes for issues with compliance and potential interventions were discussed. **When? Grand rounds in** August, 2013

**b. What were the primary underlying/root causes for the problem(s) that the project can address?** *(Causes may be aspects of people, processes, information infrastructure, equipment, environment, etc. List each primary cause separately. How the intervention(s) address each primary underlying cause will be explained in #14.c.)*

1. Lack of awareness of performance measures/standards of care for SAB
2. Difficulty remembering to follow all of the recommendations

## C. Do

**14. Intervention(s).**

**a. Describe the interventions implemented as part of the project.**

1. A pocket card was developed delineating each performance measure and distributed to all ID physicians. It provided a quick and accessible reference outlining standards of care in the management of SAB.
2. AST provided real-time feedback on each case of SAB if performance measures were not being met.

**b. How were underlying/root causes** *(see #13.b)* **addressed by the intervention(s)?** *(List each cause, whether it was addressed, and if so, how it was addressed.)*

1. Lack of awareness: The pocket card assured that everyone was aware of the guidelines.
2. Difficulty remembering: The pocket card was a reminder of what to do and the real-time feedback mechanism reinforced the habit of using and following guidelines on the pocket card throughout the intervention period.

**15. Who was involved in carrying out the intervention(s) and what were their roles?**

1. All ID physicians who attended on the UHC ID consultation service during the intervention period were involved with implementing the performance measures in cases of SAB for which an ID consult was ordered.
2. Dr. Gandhi, Dr. Chenoweth, Jerod Nagel and Gregory Eschenauer and Cynthia Nguyen developed the pocket card and participated in real-time case review and immediate feedback.

**16. The intervention was initiated when?** (For multiple interventions, initiation date for each.)

9/1/2013

## D. Check

**17. Post-intervention performance measurement. Did this data collection follow the same procedures as the initial collection of data described in #11: population, measure(s), and data source(s)?**

X Yes ☐ No – If no, describe how this data collection

**18. Performance following the intervention.**

**a. The collection of the sample of performance data following the intervention occurred for the time period:**

The data collection was 9/1/2013-5/1/2014. The nine-month follow up period was selected based on a power analysis to assure that enough cases would be included to detect a statistically significant mortality benefit, a part of a larger study not reported here.

**b. What was post-intervention performance level?** *(E.g., for each measure: number of observations or denominator, numerator, percent. Can display in a data table, bar graph, run chart, or other method. Can show here or refer to attachment with data.)*

| Performance measure | Baseline % (N*) 9/1/11 – 8/31/13 | Post-intervention % (N*) 9/1/13 – 5/1/14 | P-value |
|---|---|---|---|
| **Appropriate duration of antibiotics** | 84% (108/128) | 95% (74/78) | 0.025 |
| **Repeat blood cultures** | 86% (126/147) | 97% (83/86) | 0.008 |
| **Eliminate and or Debride Foci of Infection** | 86% (55/64) | 97% (35/36) | 0.090 |

*Number of events (denominator) for each performance measure differ due to censoring of cases (i.e. if patient expired prior to completing duration of antibiotics or if there was not an identifiable focus of infection requiring source control)

**c. Did the intervention produce the expected improvement toward meeting the project's specific aim (item 12.b)?**
Yes, all three performance measures exceed the goal of > 90 %.

## E. Adjust – Replan

**19. Review of post-intervention data and identifying continuing/new underlying causes.**

**a. Who was involved in reviewing the post-intervention data, identifying underlying (root) causes of the continuing/new problem(s), and considering possible adjustments to interventions ("countermeasures") to address the causes? Briefly describe:**

- **Who was involved?** The AST and ID physicians
- **How?** Data were presented and discussed at an ID business meeting to identify any further barriers to continued success at meeting SAB performance measures and possible changes to interventions.
- **When?** December, 2014

**b. What were the primary underlying/root causes for the continuing/new problem(s) that the project can address?** *(Causes may be aspects of people, processes, information infrastructure, equipment, environment, etc. List each primary cause separately. How the intervention(s) address each primary underlying cause will be explained in #20.c.)*

Issues to address immediately

Cost of providing real-time feedback. The real-time AST feedback was time and labor intensive and may no longer be cost-effective with the pocket cards and routine procedures in place.

Issues to begin to address (longer term)

Patients with SAB not seen by ID. Other clinical services are less likely to be aware of the guidelines.

Turnover among ID staff. While current staff are performing well, new faculty may not be aware of guidelines or remember to follow them.

1. The project met the stated goals.
2. ID physicians will continue to utilize the pocket cards.
3. A MICHART (UMHS Electronic Health Record) template will be developed to assist in compliance with these performance measures.
4. The data will be presented at Executive Committee for Clinical Affairs (ECCA) in support of mandatory ID consults in adult patients with SAB.

## F. Redo

**20. Second intervention.**

**a. The second intervention was initiated when?** December 1, 2014 – January 31, 2015.

**b. What interventions were implemented?**

The AST real-time feedback was discontinued, with use of pocket cards continued.. The next observation period will be used to determine whether performance continues to be above goal with costs reduced.

**c. How were continuing/new underlying/root causes** *(see #19.b)* **addressed by the intervention(s)?** *(List each cause, whether it was addressed, and if so, how it was addressed.)*

Cost of providing real-time feedback. The feedback was discontinued. T

## G. Recheck

**21. Post-second intervention performance measurement. Did this data collection follow the same procedures as the initial collection of data described in #11: population, measure(s), and data source(s)?**

☐ Yes x No – If no, describe how this data collection.

This collection only followed the measure of repeat blood cultures to document clearance of bacteremia. This measure was selected as a representative indicator for whether performance was maintained above goal when feedback was no longer provided.

**22. Performance following the second intervention.**

**a. The collection of the sample of performance data following the intervention(s) occurred for the time period:**

December 1, 2014 – January 31, 2015. The two-month data collection period was chosen to be adequate for administrative purposes simply to monitor performance and whether it was sustained

**b. What was the performance level?**

| Performance measure | Baseline % (N) 9/1/11 – 8/31/13 | Post-intervention % (N) 9/1/13 – 5/1/14 | Post-Adjustment % (N) 12/1/14 – 1/31/15 |
|---|---|---|---|
| **Repeat blood cultures** | 86% (126/147) | 97% (83/86) | 100% (16/16) |

**c. Did the second intervention produce the expected improvement toward meeting the project's specific aim (item 12.b)?**

Yes, performance remained above 90% without real-time feedback.

## H. Readjust

**23. Review of post-second intervention data and identifying continuing/new underlying causes.**

**a. Who was involved in reviewing the data, identifying underlying (root) causes of the continuing/new problem(s), and considering additional possible adjustments to interventions ("countermeasures") to address the causes? Briefly describe:**

- **Who was involved?** All physicians attending on the ID consult service
- **How?** The results of the second intervention were emailed to all of the involved physicians and feedback solicited for discussion of additional necessary steps and future changes to these interventions.
- **When?** March, 2015

**b. What were the primary underlying/root causes for the continuing/new problem(s) that the project can address?** *(Causes may be aspects of people, processes, information infrastructure, equipment, environment, etc. List each primary cause separately.)*

While the data show that current performance is stable at a high level, the two previously identified issues still need to be addressed.

Patients with SAB not seen by ID. Other clinical services are less likely to be aware of the guidelines. A recommended solution is to pursue having an institutional policy that all cases of Staphylococcal bacteremia receive a mandatory ID consult. This recommendation has been submitted to the Executive Committee for Clinical Affairs.

Turnover among ID staff. While current staff are performing well, new faculty may not be aware of guidelines or remember to follow them. A recommended solution is that decision aids (practice alerts, smart set of orders) for SAB be incorporated into the electronic medical record system. This recommendation is being pursued.

*If no additional cycles of adjustment are to be documented for the project for Part IV credit, go to item #24.*

*If a few additional cycles of adjustments, data collection, and review are to be documented as part of the project to be documented, document items #20 – #23 for each subsequent cycle. Copy the set of items #20 – #23 and paste them following the last item #23 and provide the information. When the project to be documented for Part IV credit has no additional adjustment cycles, go to item #24.*

*If several more cycles are included in the project for Part IV credit, contact the UM Part IV MOC Program to determine how the project can be documented most practically.*

## I. Future Plans

**24. How many subsequent PDCA cycles are to occur, but will not be documented as part of the "project" for which Part IV credit is designated?**
No further PDCA cycles are planned. At this point further data has not been requested by ECCA for ongoing performance measure.

**25. How will the project sustain processes to maintain improvements?**

1. ID physicians will continue to utilize the pocket cards
2. Policy implementation for the diagnosis of staph aureus bacteremia to result in a mandatory ID consult.
3. Decision aids in the electronic medical record will be developed and incorporated into the electronic medical to assist proactively in compliance with performance measures.

**26. Do other parts of the organization(s) face a similar problem? If so, how will the project be conducted so that improvement processes can be communicated to others for "spread" across applicable areas?**

Other parts of the organization treat patients who have SAB. Mandatory ID consults and decision aids in the electronic medical record will ensure that these performance measures are met for all adult patients with SAB.

## J. Physician Involvement

*Note: To receive Part IV MOC a physician must both:*
*a. Be actively involved in the QI effort, including at a minimum:*
- *Work with care team members to plan and implement interventions*
- *Interpret performance data to assess the impact of the interventions*
- *Make appropriate course corrections in the improvement project*

*b. Be active in the project for the minimum duration required by the project*

**27. Physician's role. What were the minimum requirements for physicians to be actively involved in this QI effort?** *(What were physicians to do to meet each of the basic requirements listed below? If this project had additional requirements for participation, also list those requirements and what physicians had to do to meet them.)*

a. Interpreting baseline data and planning intervention: Attending the ID grand rounds presentation in August 2013 and reviewing baseline data, considering underlying causes, and agreeing on the protocol

b. Implementing intervention: Starting in August 2013 when attending on the ID consults service at UHC refer to the pocket cards to perform care for SAB and respond to feedback if recommended care not performed.

c. Interpreting post-intervention data and planning changes: Attending ID business meeting in December 2014 where results were presented, root causes for further improvement were discussed, and additional processes agreed upon to maintain our current level of performance cost-effectively.

d. Implementing further intervention/adjustments: Starting in December 2014 continue to use the pocket cards as needed to provide care.

e. Interpreting post-adjustment data and planning changes: In March 2015 the data were presented to the involved phsyicians via email and feedback was requested as to the necessity for further adjustments to the current intervention and utility of further data collection.

**28. How were reflections of individual physicians about the project utilized to improve the overall project?**

The project lead attended all relevant meetings and talked with participants individually. The project lead incorporated feedback into subsequent plans. For example, the feedback of the physicians led to optimization of the pocket card prior to initiation of the intervention.

**29. How did the project ensure meaningful participation by physicians who subsequently request credit for Part IV MOC participation?**

The project lead monitored participation of individuals in the activities required for Part IV.

## K. Project Organizational Role and Structure

**30. UMHS QI/Part IV MOC oversight – this project occurs within:**

x **University of Michigan Health System**

- **Overseen by what UMHS Unit/Group?**

Division of infectious Diseases

- **Is the activity part of a larger UMHS institutional or departmental initiative?**

☐ No **x** Yes – the initiative is Part of an Antimicrobial Stewardship initiative of the UM Hospitals

☐ **Veterans Administration Ann Arbor Healthcare System**

- **Overseen by what AAVA Unit/Group?**

- **Is the activity part of a larger AAVA institutional or departmental initiative?**

☐ No ☐ Yes – the initiative is:

☐ **An organization affiliated with UMHS to improve clinical care**

- **The organization is:**

- **The type of affiliation with UMHS is:**

☐ **Accountable Care Organization type** *(specify which):*

☐ **BCBSM funded, UMHS lead Collaborative Quality Initiative** *(specify which):*

☐ **Other** *(specify):*

- **Who is the individual at UMHS responsible for oversight of the QI project regarding Part IV requirements?**
  **Name**:
  **Title**:
  **Institutional/organizational unit/affiliation**:
  **Phone number**:
  **Email address**:

**31. What is the organizational structure of the project?** ***[Include who is involved, their general roles, and reporting/oversight relationships.]***

The antimicrobial stewardship group consists of 2 ID physicians (Tejal Gandhi, Director; Carol Chenoweth, Associate Director), Jerod Nagel (ID pharmacist), Gregory Eschenauer (ID pharmacist), and ID pharmacy resident. The stewardship group reports to Antibiotic Subcommittee and P&T.

**32. To what oversight person or group will project-level reports be submitted for review?**

Two committees of the University of Michigan Hospitals: the Executive Committee for Clinical Affairs and the Pharmacy and Therapeutics Committee