

An Annual Formulary Review Strategy Implemented by a Saudi Health System

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INTRODUCTION

In its health care system, Saudi Arabia (SA) applies most of the same standards as the United States. The Saudi government provides scholarships for its students to study in the U.S., and the number of students has grown by double digits for the past eight years. As a result, a significant number of Saudi physicians and allied health professionals are either educated or have received training at U.S. universities and hospitals.¹ In addition, most of the tertiary care hospitals in SA are accredited by the Joint Commission International (JCI) and implement its standards, with SA having a higher number of JCI-accredited hospital programs than any other country.² Like the U.S., SA does not have a unified national formulary, so the selection of medications and the development of a formulary are institutional responsibilities unique to the institution's practice, finance, and needs.

In the U.S., approximately 10% of health care spending is on prescription drugs.³ In SA, however, it is projected that in 2016 nearly 29% of health care expenditures will be on pharmaceuticals.⁴ Although SA is a wealthy country due to its oil-based economy, budget strains and cost-cutting are a trend facing the health care system here just as in many countries around the world. The SA government's 2016 budget included a 65% drop in health care expenditures.⁵ As a result, every strategy that can reduce costs must be considered, and one recommended by the American Society of Health-System Pharmacists (ASHP) is development of a highly effective formulary system.⁶

As in U.S. hospitals, almost all tertiary health care facilities in SA have a system in place to develop a formulary, typically under an organized multidisciplinary panel commonly known as a P&T committee. The list of medications produced by this committee should be based on thorough consideration of the most up-to-date evidence on safety, efficacy, and cost-effectiveness.

Formularies historically began as simple lists of drugs mainly developed and used by military services. However, much has changed over the years as advances in science and technology have led to a boom in the pharmaceutical industry. Today, the market is inundated with drugs and the process of drug selection, procurement, management, and prescribing has become far more complex. With this complexity came the need for a P&T committee that can manage the formulary. The ASHP describes the formulary system as an ongoing process that involves the development of policies that guide the institution's appropriate use of drugs and selects the most medically appropriate, cost-effective drugs that specifically meet the needs of the health care organization.⁷

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Even though a formulary may still be perceived by some as a simple list of the medications available at an institution, an advanced, managed formulary system should be designed to guide the rational use of medications and promote best practice, based on the best available evidence.⁷ Nevertheless, over the years a formulary could become overwhelmed by medications that, when added, seemed rational and relevant based on the evidence then available; this might not be the case after the passage of time as new evidence emerges on safety, lack of efficacy, availability of safer or more effective alternatives, and availability of lower-cost alternatives.⁸

The JCI calls for an annual review of the formulary in its medication management and use chapter (Standard MMU.2.1) based on emerging safety and efficacy information and information on usage and adverse events.⁹ However, it provides little guidance on how to achieve this; the strategy most commonly suggested by other institutions is thorough class reviews.^{10,11} Strategies recommended by the ASHP include a reduction in the number of drugs in the same therapeutic group or class and periodic housecleaning to remove underused and discontinued items.⁶ We believe that class reviews, although effective, do not cover all aspects required by the JCI (safety, efficacy, and usage). Because a clear outline for an institution on how to perform such an overall formulary review is lacking, our institution attempted to develop a strategy that would efficiently review the whole formulary. The strategy outlined in this article could be used on an annual basis by other P&T committees.

At our institution, which includes facilities in the Central, Eastern, and Western regions of SA, we have a unified formulary managed by a corporate P&T committee. The committee has three regional subcommittees, an antimicrobial subcommittee, an oncology subcommittee, and a drug evaluation subcommittee that report recommendations to the corporate P&T committee for final decisions.

METHODS

We formed a task force of members from the P&T committee with the objective of performing an annual review of the formulary. The formulary review process included three main aspects: safety, efficacy, and utilization. The formulary was screened based on each aspect individually to identify any required changes or recommendations for our corporate P&T committee. Recommended changes included the addition of new drugs or dosage forms, deletion of drugs or dosage forms, changes in drug-use restrictions, a need for class reviews or drug utilization reviews, alerts to be added to the computerized prescriber order entry (CPOE) system, or development of a drug-use policy or guideline.

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Safety

We compiled all drug safety alerts sent throughout the year by national and international drug regulatory authorities (the Saudi Food and Drug Authority, the U.S. Food and Drug Administration [FDA]), the European Medicines Agency [EMA], Health Canada, Hong Kong's drug office, etc.). For each drug safety alert, a recommendation was made that included options such as deletion from the formulary, changes in restrictions, developing a drug-use policy, and/or incorporating an alert in the CPOE system.

We also reviewed the list of hazardous medications for which specific dosage forms were prepared in the compounding pharmacy. A search was conducted for commercially available, ready-to-use dosage forms; once the availability of a dosage form was determined, a recommendation was made to add it to the formulary. This was done in an effort to minimize staff exposure to hazardous drugs during compounding, which increases such exposure.¹²

In an attempt to minimize both staff and patient exposure to hazardous drugs, the list of such drugs on the formulary was also reviewed for tablets that should not be cut or crushed due to their hazardous nature, with a focus on commonly required strengths that were not available on the formulary. Accordingly, revisions were recommended to add additional strengths of some hazardous medications.

Finally, the institution's adverse drug reaction (ADR) reports were reviewed for signals and trends. Institution-specific ADR reports can provide signals about safety concerns such as drug quality and practice-related issues that can guide formulary decisions.

Efficacy

At our institution, it is common when a new medication enters the market that the P&T committee does not consider its addition to the formulary until a physician initiates a request. We took a proactive position by reviewing new and emerging information on effective treatments and requesting feedback from the departments involved.

For efficacy data, we relied on three main approaches: reviewing medications newly approved by the FDA and EMA, reviewing new therapeutic classes and drugs with novel mechanisms of action, and reviewing practice-changing articles from various resources.^{13,14} We generated a list of medications that were initially appraised as having substantial evidence of superior efficacy or a proposed advantage compared to items already on the formulary. The medications on this list were then sent to the heads of the concerned specialties to solicit their expert opinions on considering the drugs for addition to the formulary. If positive feedback was received, the drug's proposed addition would then go through the regular pathway used for any formulary drug evaluation.

Usage

In collaboration with the pharmaceutical planning department, we analyzed reports on usage of formulary medications. Reports on drugs not utilized for 12 months or more, drugs that had been discontinued by the manufacturer, and drugs that had been in shortage for a long period were systematically reviewed to evaluate the reasons for the drop in consumption,

the availability of alternatives on the formulary, or the need to add an alternative to the formulary.

The formulary was also screened for therapeutic classes that had three or more drugs of similar dosage forms and intended indications. For each class, a recommendation was made on whether a class review was needed or not. Class reviews were then forwarded to our drug evaluation subcommittee to perform this work.

RESULTS

Our methodological review of the formulary led to recommendations to add 13 new drugs and 13 new dosage forms, delete 66 drugs, conduct eight class reviews, change two medication restrictions, add eight new CPOE system alerts, develop four new drug-use policies or guidelines, and conduct two drug utilization reviews.

The drugs most recommended for deletion were antibiotics (20%), followed by antineoplastics (14%). The majority of deletions were due to lack of utilization, followed by safety concerns, changes in practice, and discontinuation of the drug from the market. Of the recommended deletions because utilization was lacking, 45% were due to the availability of alternative dosage forms, strengths, or volumes of the drug on the formulary; 38% were due to the availability of a more effective alternative on the formulary; 9% were due to the availability of a safer alternative on the formulary; and the remaining 8% were due to the availability of multiple drugs of the same therapeutic class.

The task force members spent about three weeks reviewing the formulary, finalizing the plan, and summarizing the recommendations. The plan and the recommended changes were provided to all members of the corporate P&T committee for their comments and feedback, after which the recommendations were categorized and sent to the specialty services involved for their feedback. The corporate P&T committee has been acting upon the recommendations at its meetings. To date, 10 medications have been deleted from the formulary, and 10 more are to be considered for deletion at the next scheduled meeting. Class reviews have been assigned to clinical pharmacists, and one new medication has been added to the formulary.

Table 1 illustrates each aspect of the review, the applicable strategy, an example, and the recommended action(s).

CONCLUSION

An annual review of the formulary might seem to be an easy task that can be achieved successfully through a couple of class reviews. However, we believe that the systematic process outlined in this article can be used by other institutions—and will definitely be used by ours—on an annual basis to polish the formulary and guide the use of medications throughout the institution with a carefully selected list of drugs based on the most up-to-date evidence on safety, efficacy, and utilization.

Our results indicate that there was a crucial need for this overall review, because the number of medications recommended for deletion was unexpectedly high. However, this was our first annual comprehensive review of the formulary, and we anticipate less drastic changes will be needed during our next annual review.

The results showed that formulary drugs with multiple dosage forms can be targeted for regular review and that

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Table 1 Selected Illustrations of the Formulary Review Process

Strategy	Example	Action(s) Taken
Safety		
Review drug safety alerts from national and international drug regulatory authorities	<i>Bromocriptine</i> : EMA warning not to use the drug for routine suppression of lactation due to fatal cardiovascular side effects (such as heart attack and stroke), seizures, and psychiatric side effects ¹⁵	<ul style="list-style-type: none"> Warning sent to prescribers. Cabergoline determined to be a formulary alternative. Bromocriptine recommended for formulary deletion.
	<i>ACEIs and ARBs</i> : SFDA and EMA warning against using the drugs in combination ^{16,17}	Alert added to CPOE when two medications of these groups are prescribed together.
	<i>Domperidone</i> : EMA warning of serious cardiac adverse effects, including QT interval prolongation and arrhythmias; new restrictions on indications and dosing ¹⁸	<ul style="list-style-type: none"> Recommended a DUE Due to parallel warning on metoclopramide, a recommendation was made to develop a guideline for use and selection of antiemetics.
Review list of hazardous medications for which commercial ready-to-use dosage forms are available	<i>Valganciclovir</i> : We were compounding the oral suspension; the oral suspension is available commercially.	Recommended addition of the oral suspension.
Review list of hazardous medications for which tablets of specific strength or dosage forms are available, minimizing the cutting of tablets	<i>Mycophenolate</i> : We had only the 500-mg capsule and prepared the oral suspension; the oral suspension and a 250-mg capsule are commercially available.	Recommended addition of the 250-mg capsule and the oral suspension dosage forms.
Review adverse drug reaction report	<i>Esomeprazole</i> : Reported to have lack of efficacy once the institution switched from brand to generic	Reports and concern forwarded to SFDA for testing.
Efficacy		
Review newly approved medications	<i>Lumacaftor/ivacaftor</i> : This combination of two cystic fibrosis modulators was approved by the FDA in July 2015. ¹⁹	Memo sent to head of pulmonology for expert opinion on considering the drug for addition to the formulary.
Search for new therapeutic classes and drugs with a novel mechanism of action	<i>Uridine triacetate</i> : This new, potentially life-saving oral medication treats overdoses of fluorouracil and capecitabine. ²⁰	Memo sent to head of oncology for expert opinion on considering the drug for addition to the formulary.
Review changing practice articles	<i>Ambrisentan and tadalafil</i> : For patients with Group 1 pulmonary arterial hypertension who have Class II or III symptoms, these two drugs are recommended rather than other combinations or single-agent therapy. ²¹	Tadalafil is not on the formulary. Memo sent to head of pulmonology for expert opinion on considering the drug for addition to the formulary.
Usage		
Review reports on drugs not utilized in the institution for 12 months or more	<i>Hydrochlorothiazide oral solution</i> : Not used for many years; alternatives could be prepared in the compounding pharmacy if needed.	Recommended for deletion.
Review reports on drugs that have been discontinued by the manufacturer	<i>Lepirudin injection</i> : Discontinued worldwide	Deleted from the formulary.
Review reports on drugs that have been in shortage for a long time	<i>Maprotiline tablets</i> : In worldwide shortage	Consulted psychiatry for deletion from the formulary.
Screen all classes of the formulary and list those with more than three drugs of the same intended indication and dosage forms	<i>Nonsteroidal anti-inflammatory drugs</i> : This class had more than three drugs.	Recommended a class review.
ACEI = angiotensin-converting enzyme inhibitor; ARB = angiotensin-receptor blocker; CPOE = computerized prescriber order entry; DUE = drug utilization evaluation; EMA = European Medicines Agency; FDA = U.S. Food and Drug Administration; SFDA = Saudi Food and Drug Authority.		

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further requests for adding dosage forms of a single drug must be evaluated critically. The results also indicated the importance of addressing deletion of drugs once a more effective alternative is considered for addition—if not at the same time, then within a specific time frame after the new drug is introduced.

Finally, although beyond the scope of this review, a beneficial financial outcome seems almost inevitable. Based on our results, the potential for cost-savings through an overall formulary review can come from:

- Minimizing further stocking of underutilized and no-longer-used drugs.
- Minimizing the cost associated with adverse drug reactions through screening for safety concerns, institutional ADR reports, and the addition of drugs with evidence of a better safety profile.
- Reducing the cost of compounding hazardous drugs and the indirect cost associated with caring for staff that might potentially be harmed through exposure.

However, further research is needed to estimate the cost-savings this approach may provide.

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