Implementation of an Antimicrobial Stewardship Program using Transformational Care and Lean Methodology

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Primary Intended Outcome
To optimize the use of antibiotics including appropriate selection, dose and duration of antibiotics while minimizing adverse effects.

Relevant PPMI Recommendations
B23. The following characteristics or activities should be considered essential to pharmacist-provided drug-therapy management in optimal pharmacy practice models:

B23j. Participation in antimicrobial stewardship.

C8. Human factors engineering principles should be employed to design and optimize safety, efficiency, and effectiveness of technology.

C10. Technology in medication-use systems should be designed to support pharmacy processes to improve patient outcomes.

Situation Analysis
Antimicrobial stewardship is a vital component of modern health care. The Center for Disease Control and Prevention (CDC) launched the Get Smart for Healthcare campaign with the focus of “improving antimicrobial use in inpatient healthcare setting” through use of antimicrobial stewardship programs (ASPs).1 Interventions through ASPs are designed to ensure that patients receive “the right antibiotic, at the right dose, at the right time, and for the right duration” in the hospital setting.1

At Mercy Gilbert and Chandler Regional Medical Centers, a call to action to identify areas for improvement to increase patients’ quality of care resulted in discussion regarding antibiotic utilization. It was identified that five broad-spectrum
antibiotics with potential for misuse made up 60-70% of total antibiotic spend.

At the same time, pharmacy departments were not tasked with reviewing and approving antibiotic orders on a consistent basis, resulting in varying prescribing practices and overutilization of antibiotics. The hospitals moved to create a cross-site, interdisciplinary team to provide a solution. In doing so, they joined a national movement to implement ASP programs as part of routine therapy management.

The team started by using Transformational Care (TC) methodology (which incorporates Lean methodology tools and ideas) to identify areas of opportunity and formulate efficient solutions. TC methodology provides tools such as process mapping, pain point (problem) identification, and prioritization efforts to facilitate areas of focus.

Within TC methodology, a reporting method called the TC-1 report also provides a way to communicate with team members, introduce and identify key metrics, summarize future goals, implement initiatives, analyze issues, and define problems.

After the team was assembled, members received 12 weeks of training on TC methodology and principles, including process mapping, prioritizing of pain points based upon the impact and frequency, and prioritization of solutions based upon ease of implementation and size of opportunity. TC methodology empowered the front-line staff to look at departmental and institutional processes such as development of tools, department roles in therapy management, and metrics in order to pinpoint inefficiencies in their current practice.

Team members discussed the limited role of pharmacists in managing ID therapies, the lack of standardized diagnostic order sets, and a lack of a standardized system for pharmacy reviews and interventions. Having identified the pain points, created possible solutions, and prioritized the solutions, the team worked to implement these changes in both hospitals.

Service Description
Evidence-based adult empiric antibiotic guidelines, a standardized adult antibiotic orderset based on diagnosis, and pocket guides containing the guidelines and antibiogram were developed for distribution at both hospitals. The team also created criteria for using broad-spectrum, high-cost antibiotics. The pharmacy departments were required to review their internal practice cultures as well as monitor metrics daily, including days of therapy (DOT), the number of patients on the top five target antibiotics, number of patients on the top five target antibiotics for more than five days, and successful de-escalation recommendations.

The team measured cost per inpatient day and defined daily doses (DDD) both monthly and quarterly. Additionally, TC data analysts created a performance management tool (PMT) for pharmacists to review and provide feedback through daily staff huddles. Lastly, the team developed monthly TC-2 reports for senior leaders who could then provide updates on the program’s progress and metrics evaluation.
Key Elements for Success
1. Cross-site team to collaborate and coordinate efforts to identify areas for improvement and implement changes,
2. A clinical ID pharmacist,
3. Administrative support to fast-track recommendations to standard practice,
4. A physician champion (preferably an ID specialist), and
5. TC methodology to focus efforts in an efficient and directed manner.

Resource Utilization
Personnel: A cross-site team consisting of pharmacy leadership, clinical ID pharmacists, ID physicians, several other physicians, infection preventionists, a microbiologist, information technology pharmacists, TC directors and data analysts dedicating 12 weeks for TC training and weekly meetings.

IT and other infrastructure: Development and incorporation of standardized adult empiric antibiotic guidelines and a diagnostic order set into medication ordering procedures and a system to review culture results, provide interventions, and view acceptance rates. IT support to create customized automated reports for pharmacy review and intervention.

Supply Expense: Development of guidelines and pocket guides for distribution.

Return on Investment: Reduction in antibiotic utilization and improved cost effectiveness of antibiotic usage.

Recognized Intangible Benefits
Expansion of pharmacy services, including the ability to review orders and make direct interventions, and collaboration of pharmacists with other health care disciplines.

Outcome Measures
1. Resulted in 1,966 interventions, including discontinuations, de-escalations of therapy, and regimen changes,
2. Decrease in antibiotic days,
3. Decrease in the number of patients on the top five antibiotics for more than five days,
4. Decrease in defined daily doses of antibiotic therapies,
5. Decrease in top five antibiotic spend per inpatient day, and
6. Decreases in total antibiotic spend per inpatient per day.

Lessons Learned
1. Having a champion from each discipline and buy-in from the beginning was very important and beneficial. While not every physician may support the development and implementation of such programs, having multidisciplinary teams to provide feedback from various front-line staff helped greatly.
2. Utilizing efficiency methodology such as TC or Lean helped guide the project by allowing for a more structured, prioritized approach to evaluation, development, and implementation of the ASP based on the level of impact and ease of initiation.

3. To limit wasted time and resources, it's important to formulate a set of metrics and measures for routine monitoring to determine progress.

Other Considerations
Working collaboratively with a team of people from multiple specialties and departments from each of the potential sites is helpful in creating uniform recommendations for both sites.

Suggestions for Other Hospitals/Health Systems
1. Recruit physician champions who represent ID and other specialties, and get buy-in from physicians in the beginning in order to better facilitate change.

2. Do not underestimate the value of having a specific methodology to help guide the process in order to keep progress on track and efficient.

3. To limit wasted resources (including time and financial support), create and routinely evaluate key metrics to determine if changes need to be made.

Helpful References