

Benchmarking in health-system pharmacy: Experience at Glens Falls Hospital

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This article discusses the ongoing experience of Glens Falls Hospital (GFH) with the Benchmarking Program, which is coordinated by The Clinical Pharmacokinetics Laboratory at Millard Fillmore Hospital in Buffalo, New York. GFH, a community hospital in upstate New York with 442 licensed beds, serves patients in a five-county area. Over the past few years, the pharmacy staff and the antimicrobial task force at GFH have been working to develop antimicrobial management strategies to optimize the utilization of antimicrobial therapy and minimize the emergence of antimicrobial resistance. In pursuit of these goals, GFH has continually sought out opportunities to share information with other institutions, particularly since GFH is somewhat geographically isolated.

Participation in the Benchmarking Program

In 1997, GFH received an invitation to participate in the Benchmarking Program. The GFH pharmacy staff and the antimicrobial task force agreed that participation in the program would provide a unique opportunity and methodology for measuring GFH's perfor-

Abstract: The experience of Glens Falls Hospital (GFH) with the Benchmarking Program coordinated by The Clinical Pharmacokinetics Laboratory at Millard Fillmore Hospital is described.

GFH, a community hospital in upstate New York with 442 licensed beds, serves a patient population drawn from a five-county area. In 1998, GFH developed a multidisciplinary pharmacy task force charged with generating strategic initiatives for curtailing drug costs. Proposals for various programs, including specific goals, were developed with the aid of trends reported in the individual hospital reports provided by the Benchmarking Program. The data obtained through these reports helped GFH's pharmacy staff establish goals for the appropriate use of many agents, including vancomycin, and allowed GFH to assess the impact of its initiatives through comparisons with similar hospitals across the United

States. In 1995, vancomycin expenditures at GFH substantially exceeded those for benchmark hospitals of similar types, but, with the implementation of new vancomycin guidelines aimed at reducing inappropriate use in 1996, the difference was eliminated.

The individual hospital reports generated by the Benchmarking Program provide valuable data that can be used to assess pharmacy performance, set drug expenditure goals, and design programs to reduce antimicrobial resistance.

Index terms: Administration; Antibiotics; Benchmarking; Costs; Drug use; Economics; Pharmaceutical services; Pharmacy, institutional, hospital; Protocols; Rational therapy; Vancomycin

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mance against that of similar institutions. In 1997, GFH submitted its first set of data to the Benchmarking Program, containing information for 1994 through 1996. The individual hospital report that GFH subsequently received for each year of data submitted provided a comprehensive summary of the data collected, as well as valuable comparative information from peer-group insti-

tutions. From a review of these reports, it was concluded that continued participation in the Benchmarking Program would enable GFH's pharmacy staff to efficiently monitor not only antimicrobial expenditures, but also expenditures for other high-cost pharmaceutical agents.

In 1998, GFH established a multidisciplinary pharmacy task force

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charged with generating strategic initiatives aimed at curtailing drug costs. Proposals for various programs, including specific goals, were developed with the aid of trends reported in the individual hospital reports provided by the Benchmarking Program. For example, even before GFH received its first individual hospital report, it was known that propofol was being overutilized for patients requiring continuous sedation in critical care areas. Upon receipt of the 1997 individual hospital report, it was discovered that the propofol expenditures at GFH were twice those of the benchmark hospital for hospitals of a similar type ($n = 31$). Therefore, a goal was set to reduce propofol expenditures in the critical care sedation program by 33%. The comprehensive program that was initiated for this purpose has realized a 48% reduction in propofol expenditures and has had, through improved sedation practices, a positive impact on patient care.

The individual hospital report for 1997 also allowed GFH's staff to identify aztreonam expenditures as a potential area for investigation. The report showed that GFH's spending on aztreonam (in dollars per occupied bed) had increased from 1995 to 1997, was substantially above the 75th percentile at institutions of a similar type ($n = 22$), and was far in excess of that at peer-group benchmark hospitals. Data from the individual hospital report triggered a utilization review to describe prescribing patterns for aztreonam. Similarly, an evaluation of trends presented in the individual hospital report helped the staff to define goals for the use of imipenem, vancomycin, and other antimicrobials, as well as to develop specific programs for antiemetic agents used in conjunction with chemotherapy. Furthermore, data from the individual hospital report were included in a formal pharmacy department presentation to various internal committees at GFH. This pres-

entation was designed to describe trends in pharmaceutical expenditures at GFH and to describe the pharmacy task force initiatives. The larger context provided by the individual hospital report's comparative data helped emphasize to these committees the possibilities of the proposed pharmacy programs. GFH's continued participation in the Benchmarking Program and receipt of annual individual hospital reports have enabled GFH's pharmacy staff to continue to monitor the initiatives.

Assessment of vancomycin use

The alarming increase in the rate of infections caused by vancomycin-resistant enterococci (VRE) across North America has been well documented. Because prior exposure to vancomycin has been identified as a risk factor for the acquisition of VRE, it is important that all reasonable measures be taken to minimize inappropriate use of vancomycin. Vancomycin use, measured in grams per 1000 inpatient days, has been monitored at GFH since 1995 (Figure 1). Participation in the Benchmarking Program allowed GFH to confirm the benefits of early actions targeted at optimizing vancomycin use.

In 1996, before participating in the Benchmarking Program, GFH

adopted specific guidelines for the appropriate use of i.v. vancomycin. These guidelines were consistent with the guidelines of the Hospital Infection Control Practices Advisory Committee (HICPAC) of the Centers for Disease Control and Prevention (CDC) for appropriate vancomycin use but did not reiterate the HICPAC guidelines for circumstances under which vancomycin use was to be discouraged.¹ The criteria are as follows:

- Infection by methicillin-resistant staphylococci,
- Documented invasive infection by methicillin-resistant *Staphylococcus epidermidis*,
- Serious infection by a gram-positive organism in a patient with severe, life-threatening β -lactam allergy,
- Serious infection caused by a β -lactam-resistant gram-positive organism,
- Prophylaxis of endocarditis in a patient with penicillin allergy, and
- Surgical prophylaxis in a patient with life-threatening β -lactam allergy.

Criteria for appropriate vancomycin use were printed on a form and placed at the front of every patient chart at GFH. This was done to provide a reminder to prescribers and was a first attempt at conforming with the HICPAC guidelines.

Figure 1. Annual vancomycin use at Glens Falls Hospital, 1995 to 1999.

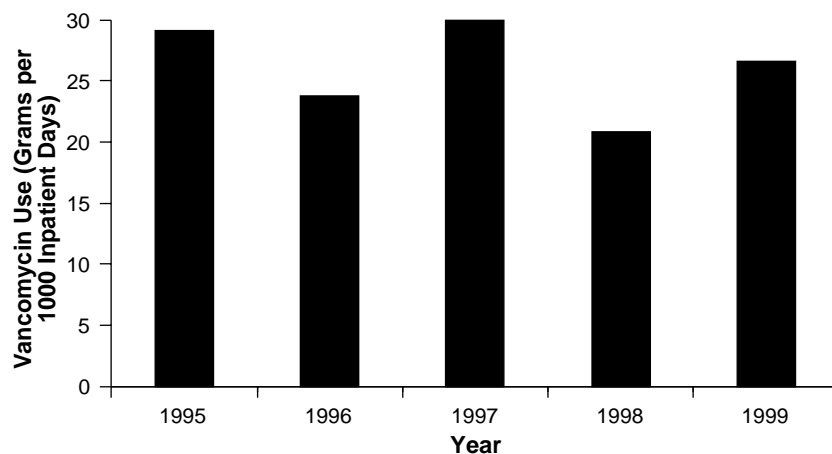


Figure 1 shows that vancomycin use at GFH remained relatively stable from 1995 to 1999, although there was a notable reduction in use between 1995 and 1996 that coincided with the implementation of the vancomycin guidelines. While the monitoring of vancomycin use at GFH has been instructive, participation in the Benchmarking Program allowed GFH to put these internal data into proper context. In 1995, vancomycin expenditures at GFH (\$67 per occupied bed) exceeded those at the similar-type benchmark hospital (\$23 per occupied bed). When the new vancomycin guidelines were implemented in 1996, the difference was essentially eliminated, with vancomycin expenditures for the similar-type benchmark hospital exceeding those at GFH by \$5 per occupied bed. A similar trend was seen when the vancomycin expenditures at GFH for 1995 to 1997 were compared with those for the similar-size benchmark hospital.

IPRO study of vancomycin use

In the spring of 1998, GFH received a report containing baseline data gathered during its participation in a quality improvement study, the Vancomycin Utilization Project, for IPRO.^a IPRO is one of 11 peer-review organizations in the Northeast, representing 15 states, districts, and commonwealths that participated in this project. Sixteen New York State hospitals participated, representing 1059 discharges

(14%) of the 7645 reviewed. The goal of this project was to decrease unnecessary vancomycin use in hospitals in a manner consistent with the HICPAC guidelines.¹ The rate of vancomycin use found to be consistent with the guidelines was low, both in New York hospitals (26%) and in hospitals in the Northeast (35%). Of the 1059 New York cases reviewed for this project, 87 were extracted from medical records at GFH (Table 1). Each of these cases was reviewed for compliance with CDC's HICPAC guidelines, and the use of vancomycin in each case was categorized as either supported or unsupported. Vancomycin use was unsupported in 50.6% of cases for infection and in 29.8% of cases for prophylaxis. The rate of unsupported vancomycin use at GFH exceeded the average rates for all New York State hospital cases combined, 47.3% for infection and 20.1% for prophylaxis. Also, the percentage of patients with presumed but undocumented penicillin allergy or cephalosporin allergy was 14% higher at GFH than for the average of all New York State hospitals.

Compared with other New York State cases, GFH cases had a disproportionately high percentage of patients who had end-stage renal disease or who were on dialysis (41.4% versus 14.8%) and a disproportionately low percentage of patients with documented infections due to gram-positive organisms (17.2% versus 33.8%). While unsupported

use of vancomycin does not necessarily mean inappropriate use, these results nevertheless indicated that closer monitoring of vancomycin use was warranted. Having combined this information from the IPRO study with the data from the Benchmarking Program, GFH decided to formally reevaluate its vancomycin-use guidelines.

Revised vancomycin guidelines

In 1998, GFH took several steps in response to the reevaluation of its vancomycin-use guidelines. These included (1) a formal presentation of the IPRO study results by IPRO representatives to a select multidisciplinary group at GFH, the details of which were passed along in a report to the antimicrobial task force and the pharmacy and therapeutics committee, (2) reports to various hospital committees regarding vancomycin-use patterns, and (3) a review of the charts for some notable cases of infection by VRE. The primary purpose was to highlight the relationship between increased or unnecessary vancomycin use and an increased annual rate of cases of VRE infection at GFH. Collectively, this information resulted in (1) modification of the physician antimicrobial order sheet to require that reported medication allergies include specific documentation of the nature of the reactions, (2) prominent display of the guidelines for vancomycin use on the back of every physician order sheet at GFH, and

Table 1.
Vancomycin Use at Glens Falls Hospital, 1997^a

Reason for Use	No. (%) Patients	
	Glens Falls Hospital (n = 87)	All New York State Hospitals (n = 1059)
Infection	54 (62.1)	729 (68.8)
Supported	10 (11.5)	228 (21.5)
Unsupported	44 (50.6)	501 (47.3)
Prophylaxis	27 (31.0)	231 (21.8)
Supported	1 (1.1)	18 (1.7)
Unsupported	26 (29.8)	213 (20.1)
Not determined	6 (6.9)	99 (9.3)

^aFrom the IPRO study.^a

(3) changing the formulary β -lactam- β -lactamase inhibitor combinations from ticarcillin-clavulanate to ampicillin-sulbactam and piperacillin-tazobactam. GFH intended to avoid unnecessary use of vancomycin for minor or non-allergy-related antimicrobial reactions reported as allergies, to have vancomycin guidelines on every order sheet as a constant reminder of our commitment as an institution to the prudent use of vancomycin, and to provide more potent antimicrobial coverage of enterococci through the use of ampicillin-sulbactam and piperacillin-tazobactam when such agents were required for polymicrobial infections potentially harboring enterococci. The pharmacy staff at GFH has attributed the decrease in vancomycin use in 1998 (Figure 1) to the success of these changes.

In 1999, the GFH pharmacy further expanded the allergy reporting requirements by redefining the "give despite allergy" standard. This standard defines when a pharmacist would require a separate "give despite allergy" order from a physician before dispensing a drug for which the patient has an allergy or the potential for a cross-reaction. Experience had led the staff to believe that the strict policy of requiring a "give despite allergy" order whenever an agent from the penicillins class or a "potentially cross-reactive" class (i.e., other β -lactams) was ordered for a patient with a history of penicillin allergy (regardless of its nature) precipitated unnecessary vancomycin orders. The new standard, which no longer requires pharma-

cists to request a "give despite allergy" order when a patient reports a minor or nonallergic antimicrobial reaction, is expected to alleviate some of the inappropriate vancomycin use at GFH.

The changes and initiatives described in this article have had a significant impact on vancomycin use and antimicrobial resistance patterns at GFH, including the frequency of infections by VRE. VRE were first identified at GFH in 1993. Since that time, the largest number of cases of VRE-associated infection reported in a one-year period was six; this occurred in both 1995 and 1998. Of the 64 enterococcus isolates tested in 1997-98, 22% were resistant to vancomycin. This rate of resistance at GFH paralleled the rate of VRE (21%) in isolates from non-intensive-care patients reported by CDC's National Nosocomial Infections Surveillance (NNIS) system for the same period. However, only 10% of the 41 enterococcus isolates tested at GFH in 1998-99 were vancomycin resistant, which was far below the 22.5% VRE rate reported by the NNIS system for the first six months of 1999.² Thus, over the past two years, GFH has experienced both a reduction in the number of VRE isolates and an improved rate of vancomycin susceptibility among all enterococcal isolates.

But VRE has not been the only resistant organism meriting scrutiny at GFH. In 1994, the rate of infection by methicillin-resistant *Staphylococcus aureus* (MRSA) was approximately 13%. The rate declined to 6% and 8% in 1995 and 1996, re-

spectively, and was 17% in 1999. While there has been a notable increase in MRSA over the past two years, the rate of increase at GFH has actually lagged behind that at many other institutions participating in the Benchmarking Program. Among institutions similar in type to GFH, median MRSA rates approached 20% in 1995 and doubled by 1998. Despite the increased rate of MRSA at GFH, actual vancomycin use has remained stable. This could be the case only if the increasing utilization of vancomycin in appropriate cases is being matched by decreasing utilization in inappropriate cases.

Conclusion

The individual hospital reports generated by the Benchmarking Program provide valuable data that can be used to assess pharmacy performance, create drug expenditure goals, and establish programs for reducing antimicrobial resistance. The pharmacy staff at GFH found the individual hospital report to be an ideal springboard for discussions with physicians on antimicrobial utilization and resistance patterns.

²Will TO. HCQIP Project: The Vancomycin Utilization Project (VUP). IPRO, HCQIP administrative memorandum no. 98-02. Lake Success, NY; 1999 Jan.

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