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EDITORIAL MISSION

JMCP is dedicated to providing managed care pharmacists, associates, and students with the tools to excel in their daily practices by focusing on:

Policy: Providing a forum for in-depth discussion of issues of topical and long-term importance.

Practice: Presenting information of interest and educational value to the membership.

Research: Publishing research that increases the quality of research standards used in managed care pharmacy practice and helps apply that research to improve the practice of managed care pharmacy.

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About our cover artist

Florence: Certosa, Monastery Pharmacy • Fratelli Alinari

Pale, sepia-toned cards, these photographs do not reproduce the beauty of the colors or the charm of the light that makes the marbles and mosaics shine. Rather, they freeze the memory and sensation of a particular place and time.¹ Therein lies the secret behind the photography of the Alinari brothers.

While working as an apprentice in 1845, Leopoldo Alinari refined his skills as an engraver and photographer. In 1852, he opened a photography studio in Florence and was joined by his brothers Romualdo and Giuseppe. Together, they formed Fratelli Alinari, Fotografi Editori. Historical records identify Leopoldo as the photographer, while Giuseppe and Romualdo handled business development and administration.

The Alinari brothers were well known for their reproductions of popular works of art; their portrayals of Italian churches and museums were thought pure and stunning. As pioneers of photography, the brothers promoted their expertise by capturing the attention of tourists. One of their first major projects was a picture album that focused on reproducing picturesque scenes of Florence, Pisa, Siena, and San Gimignano. Their works combined detail and clarity while portraying a panoramic diversity of cultural settings including natural scenery, city views, and works of old masters from Italian museums.

In 1855, the brothers won a medal at the Exposition Universelle in Paris. In reference to their skills, they were among a small group of photographers who were granted permission to photograph paintings in the Uffizi Gallery. In 1864 the capital of Italy relocated to Florence, and the Alinari brothers were appointed official government photographers and were commissioned to take portraits of civic and cultural leaders. Even after Leopoldo’s death in 1865, the firm’s success was evident in its prestigious business address on the Via Nazionale.

By the 1880s, Fratelli Alinari had more than 100 employees and published catalogs that featured thousands of photographs. Both Romualdo and Giuseppe died in 1891, and Leopoldo’s son, Vittorio, began managing the firm. In 1920 a Florentine group gained ownership of Fratelli Alinari.

The works of Leopoldo, Romualdo, and Giuseppe continue to serve as a reference for art students and historians. Like the Alinari brothers, we can refine the business of managed care pharmacy with creativity, business development, and administration. If you would like to personally view this 19th century work of art, please visit the Tampa Museum of Art during AMCP’s upcoming meeting in Tampa on April 18–21, 2001.

Celeste d’Elliott
JMCP Contributing Editor

Cover Credit
Fratelli Alinari (Italian brothers, active in Florence from 1854): Leopoldo Alinari (1832–1865), Romualdo Alinari (1830–1891), and Giuseppe Alinari (1836–1891); Florence: Certosa, Monastery Pharmacy, 19th Century. Albumen print, 7 ¼ x 9 ¾ in., cropped. Collection of the Tampa Museum of Art, gift of Mr. and Mrs. William Knight Zewadski.

References
Quality Measures: Looking in All the Wrong Places

It is difficult to avoid seeing information about full accreditation status of managed care organizations (MCOs) in their promotional materials and reports. I, for one, am pleased that the National Committee for Quality Assurance (NCQA) exists and that the Health Plan Employer Data and Information Set (HEDIS) was developed. Clearly, knowing what percentage of diabetic patients receive annual ophthalmologic exams is superior to not knowing this statistic, and MCOs might work to increase the number knowing that it might be used as a proxy for quality in comparisons of health plans.

However, knowledge about eye exams, or about the percentage of women having mammograms, is only mildly helpful to health care consumers. All of the information is roughly equal to the information given by a pilot to the passengers on an airplane just before takeoff. When the plane is on the ground, few people are concerned about visibility from the cockpit window, yet the pilot announces that current visibility is three miles or half a mile, and that the wind is at eight miles per hour from the north-northeast.

Pilots need to know wind speed and direction, as well as visibility, but it is likely that most passengers have no interest in these statistics unless there is a problem. The same is true, in most cases, for eye exams for diabetics, pediatric immunization schedules, and mammograms as factors that influence decisions on choosing health plans. But mention what an MCO does for male-pattern baldness and the ears of a 35-year-old healthy male will perk up.

In reality, health plans do not practice medicine: That is done by practitioners who work pretty much independently and who make decisions based on their best judgments, considering the individual factors surrounding each individual patient. So, one can now begin to recognize that while aggregate scores for whole MCOs might have some value in a gross, crude, or macro-level way, they do not answer the most relevant questions—those about individual practitioners.

If an MCO had 10 internists caring for diabetic patients and 8 of those 10 referred every diabetic patient for annual eye exams, but 2 never referred any patients, the MCO’s score for diabetic eye exams would be 80%, which is more than adequate. Given that information, a diabetic patient might be in for a real surprise if he or she selects one of those two physicians who never refers a patient for an eye exam, having no way of knowing this in advance.

This is similar to the old story about the airplane pilot who graduated from pilot school with an average grade of B. Unfortunately, the story goes, the pilot had an average of A+ in takeoffs but had only a C– in landings. This would not be my first choice as a pilot. In these examples, the consumers were not given enough information to enable them to make practitioner-level decisions.

This dilemma is similar to Donabedian’s construct of the three means to conduct quality studies (structure, process, and outcomes).1 We look at structure or process, when in fact the only really valuable information to assist in rational decision making is outcomes data associated with the individual practitioner.

I would want to know which surgeon had the best results, which cardiologist had the longest survival rates for congestive heart failure patients. Here, the average result for all of the surgeons is of little value when the result for one is wanted. And with the cardiologist, the answer is not what proportion of patients were on aspirin or beta blockers, but the survival times from the time of diagnosis.

MCOs want to have information about individual practitioners regarding percentage drug formulary compliance, percentage of prescriptions for generic drugs, and the average cost per prescription, among many other variables. This observer, however, would gladly trade those data for the percentage of cases requiring re-surgery for each surgeon, their patient survival rates, and with regard to specific specialty areas or disease states, the average level of HbA₁c for their patients for endocrinologists as well as the percentage of their patients persisting with their prescribed drug regimen at one year. These proxies reveal which doctors take the time, or use effective communication, or whom patients trust.

In cardiology, I would want to know the comparative percentages of normotensive patients for each practitioner, the percentage of their patients taking aspirin or statins, and compliant with their antihypertensive medications after six months and one year.

The current quality measures are good first steps toward a more telling and useful system, but rather than perfecting this system for the next decade, this writer believes that it is time for us to start making perceptible steps toward a real quality-measurement system—one that tells us more than wind speed and direction at an elevation of 10,000 feet.

Reference

he federal Office of Economic Opportunity funds community and migrant health centers to increase the availability of primary and preventative health care for low-income populations in medically underserved areas of our cities and rural communities. Since the Kennedy and Johnson administrations, community health centers (CHCs) have been important safety-net providers for Medicaid beneficiaries, minorities, and uninsured families, and have maintained strong bipartisan support. In some communities, a CHC may be the only primary-care provider available to these vulnerable populations.

CHCs rely on funding from a variety of public and private sources; payments for services from Medicaid and Medicare have been significant. The dramatic increase in the use of managed care programs offers new challenges for CHCs. Other challenges to the ability of these safety-net providers to meet the needs of the nation’s vulnerable populations are the steady growth in the number of uninsured Americans (now near 45 million) and increased competition and consolidation among health care providers.

For nearly 35 years, more than 600 CHCs across the United States have been the focus of valiant efforts by physicians, nurse practitioners, and community health care workers. In addition to primary care, CHCs provide a range of ancillary services—unfortunately in an uneven pattern, depending on their financial capabilities. All too often, they have had to curtail these ancillary services because of declining revenues or increased demand. Historically, pharmacy services have been scant in CHCs and are always at risk for cutbacks when drug prices increase.

Full-fledged pharmacies are usually not available in CHCs, even though the pharmacotherapeutic needs of the indigent population are extensive. Lon Berkeley of the Joint Commission on Accreditation of Healthcare Organizations maintains that only about 25% of CHCs seeking accreditation have functioning pharmacies.1

Since the 1960s, pharmacists have rarely been in the forefront of the community-health movement, thus accounting for the infrequent staffing of licensed pharmacists at CHCs. The U.S. Health Resources and Service Administration, which funds CHCs with block grants, has been encouraging centers to plan strategically, form partnerships, and participate in managed care. Such new directions open up opportunities for socially conscious pharmacy practitioners to forge new efforts in disease-state management for our most vulnerable citizens. This article describes the efforts of a pharmacy student who, with help from her professor, seized this opportunity at a CHC on the West Side of Chicago.

Chicago’s Lawndale Community Health Center

Lawndale is a neighborhood in inner-city Chicago with a strong cultural division. North Lawndale residents are mostly poor African Americans, while South Lawndale is predominantly Hispanic. Yet just outside of Lawndale’s community center, the car-lined streets are filled with a mixture of Hispanic and African American residents casually conversing with one another. Looking at this small area of the neighborhood, one would be surprised to learn that this is one of the poorest communities in the nation. Many of its residents live in substandard housing and endure life-threatening situations as part of their daily lives. Accessibility to medical care is scarce and certainly an expense that many residents cannot readily afford, nor even care (at times) to worry about.

Lawndale Community Church was established in this neighborhood nearly 23 years ago in hopes of having a positive social and spiritual impact on it. Since the congregation consists primarily of neighborhood residents, the church sought to reach out and serve the surrounding community, following biblical teachings. The church made a list of services it could provide as a social ministry to transform the neighborhood. These services included providing a safe place to do laundry, providing health care, and conducting neighborhood economic development. As it turns out, church members’ early vision has become a reality. As various storefronts began to proudly display association to Lawndale Community Church, residents of the community respected and supported the valiant efforts of the church leaders. Many residents began to help out with projects. For example, a basketball court inside the health center was built with the cooperative help of local teens.

One of the church’s most notable contributions to the community has been Lawndale Community Health Center (LCHC). LCHC’s vision is to “supply quality, affordable health care in an atmosphere of Christian love.” Over the past 16 years, what began as a small practice of just two doctors has grown into a full-service medical and dental clinic, now comprised of 20 doctors and a dedicated staff that supports nearly 70,000 patient visits each year.

Lawndale Pharmacy

Lawndale Pharmacy was established in 1996 as an integral part of the health center thanks to the initiative of Kristen Fout, Pharm.D. As a student at the University of Illinois at Chicago-College of Pharmacy (UIC-COP), Dr. Fout began an independent study project under the guidance of Professor Jack Salmon. Her research focused on inner-city CHCs providing services to indigent populations. The ultimate goal of her project was to investigate how pharmacists could offer unique pharmaceutical care in an inner-city community. Not surprisingly, the project revealed a great need for full-fledged pharmacies inside CHCs, including LCHC.

Some health centers have doctors dispensing medications out of “drug rooms,” which are often left unattended and have unrestricted availability of prescription
Supplying affordable health care to an indigent population requires working with managed care organizations and developing a feasible payment plan.

medications. In fact, these “drug rooms” often are overflowing with caches of sample medications donated from drug representatives, and have poor methods of monitoring what is dispensed and no proper labeling.

On the other hand, many CHCs have neither a pharmacy nor a drug room. Consequently, patients who come for medical help must perhaps leave the health center with a fistful of prescriptions to find the closest chain pharmacy, which may be miles away, to get their medications. This assumes that they have the money to pay for their prescriptions, or a Medicaid drug benefit. Most uninsured persons have neither. Before LCHC had a pharmacy, patients who had the financial resources to pay for their medications were forced to travel more than a mile to the nearest pharmacy. This is troublesome in Chicago in the winter because most residents do not have cars, and many residents fear crossing gang territories or venturing into another cultural neighborhood. Independent community pharmacies had long ago closed their doors across Chicago’s inner city; chain drug stores generally invest only in middle-class suburban areas. The pharmaceutical-care access dilemmas for the inner-city uninsured are two-fold: both geographic and financial.

As it turns out, what began as a school research project evolved into a greater task of implementing a pharmacy practice within a health center. After realizing the value of having an on-site pharmacist, LCHC invited Dr. Fout to organize a pharmacy and secure a license. She spent one UIC-COP rotation in her final year of school exploring the feasibility of a pharmacy at LCHC.

With the support and encouragement of the staff and several pharmacy professional leaders, Lawndale Pharmacy opened its doors in November 1996, just six months after Kristen’s graduation. Today Lawndale remains the only 1 of 13 federally funded CHCs in Chicago to have a licensed pharmacist on staff to dispense medications and counsel patients on their proper usage.

Advantages
Since its inception, the pharmacy has grown to become a vital and integral part of LCHC. A pharmacy located within the center allows for complete health care for the Lawndale residents. First of all, it facilitates prescription compliance by patients by making it easier for them to obtain prescriptions. The accessibility of the on-site pharmacy eliminates the need for patients to commute to a retail pharmacy and reduces the probability that patients will forget to fill their prescriptions. Secondly, it facilitates vital communication between the physician and the pharmacist. The Lawndale pharmacy is adjacent to the physicians’ examination rooms; questions from the pharmacist to the physician regarding appropriate drug therapy selection and illegible handwriting can be answered promptly. Lawndale Pharmacy has been very beneficial in enhancing continuity and quality of care.

Giving the residents of Lawndale the option of going to the LCHC Pharmacy for their prescriptions has other advantages. For example, Lawndale Pharmacy has its own formulary, which is not dictated by the HMOs. This allows the pharmacy to stock specific medications for the disease states of its indigent patients—drugs not normally available in some retail pharmacies or through the HMOs. The pharmacy also dispenses over-the-counter medications to provide even a wider range of pharmacotherapy to these patients.

Also, since it is recognized as a charitable nonprofit organization, Lawndale can obtain medications through the U.S. Public Health Service at discounted prices. This is important because lower acquisition costs ultimately yield more affordable medications for patients. Maintaining an in-house pharmacy with highly discounted inventory within the CHC allows additional subsidization of pharmaceutical costs for economically disadvantaged patients.

Operations
Working with an indigent population requires the pharmacy and the health center to confront and resolve issues of operational financing, since most residents can barely afford to pay for such services—they are the “working poor” and are uninsured. Nevertheless, the financial survival of the health center depends on important resources. LCHC receives almost $2.8 million for HMO patient capitation, $2 million for Medicaid fee-for-service, $2 million from various grants and contracts, $136,000 in revenues from the pharmacy plus several other sources, for a total annual budget of $8.4 million.

Currently, the majority of LCHC’s patients are from families on Medicaid; the rest are charged a cash payment for their medications, based on a sliding scale according to their ability to pay. (The pharmacy adds a flat dispensing fee of $1.50.)

Supplying affordable health care to an indigent population requires working with managed care organizations and developing a feasible payment plan for uninsured patients, which comprise a significant portion of the practice. Such plans must consider the patients’ drug therapy needs.
About 53% of LCHC’s patients have their medications paid for by the Illinois Department of Public Aid (IDPA), which has contracts with five health maintenance organizations (HMOs). The pharmacy does not deal with any other outside insurance or “off-the-street” patients because of both capacity issues and a desire not to compete with existing retail stores. As LCHC patients began to sign up with private HMOs, the center was led to partner with these HMOs to ensure that patients would continue using LCHC for their health care needs. The pharmacy is reimbursed a $3.50 dispensing fee per medication, plus the cost of the medication through IDPA. Reimbursement for Medicaid patients’ pharmacy services constitutes a portion of the per capita funding for the HMO patients.

Unfortunately, this prospective method of payment involves risks for the LCHC providers. One major risk is not knowing how much of the capitation amount is being used outside LCHC. Although LCHC managed care patients are receiving care from its physicians and nurse practitioners, the patients have the option of obtaining their prescription drugs from another retail pharmacy. When this occurs, it reduces the budgeted financial resources available to LCHC for providing health care and pharmacy services. LCHC was able to greatly reduce this risk by establishing an in-house pharmacy. The complex relationships facing CHCs with the spread of managed care figured into the decision to open Lawndale Pharmacy. Securing Public Health Service pricing for purchasing pharmaceuticals also helps LCHC financially by allowing the subsidization of uninsured patients’ drugs.

The challenge for LCHC is to provide affordable health care to needy residents while balancing its operations budget. Financial barriers to care discourage residents from seeking appropriate medical attention. Positive health outcomes are less likely if families have to choose between placing food on the table and buying medications. LCHC must continually ensure that it is providing the most cost-effective health care to its patients, and payment issues should not hinder the residents of Lawndale from receiving appropriate pharmaceutical care.

Community health services continue to operate in a changing health care environment to serve vulnerable populations. Modifications in the Medicaid program present a challenge for CHCs participating in Medicaid managed care. These challenges require strong consideration for developing and operating in-house pharmacy services. Lawndale Pharmacy was constructed to help the indigent population obtain needed medications at affordable prices, and obtain complete pharmaceutical counseling.

The inspiration of a local pharmacist in the community helped create Lawndale Pharmacy. The pharmacy continues its notable impact on the residents of Lawndale and has become an essential partner to other health care professionals at LCHC in providing quality medical care for its residents.

Gina Yun, Pharm.D. (Cand.), J. Warren Salmon, Ph.D., and Kristen Gergen Fout, Pharm.D., University of Illinois at Chicago-College of Pharmacy
he current health care environment can be characterized this way: Do more with less and be nicer about it.

Given this reality, the management skills, behaviors, techniques, models, theories, and insights required to deliver pharmaceutical products and services efficiently take on critical importance. Faculty members at the Mylan School of Pharmacy at Duquesne University have noticed in conversations with many practitioners, in all kinds of practice settings, that the practitioners regret that they were not exposed to more courses in management, marketing, and finance while in school. These conversations, coupled with intuition, experience, and an understanding of the marketplace and the demands of surviving in that marketplace have led the Mylan School to develop three new programs in the past 18 months. These programs are designed to meet the needs of students—both entry-level Doctor of Pharmacy (Pharm.D.) students and practitioners—for management and marketing skills. The programs are the management concentration for Pharm.D. students and an executive program based on management certificates for practitioners, and a Master of Science (M.S.) program in Pharmacy Administration developed to meet the demands of graduate education in social and behavioral disciplines related to marketing and management.

The Management Concentration

The entry-level Pharm.D. program was instituted at Duquesne in 1994. The first class to complete the program graduated in 2000. During the professional phase of the program students take 134 credit hours of required didactic and experiential courses. Within these are required courses in Management (five hours), Communication (three hours), American Health Care Systems (three hours), Pharmacy Law (two hours), and Advanced Law and Ethics (three hours). In the revised American Health Care Systems course, students are exposed to concepts in managed care pharmacy, with 10 lecture hours specifically on insurance and risk management, basic managed care principles and policies, and the Medicare and Medicaid systems. The last eight to nine classroom hours are spent reviewing basic principles of pharmacoeconomics. Students also take 10–13 hours of professional elective credits during their final two years in the program. Five new electives have been developed to take advantage of these open credit hours. Those electives are as follows:

Health Care Economics: the application of microeconomic theory to decision making in the health care arena. Students participate in both informal and formal compulsory debates on issues such as managed care and the appropriate rationing of health care resources, the effects of technology on the supply of and demand for pharmacists, and the integration of economics and value judgments into the proper structure and design of prescription drug benefits.

Financial Management: basic and advanced concepts in accounting and finance to assist students in business operations. Students perform projects enabling them to better understand capital budgeting and allocative decisions, techniques to evaluate the viability of programs, and the integration of economics and value judgments into the proper structure and design of prescription drug benefits.

Marketing and Customer Service: the application of basic marketing theory and management principles to teach students how to attract and retain customers. Peer-reviewed readings and projects deal with issues such as attracting customers to new services, recovering from service failures, and empowering employees to take care of customers.

Pharmacoeconomics: further application of basic concepts provided in the American Health Care Systems course. Students critically evaluate the literature and develop a proposal for a cost-effectiveness evaluation of a new drug or service and give a poster presentation of this proposal that is open to the public.

Advanced Managed Care Principles and Policies: a very detailed examination of managed care and pharmacy benefits management. Students attend weekly seminars given by persons employed in the field, including insurers, administrators from pharmacy benefit management companies (PBMs), managed care liaisons from the pharmaceutical industry, and diplomats from the Academy of Managed Care Pharmacy (AMCP).

Students are not required to take all five of these courses but may replace one of them with any of a number of relevant courses from the School of Business or the Rangos School of Health Sciences. At the completion of the five electives students are awarded a certificate for a management concentration.

At its first offering, seven students enrolled in and completed the management concentration. In the current sixth-year class, 25 students from a class of 123 are on schedule to complete the management concentration; in the current fifth-year class, 48 students from a class of 143 are on schedule to complete the program. Obviously, the program has been well received by the students. The test of the value of the management concentration lies in the future, in the performance of these students as they move through the ranks of the pharmacy profession.

The Management Certificate

Practitioners who want to enhance their management skills often have a problem: They need more information than can be provided through continuing education (CE) programs, but do not have the time or interest to enroll in a full academic program such as a Master of Business Administration program.

Continued on page 96
Faculty members are currently active in research projects with direct implications for managed care pharmacy and the rational and cost-effective use of drug therapies.

The Management Certificate at Duquesne is an alternative to these two choices. In the spring of 2000 the American Council on Pharmaceutical Education granted approval to the Mylan School of Pharmacy to offer a certificate in management—the first such certificate in the nation.

The management certificate specifically focuses on personnel management and human resources. This program focuses on managing conflict, change, motivation, and performance appraisal and is targeted at practicing pharmacists in community and health systems, as well as nonpharmacists employed within the industry in management positions. The certificate requires 30 hours to complete, 16 of which are contact hours. Outside readings and written assignments are completed in the remaining 14 hours. In-class contact hours emphasize discussion, demonstrations, role-play, and small group exercises.

The focus of the certificate is applied; theory is minimized. Further certificate programs are under development in financial management, strategic planning, and marketing and customer service. In addition to being awarded a certificate upon completion of each program, participants will be awarded CE credits.

The Master’s Degree Program

In the fall 2000 academic semester, the school’s first M.S. class in Pharmacy Administration began taking courses and initiating their research projects. Students choose between the non-thesis and thesis programs. Requirements for completing the non-thesis track include 30 hours of didactic courses and 3 credit hours of “special problems” in which the student completes an applied research problem appropriate for his or her primary work environment. The thesis track is comprised of 24 credit hours of didactic course work and 9 credit hours toward completion of the thesis.

Students may choose one of four faculty members to direct their thesis projects. Each of these faculty members is currently active in research projects with direct implications for managed care pharmacy and the rational and cost-effective use of drug therapies. Shane Desselle, Ph.D., uses advanced psychometric techniques to develop instruments that may be used to assess member satisfaction with prescription drug coverage, and is currently researching other issues related to prescription drug benefits design. Vincent Giannetti, Ph.D., investigates the ethical distribution of pharmaceuticals and other health products and services in managed care and other populations, and examines counseling behaviors of pharmacists in a variety of settings. Michael Miller, M.S., our resident pharmacoeconomist, evaluates the quality of government-sponsored programs designed to increase the access of prescription drugs to indigent populations. David Tipton, Ph.D., is developing a set of protocols for practitioners to use in delineating customer-service strategies for new cognitive services; he also seeks to uncover the most appropriate methods to deal with service mistakes by pharmacists. Graduate students are obviously afforded many choices from a group of faculty members who are diverse in their interests yet focused on advancing the profession of pharmacy and the rational use of drug therapy by patients.

The entry-level management concentration and master’s program have been dovetailed nicely for current students. Courses taken during the management concentration are all applicable toward a master’s degree, as long as students complete additional assignments when they take the courses as undergraduates.

Conclusion

The Duquesne University Mylan School of Pharmacy Department of Pharmacy Administration now has three programs for entry-level students, graduate students, and practitioners to gain insights related to marketing, management, and the social and behavioral aspects of pharmacy, particularly as they apply toward managed care pharmacy practice.

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Traditional approaches to controlling prescription benefit costs and improving quality (e.g., benefit design, prospectively delivered prescribing guidelines, disease management, and retrospective performance penalties) have peaked in terms of effectiveness. Unfortunately, this peak is not high enough: Drug spending has been rising at a blistering rate, and prescribing errors remain rampant.

The cornerstone of the solution to these problems is computerized prescribing—what some call “ePrescribing.” The Institute for Safe Medication Practices has called for the elimination of handwritten prescriptions within three years. In spite of such declarations, the vast majority of prescriptions continue to be hand-written. This is about to change. A multitude of powerful forces—the most important of which are the emergence of low-cost Web technologies and the increasing popularity of palm-sized devices amongst physicians—are converging to drive a rapidly evolving ambulatory care ePrescribing market.

Why ePrescribe? Quality, Drug Spending, and Efficiency

Reducing Medication Errors

According to a 1999 Institute of Medicine report, 7,000 deaths occur each year as a result of medication errors. Between 1% and 3% of hospital admissions are attributable to medication errors, and the annual cost related to these errors may be as high as $77 billion.

There is very little published data about the rate of adverse drug events (ADEs) in outpatient settings. A recent study found that 394 (18%) of 2,248 patients who had received a prescription reported complications, but chart documentation of an ADE was only present in 64 cases (3%). Nearly half of the 394 patients reporting complications sought medical attention, while 3 of the 64 patients with a documented ADE required hospitalization. Eight of the 64 patients had a documented previous reaction to the causative drug.

There is also little published data regarding the causes of preventable outpatient ADEs. While dispensing errors related to illegible prescriptions have received considerable attention lately, the majority of outpatient medication errors have nothing to do with legibility. For instance, in Massachusetts, the State Board of Pharmacy estimates that 90% of the 2.4 million prescriptions filled improperly each year are a result of either the wrong drug or dosage having been prescribed. These errors are usually the result of either inadequate point-of-care access to current clinical knowledge (e.g., a prescriber is unfamiliar with the best drug or dosage for a particular situation) or unavailable patient data (e.g., a prescriber does not have ready access to information about a patient’s current and previous medication usage, allergy history, or lab data). In a large inpatient study of preventable ADEs, these two “system failures” alone accounted for almost half of the ADEs encountered in the study.

By delivering knowledge-based, patient-specific feedback to physicians as they make prescribing decisions, physician order entry (POE) applications are ideally suited to improve both of these systemic problems. It should thus come as no surprise that studies of ePrescribing consistently show dramatic quality benefits. At Partners Healthcare in Boston ePrescribing reduced errors by 55%, from 10.7 to 4.9 per 1,000 patient days; remarkably, oversight by a nurse/pharmacist team conferred no additional benefit. Another study of the impact of inpatient POE on physician prescribing patterns found that compliance with the recommended H-2 blocker jumped from 15.6% to 81.3%, use of the approved frequency of ondansetron (Zofran) improved from 6% to 75%, and the appropriate use of prophylactic subcutaneous heparin went from 24% to 47%.

The role of POE in preventing prescribing errors can best be understood from an...
Prescription benefit costs have been escalating rapidly for the past several years—14% to 18% annually—and now account for 15% of total health care expenditures. Just as POE systems reduce errors, they are the most effective means of steering physicians to the lowest cost prescribing options. While published data from outpatient settings is scarce, there is little doubt that ePrescribing increases formulary compliance and generic substitution. At LDS Hospital in Utah, physicians were found to make more cost-effective prescribing decisions when using an ePrescribing system: The annual amount spent on antibiotics dropped almost $400,000 (from $987,000 to $612,000), even though antibiotic use increased from 32% to 53% of admissions.

**Improving Physician Office Efficiency**

Preventing prescribing errors and controlling drug spending, by themselves, may not provide enough return on investment to justify ePrescribing conversion costs. In order to be accepted by physicians and be worth the effort and expense of deploying, an ePrescribing application must deliver clear workflow and productivity advantages.

Fortunately, ePrescribing holds enormous promise for improving practice efficiencies, particularly in the realm of prescription-related messaging. For instance, a 15-family-physician primary care practice in Kokomo, Indiana, was fielding 206 prescribing-related phone calls per day (see Figure 1, this page). Almost half of these calls (97/206) were requests for renewal authorization. Of the remaining 109 calls, 50 were requests for clarification from a pharmacist and the other 59 were requests from patients for new prescriptions. Half of the 206 prescribing-related calls were accompanied by chart pulls.

Daily call handling required 28 hours of phone-nurse time and 6 hours of physician time (3.5 phone-nurse and 0.75 physician full-time equivalents [FTEs]). Within six months of deploying an ePrescribing application, the practice estimated a support-staff savings of 4.5 FTEs, largely as a result of reduced phone-call volume, streamlined renewal workflow, and fewer required chart pulls. Formulary phone calls dropped from 15 to 2 per day (an excellent example of reduced process dependence on downstream inspection).

Pharmacy efficiency also benefits from ePrescribing. The National Association of Chain Drug Stores estimates that “clean” prescriptions (i.e., those that are legible and formulary compliant) cost $1.00 less each for a pharmacy to process than those that are not clean, even if the prescription is printed or faxed to the pharmacy. If the ePrescribing system can pass data electronically directly into the pharmacy system, additional data-entry savings occur. Moreover, some ePrescribing systems capture patient prescription benefit plan group and member identification numbers in the clinic. This information can be passed electronically to the pharmacy, reducing a well-known major inconvenience for pharmacy staff.

**Technology Developments Enabling ePrescribing**

Concerns about quality, drug spending, and efficiency have not been enough, even collectively, to rapidly drive the early ePrescribing market. It has been driven primarily by new technologies that dramatically reduce the cost of deploying clinical applications. Foremost are: (1) applications based on Web technology and delivered via an application service provider (ASP) model, and (2) the proliferation of palm-sized personal digital assistants (PDAs) amongst physicians.

**ASP versus Client/Server Technology: Reducing the Total Cost of Ownership**

Total cost of ownership (TCO) has been a long-standing obstacle to deploying clinical applications. TCO tends to be particularly high with client/server technology, in which proprietary client software must be installed on every personal computer (PC), and every clinic requires a dedicated server. While extra startup capital is usually required for purchasing servers and client software licenses, ongoing administration and maintenance is what makes the client/server approach cost-prohibitive.
The main advantage of PDAs for ePrescribing is their low cost and low infrastructure requirements. But these devices can bring both potential and problems to the interaction between pharmacists and physicians.

In sharp contrast, the only requirement for deploying clinical applications using an ASP model is a standard-issue Web browser, such as Microsoft Internet Explorer, and an Internet connection. The “heavy lifting” occurs outside the walls of the clinic via a remote database and Web server hosted by the ASP vendor; clinic staff are thus relieved of the administrative burden of maintaining servers and client software. Such a model also facilitates monthly-subscription pricing instead of hefty up-front software licensing fees, further reducing required startup capital. Indeed, first-year application costs using an ASP model are typically one-fourth to one-third the costs of client/server environments.

In 1997, outfitting an exam room with a desktop PC and a full-sized monitor was a $3,000 proposition, not including any additional hardware or exam-room structural modifications needed to support a wall-mounted monitor. Mobile devices, such as laptops or slates, cost even more. In 2000, highly capable PC workstations can be had for $1,000 or less. The cost of flat-panel displays has also been dropping, so that clinics without footprint space to support full-sized monitors now have a reasonably priced alternative.

Usability advantages aside, fixed exam-room workstations are frequently not an option given hardware-cost, network-infrastructure, and/or footprint-space constraints. Enter mobile computing. Traditional laptops and slates were too expensive, heavy, and fragile and had too little battery life to be widely useful in ambulatory settings. Moreover, wireless radiofrequency (RF) bandwidth was not broad or reliable enough. Newer PC laptops, ultraportables, and slates have eliminated many of these problems, and RF wireless is now both robust and reliable enough to support mission-critical application use. Moreover, a variety of Web slates in the $500–$700 price range will be available starting in mid-2001. These devices will be able to access the Internet via a single Internet-connected PC. This eliminates the need to install a physical local area network (LAN) with expensive traditional RF wireless access points.

This could take considerable wind out of the PDA ePrescribing market (discussed further below), since the principal allure of PDAs is mobile computing without major equipment or infrastructure investment. Of particular importance here is that these new mobile Web slates will be able to run a Web browser while maintaining continuous connectivity with a remote Web server (the traditional Web/ASP model), something that will not be practical with PDAs for some time.

**PDAs: Promises and Pitfalls**

Palm-sized PDAs deserve special consideration in any discussion of the role of devices in enabling the ePrescribing market. A plethora of vendors offering ePrescribing solutions have emerged in the past 12 to 18 months with applications designed solely for these devices, which are extremely popular among physicians.

PDAs use one of two operating systems (Palm OS and Windows CE). Palm Pilots and Handspring Visor devices each use the Palm OS. A new version of WinCE was recently released and a new family of devices has followed (e.g., the iPaq from Compaq). Palm OS devices generally have 8 MB of built-in memory capacity and a 20–33 MHz processor, compared with 36 MB of memory and a 200 MHz processor for WinCE devices. These storage and computing power differences have significant implications for PDA ePrescribing, which usually occurs in a disconnected, asynchronous mode: Large DUR and formulary databases need to reside on the PDA itself, and the PDA must have enough computing horsepower to rapidly sift through the data as drugs are being selected by the prescriber. It is thus no accident that most PDA ePrescribing vendors have developed their applications for the WinCE platform and those applications that do exist on the Palm platform tend to be considerably less capable than their WinCE counterparts. This is unfortunate, since Palm has over 80% of the market share and most physicians who own a PDA have a Palm device. That means that WinCE application vendors need to worry not only about distributing their...
software, but must get new devices into their users' hands as well.

To fully appreciate the implications of this, one needs only look at ePocrates, which provides free drug-information application for Palm devices. In the past 18 months, almost 80,000 physicians have downloaded ePocrates onto their PDA.

The main advantage of PDAs for ePrescribing is their low cost and low infrastructure requirements. Besides the PDAs themselves, a single PC and an Internet connection may be the only elements required, at least for a small clinic. This is especially appealing in the independent-physician market, where basic networking infrastructure is frequently absent, and device costs can be intimidating. The reduced-infrastructure cost advantage of PDAs is far more important than perceived mobility or usability advantages; in fact, mobility is not as big an issue for clinic use as it is for inpatient or outpatient use, and the limited screen real estate on a PDA coupled with the lack of a keyboard actually represent usability disadvantages over traditional workstations or larger mobile slates.

While PDAs have jump-started the ePrescribing market by lowering startup infrastructure cost barriers, they bring with them their own set of problems. Deploying ePrescribing involves far more than sprinkling PDAs from the sky. Regardless of what devices are used, the ePrescribing application must be integrated into the physician's messaging and documentation workflow. This, in turn, depends on integration with existing patient-specific data. Thought needs to be given to such issues as how and from where patient data will be extracted, how prescriptions will route to the pharmacy, how a clinic nurse will notify the physician about renewal authorization requests, and how the physician will in turn signify approval. Even if the PDA's ePrescribing application supports such messaging, will nurses and other support staff be expected to do all of their work on a PDA, or will they need full-sized workstations? What about site-specific data setup and administration? What about training?

The major drawback of PDA-based ePrescribing is the difficulty of maintaining continuous communications with a central Web server. Most PDA ePrescribing devices require cradle-based synchronization to exchange data with a server. Patient historical data, formulary tables, and other drug data (e.g., drug-drug interaction tables) all need to fit into the device, and new patient data cannot be shared with other users until the next synchronization session occurs. The same is true for prescription routing (other than printing) and intra-office messaging. Perhaps most important, the absence of continuous server connectivity precludes the usual Web/ASP approach, in which the application code resides on a remote Web server and user organizations are spared the complexity of maintaining applications on individual client devices. Most vendors have had to write device-specific applications to deliver ePrescribing on a PDA.

Lastly, most ePrescribing vendors have developed prescribing-only niche applications and offer no clear path to more complete clinical functionality. In fact, many PDA ePrescribing installations are beginning without regard to institutional clinical information technology (IT) strategy. Forrester Research, in a March 2000 report, "Why Doctors Hate the Net," was so concerned about the rapid proliferation of proprietary, nonintegrated PDA applications that one of its key recommendations was that "the American Medical Association should lead a fight against PDA clutter."

Independent versus Integrated Practices

There are two distinct ePrescribing physician market segments: integrated and independent. The integrated-physician market includes physicians in integrated delivery networks or large group practices; it only accounts for less than one-third of practicing physicians. The majority of physicians practice in independent small groups of five or fewer. Integrated groups generally have more IT infrastructure, share a common practice-management system, and use the same reference labs and hospitals as other groups in the network. Independent practices have no shared IT infrastructure or systems. From a vendor's perspective, the integrated market is more attractive than the independent market since sales to large numbers of physicians can be managed through a single channel, ePrescribing conversion cost barriers are lower, more capital for IT investments is available, and data interfacing costs can be diffused over many clinics and physicians.

Business Models: Subscriptions, Transactions, eDetailing, and Data

Traditional software licensing models, in which users pay a one-time, up-front license fee for unlimited software use, are almost nowhere to be found in the ePrescribing market. Instead, pricing is usually by subscription. Subscription costs run as high as $240 per doctor per month, although pricing at this level includes hardware. Hardware aside, the physician market will generally bear pricing in the $50–$100 per physician per month range, according to the Hambrecht report. Even at $100 per physician per month, profit margins are inadequate. Most ePrescribing vendors are faced with high fixed costs related to third-party data and software licensing, application...
hosting, infrastructure, implementation and training, customer service, product development, quality assurance, interface construction and maintenance, and other services. Accordingly, vendors have turned to other revenue sources to compensate for the physician market's historic inability to bear the full cost of services. Foremost among these alternative revenue streams are fees garnered from transactions with PBMs and pharmacies. Unfortunately, this transaction market is just getting off the ground. In the near and mid-term, transaction volumes and the margins on these transactions will also not likely be enough to sustain ePrescribing vendors without additional revenue streams.

Free ePrescribing: Pandora's Box
Several startup vendors are offering both ePrescribing services and devices free of charge. These large-scale giveaways are being fueled by either venture capital or drug manufacturer dollars. Drug manufacturers are willing to pay for eDetailing as well as for acquiring more detailed and timely physician prescribing data than is available from traditional data sources. PBMs, payors, and even employers at risk for drug spending are also subsidizing physician ePrescribing costs. The availability of free ePrescribing hardware and services is creating considerable market turmoil, and the long-term viability of this model is anything but certain. Cash-strapped physicians—in no position to look a gift horse in the mouth—have been embracing this model. Yet incentives often conflict between drug manufacturers, payors, PBMs, employers, physicians, and even patients. Whoever is financially responsible for sponsoring the physician desktop (or palmtop) will ultimately determine whose rules prevail. The ethical and legal boundaries of these fledgling relationships have yet to be determined.

Physicians may become increasingly willing to bear up-front ePrescribing conversion costs and ongoing service fees, as efficiency benefits become clearer, “no-cost” options dry up, and direct drug manufacturer involvement in the prescribing process comes under closer scrutiny. This will certainly help to simplify the landscape. In the meantime, vendors are under tremendous competitive pressure to trim fixed costs and invent creative methods to deploy their ePrescribing tools with minimal implementation, training, and data-integration support. This is particularly true as vendors scramble to capture the independent-physician market, which contains over half the nation's high prescribers. Vendors must be able to sell to this market at low cost in order to remain attractive to PBMs and drug manufacturers.

Vendor Buckets
Based on the above, ePrescribing vendors can be categorized by the following questions:
• Web/ASP versus client-server?
• Clear migration path to other clinical functionality?
Electronic Prescribing in Ambulatory Care: A Market Primer and Implications for Managed Care Pharmacy

- PDA available? WinCE or Palm OS?
- Renewal workflow?
- Business model?
- Target market?
- Degree of connectivity with PBMs, practice-management systems, and reference labs?

Conclusions and Implications for Managed Care Pharmacy

The ePrescribing train has left the station and is picking up steam. Managed care pharmacy either needs to hop on board or jump out of the way. As ePrescribing becomes more commonplace, managing prescription benefits and other DUR programs will increasingly occur at the point of care rather than at the pharmacy. Disease and compliance management will similarly move upstream, and retrospective performance profiling will take a back seat to real-time prescriber messaging via POE. While these changes will likely be welcomed in the pharmacy community, they clearly have workforce implications.

As ePrescribing accelerates, several areas bear watching by the managed care pharmacy community. Foremost is the increasing role of the pharmaceutical industry in the ePrescribing market. This may not be a problem as long as the pharmaceutical industry maintains appropriate distance from individual patient prescribing decisions and defers to usual managed care rules when conflicts arise.

Another area of concern is vendor cost pressures in a highly competitive ePrescribing marketplace. To simplify application deployment and reduce implementation costs, vendors are being forced to trim application features and support services. Against this backdrop, the race to move large numbers of ePrescribing “units” at low cost into the independent-physician market is a setup for quality problems. Applications for ePrescribing can promote errors as readily as they can prevent them. Yet there is no industry-standard minimum set of features for ePrescribing applications, a situation made even more risky by a regulatory vacuum. At the current ePrescribing adoption rate, tens of thousands of physicians may be ePrescribing using marginally tested tools before the regulatory climate changes. In the meanwhile, the pharmacy community should keep a watchful eye out for problems.

Lastly, ePrescribing market winners have yet to be declared. Integration of managed care pharmacy rules, such as stepped-care protocols, into ePrescribing applications is necessary but costly. Managed care pharmacy will want to work closely with vendors who win the most market share, and be careful not to invest precious resources into integration with vendors that may not be around next year.

References

7. Wireless connectivity exists today for PDAs, both as high bandwidth radio-frequency local area network and low bandwidth cell phone-type wide area network. However, most PDA ePrescribing applications are not engineered for continuous connectivity mode because of performance and battery-life issues.
The mandate of managed care organizations (MCOs) is to provide quality health care while responsibly managing health care costs. Managed care has brought significant change to the way health care services are provided, most notably by integrating many care components and linking them financially and clinically. It has also produced changes in how health care providers and patients participate in the system and relate to each other.

As managed care has grown in the past decade, employers, health care providers, and patients have demanded more autonomy, choice, and flexibility. Along with choice, however, comes the potential for increasing costs and a need to determine the bearer of those costs. External factors such as new technology, procedures, and drugs, combined with changing member demographics and increasing numbers of Medicare and Medicaid patients, have also had an impact on costs. These trends suggest the need for a reassessment of the direction managed care organizations must take to both succeed in business and focus on patient needs.

One method for improving both patient care and the financial outlook of MCOs involves making better use of the vast amounts of clinical and financial data available within managed care systems, especially in the pharmacy area. Addressing the demands of consumers, physicians, and employers requires an accurate assessment of costs and clinical outcomes. Many organizations are not yet using an integrated approach that includes several, if not most, components of care. Pharmacy departments are in a unique position to view cost and clinical outcomes across the continuum of care, from primary care visits to hospital inpatient care and post-hospitalization, because they touch the patient at each stage of care. Pharmacy departments can take the initiative in developing models for improved patient and financial outcomes by using the information available for the benefit of the entire organization. This may mean going directly to the information-systems department, identifying subsets of patients who use significant resources, and examining ways to improve resource use to optimize outcomes. It may mean conducting studies of particular patient populations. Regardless of the tactics used, pharmacy can often be the focal point to highlight important clinical and economic issues and the results of interventions.

This article reflects on several key managed care evolutionary trends and some challenges for the future. Managed care data cited were supplied by SMG Marketing Group, Inc., and published in the Aventis Managed Care Digest Series, a central source of information about all aspects of managed care. In addition, this paper includes examples demonstrating how pharmacists can use information available to them within their own organizations to highlight areas for improvement in patient intervention while also decreasing costs for the entire health plan.

**Growth of Managed Care Organizations**

There has been an overall increase in managed care penetration in recent years, with 104.6 million persons, 37.9% of the U.S. population, in health maintenance organizations (HMOs) in 1999 (see Figure 1, page 106). Of that total, 18.5 million persons were enrolled in point-of-service (POS) plans, which provide more flexibility in choice of providers. As a result of consumer demand for choice, interest in preferred provider organizations (PPOs) and in POS plans has remained strong. Employers also appreciate that in these programs consumers themselves bear at least some of the economic costs of the choices they make.

Membership demographics in managed care organizations have also been affected by a significant increase in Medicare and Medicaid patients (see Table 1, page 106). In 1998 HMO enrollees included 6.5 million Medicare beneficiaries and 9.8 million Medicaid beneficiaries. Those numbers rose to 6.7 million for Medicare and 11.3 million for Medicaid in 1999, even though some Medicare risk plans withdrew from the
The increase in the number of older Americans has also changed HMO membership demographics, affecting service and resource use. As the general population ages, there is an increasing need for treatment of chronic age-related diseases, such as cardiovascular disease, type-2 diabetes, arthritis, and osteoporosis. The addition to HMOs of members who are older and sicker challenges both the clinical protocols and the fiscal viability of today's MCOs.

HMO Pharmacy and Utilization
Increased HMO growth and enrollment has also brought increased utilization. Over the past five years, ambulatory visits and physician encounters rose for all enrollees (non-Medicare, Medicare, and Medicaid). Physician encounters for Medicare HMO members almost doubled during the 1990s. Prescription use also increased significantly between 1988 and 1999. The average number of prescriptions for non-Medicare members per year increased from 4.9 in 1988 to 7.1 in 1999. Pharmacy expenditures increased as well. Average ingredient costs rose from $11.50 in 1988 to $28.35 in 1999. As a result, pharmacy premiums for both individuals and families grew at an average annual compounded rate of 2.36% between 1988 and 1999. Pharmacy expenses as a percentage of total operating expenses grew from 10% to 13.4% during the same period (see Table 2 and Figure 2, both on page 107).

Coinciding with increases in pharmacy costs, however, are significant decreases in the use of hospital care. Hospital admissions per 1,000 non-Medicare patients decreased 21.7% between 1990 and 1998; length-of-stay decreased 26%. For Medicare patients, however, hospital admissions increased 10.5% between 1994 and 1998. Table 3, page 108, illustrates utilization rates by payor type for 1998 and 1999. Interestingly, increased pharmacy costs correlate with decreased hospitalization. Specifically, the significant increase in prescriptions for non-

program. The growth in these population segments within HMOs has important implications. It reflects continuing interest by federal and state governments to cap their own financial risk while assuring availability of care. For health plans, the Medicare and Medicaid populations represent a potential source of new members that does not require attracting members away from other health plans. Yet the difficulties in providing care for these members, assuming adequate communication, and managing financial risk, are becoming more apparent each year.

### Medicare and Medicaid HMO Enrollment, 1986–1999

<table>
<thead>
<tr>
<th>Year</th>
<th>Medicare Enrollees (Thousands)</th>
<th>Medicaid Enrollees (Thousands)</th>
<th>Medicare HMOs Accepting Government Beneficiaries</th>
<th>Medicaid HMOs Accepting Government Beneficiaries</th>
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<tbody>
<tr>
<td>1986</td>
<td>1,421</td>
<td>602</td>
<td>332</td>
<td>159</td>
</tr>
<tr>
<td>1990</td>
<td>1,896</td>
<td>842</td>
<td>211</td>
<td>88</td>
</tr>
<tr>
<td>1994</td>
<td>3,080</td>
<td>2,665</td>
<td>223</td>
<td>146</td>
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<td>1998</td>
<td>6,513</td>
<td>9,795</td>
<td>335</td>
<td>267</td>
</tr>
<tr>
<td>1999</td>
<td>6,698</td>
<td>11,300</td>
<td>310</td>
<td>248</td>
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</tbody>
</table>

Source: Data from SMG Marketing Group, Inc., Chicago, IL, as published in Managed Care Digest Series 2000. Parsippany, NJ: Aventis Pharmaceuticals, 2000.
Trends in Managed Care Pharmacy: Preparing for the Future

HMO Pharmacy Utilization

![HMO Pharmacy Utilization Graph]

Drug Costs as a Percentage of HMO Operating Expenses

Percentage of HMOs using Closed Formularies

![Percentage of HMOs using Closed Formularies Graph]

Medicare members correlates with decreased hospitalization and shorter length-of-stay; drug expenditures for Medicare patients increased only slightly during the same period when hospital admissions increased for this population. Despite these opposite trends in the use of pharmaceuticals and acute care, pharmacies have come under intense scrutiny because their budgets have increased. In an effort to manage costs while striving for good care, pharmacies have used formularies, drug-utilization review (DUR), and pharmacy benefit managers. About 97% of HMO plans used formularies in 1999, with

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Table 2: HMO Non-Medicare Members

<table>
<thead>
<tr>
<th></th>
<th>Prescriptions per Member</th>
<th>Average Ingredient Cost</th>
<th>Pharmacy Premium PMPM</th>
<th>Pharmacy as a Percentage of Total Operating Expenses</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Non-Medicare</td>
<td>Medicare</td>
<td>Individual</td>
<td>Family</td>
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<tr>
<td>1988</td>
<td>4.9</td>
<td>__</td>
<td>$11.50</td>
<td>$7.40</td>
</tr>
<tr>
<td>1990</td>
<td>5.7</td>
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<td>$15.10</td>
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<td>6.0</td>
<td>16.5</td>
<td>$21.54</td>
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<td>1998</td>
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<td>18.1</td>
<td>$29.35</td>
<td>$17.43</td>
</tr>
</tbody>
</table>

Note: PMPM is per member per month.

nearly half being closed. Similarly, 94% used DUR. Many HMOs allow physicians to override formularies (70.5%), but 81% of prescriptions were still filled within formularies in 1999.

Integration of Managed Care

Increased utilization and costs have also led to changes in the way MCOs have organized themselves. Significantly, there has been a steady increase in the degree of integration in health care systems over the past five years (see Figure 3, above).

Integrated systems are designed to improve the delivery of care by coordinating various health care components, such as outpatient and inpatient hospital services. Over the long term, they provide real opportunities for coordination of phar-
macy services. Highly integrated systems—including three or more health care components—are also likely to assume more financial risk. Integrated systems have the potential to offer better data integration between health care sectors, although full potential of data integration to improve care and reduce costs has not yet been realized.

Changing Roles of Providers
A shift in traditional roles for health care providers has also occurred in the past decade. The role of physician as primary decision maker has changed: Today physicians face more responsibility, more time pressure, and a more challenging economic environment. Patients are becoming more aggressive in their search for and use of information as they take on more responsibility for their own health care choices and outcomes. These factors have contributed to a fundamental change in the physician/patient relationship and the potential for tension among health plan, provider, and patient.

Pharmacists face similar changes in their roles. Prior to the advent of managed care, pharmacists functioned solely as health care providers, interacting directly with patients and physicians. The creation of managed care formularies and their implementation has added complexities to the pharmacist’s role. Constant and ever-increasing scrutiny of pharmacy budgets has resulted in new administrative responsibilities and challenges for pharmacists, who must now increasingly focus on total pharmacy cost management as well as patient care. Pharmacists must also continually examine and confirm the value of pharmaceutical interventions in the broader continuum of care. Essentially, an entirely new discipline of pharmacy business management has resulted, and new skills are required, changing the nature of the pharmacist’s job.

Health Care Challenges
The trends enumerated have resulted in important challenges that pharmacy professionals must address to ensure that managed care successfully meets patient needs while keeping costs manageable. The changing health care needs of an evolving member population demand new approaches to providing care. Pharmacy must be allowed to take a more direct and active role across the continuum of care. Changing technology and products require new criteria to determine appropriateness, not just efficacy and safety.

Cost concerns are also increasing. Specifically, increases in pharmacy expenditures for drug therapy have coincided with decreased hospital admissions and fewer days in the hospital, impact on total cost of care is not always clear, and may be impossible to measure.

Databases within each system component are often incompatible, making accurate analysis of total organizational costs extremely difficult. While some compatibility may exist between outpatient and inpatient databases, pharmacy data is too often not integrated into the system. This information gap may represent the greatest single challenge facing MCOs because it affects their ability to provide the best possible care in a fiscally responsible manner. Poor data integration also affects an organization’s ability to accurately assess systemwide costs of care and to find opportunities to realign resources or reduce costs. It may also put departments within the same health system in conflict by focusing on individual budgets rather than on organizational goals. More importantly, poor data integration means lost opportunities to improve patient care. Finally, it may put MCOs unnecessarily at financial odds with their providers or with their customers (employers) and members. On the other hand, a fully-integrated data approach allows the entire system to analyze costs, risks, and rewards from an organizational viewpoint. Health plans must be able to compare effectiveness within their own organizations as well as compare themselves with other health plans.

Implications for Pharmacists
The key to progress in clinical and cost outcomes is to use available data on member populations and their care conditions, services, and products to determine where these outcomes can be improved and costs can be managed more effectively. The first step in achieving this goal is to refocus efforts on patient needs, essentially promoting a “patient-centric” environment that supports improved physician/patient relationships. One way pharmacists can approach this is to identify particular member populations and specific information about pharmacotherapy as an early warning system regarding patients whose conditions can result in emergency room visits, hospital admissions, and high costs. Pharmacy personnel can intervene to ensure optimal care and prevent unnecessary services; they can learn whether various intervention strategies are working and should be deployed on a wider basis. Thus, pharmacists can play a pivotal role in helping MCOs support better clinical and cost outcomes by using their data to benchmark performance, even if an ideal, fully integrated data system is not in place.

Although pharmacy departments may be excluded from system-integration efforts, pharmacists can avoid the “silo effect” by taking the initiative to work with their organization’s information systems department to obtain data. The lessons of system integration and structured change in managed care come together in a focused strategy directed at key problems. However, it is also vital to focus on interventions that show near-term cost benefits. Some long-term preventive initiatives may be better candidates for educational programs because of the asymptomatic nature of the condition and the fact that results might not be obvious for many years.

Asthma
Asthma is one of the most common chronic diseases, causing significant morbidity and accounting for total annual costs of up to $11.3 billion in 1998. The increased incidence of asthma causes concern for all health systems. Between
Type-2 Diabetes

As with asthma, the incidence of type-2 diabetes has continued to climb, especially among older persons and those who are obese. The increase in diabetes is of great concern to health plans because it is also linked to significant increases in morbidity from heart disease. Pharmacists can create a model to review appropriate intervention by analyzing the subset of diabetes patients using insulin. Inappropriate or unusual numbers of insulin refills might indicate poor disease management, for example. Further examination of records for acute care, hospital admissions, and length-of-stay will help identify patients who are not adequately controlled on current insulin regimens or who exhibit signs of comorbid conditions suggesting a need for preventive care and stricter monitoring.

Deep Venous Thrombosis

Antithrombotic agents such as coumadin and low-molecular-weight heparin are generally used to treat acute deep venous thrombosis (DVT). Patients who are on antithrombotic therapy are already at high risk because of the thrombosis itself, and anticoagulants require intensive management to prevent complications. Pharmacists may wish to pay particular attention to patients on such medications. Again, identifying patients using anticoagulants and monitoring hospital admissions, length-of-stay, and emergency room treatment, as well as the duration of treatment, may provide insights into better intervention strategies. It is also possible to determine whether aggressive management may obviate the need for other services, such as surgery. Comparing outcomes for inpatient versus outpatient care, medical costs versus surgical costs, and prevention costs versus treatment can help the pharmacist develop a detailed model illustrating the optimum use of antithrombotic therapy.

Integrating Pharmacy Data

Each of these examples requires the pharmacist to work directly with the information systems department to request specific data from a subset of managed care patients with the goals of improving patient health and reducing the costs of care. The pharmacist can take a leadership role in creating intervention models that demonstrate the value of the pharmacy component. Essentially, pharmacists are in the truly unique position of having data from all points along the continuum of care and therefore having an organizational perspective.

Conclusion

Increased managed care utilization and expected increases in chronic diseases due to the aging population suggest a strong need for a new paradigm that encourages closer integration among all sectors in a health care system. Better data sharing and a focus on total costs rather than specific department budgets may expose opportunities for cost savings. More important, using systemwide data can contribute to better patient care, but not at the expense of careful fiscal management.

Pharmacy departments are in a key position to effect change within managed care systems. Pharmacists should use the data at their disposal as well as external sources of information that identify trends in managed care to develop a targeted approach to improving patient care and reducing costs. Data-based efforts to identify target populations, target conditions, and key predictors of cost and inappropriate utilization represent major opportunities for health plans. The pharmacy department, using pharmacy data, should be the team leader in this effort.

REFERENCES

Abstracts from Poster Presentations

The following poster presentations have been prepared for the Academy of Managed Care Pharmacy’s 13th Annual Meeting & Showcase, April 18-21, 2001 in Tampa, Florida.

For more information about the studies described below, please contact the corresponding authors, indicated by an asterisk (*), whose addresses are listed in full. The names of individuals who are scheduled to present at the meeting are underlined.

- Risk of myocardial infarction with dihydropyridine calcium channel blockers in hypertensive diabetics
  
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  **OBJECTIVE:** The primary objective of this study was to determine if there was an increased risk of myocardial infarction (MI) in a high-risk hypertensive diabetic population maintained on dihydropyridine calcium channel blockers (CCBs).

  **METHODS:** A retrospective population-based case-controlled study design was used to determine the relative risk of MI versus the prescribed antihypertensive drug regimen. Diabetic patients with hypertension were identified from the Kaiser Permanente data warehouse, and the date of the MI in the study patients was used as an index date to match controls. Patients in both groups were matched for continuous enrollment, age, gender, vital signs, lab tests, and compliance. High-risk patients were defined as those with a medical history of previous MI and/or angina pectoris or those who had undergone a coronary artery bypass graft (CABG) and/or an angioplasty procedure. A chi-squared analysis was used in a 2X2 design to test for differences. The odds ratio (OR) and confidence interval (CI) were determined for each antihypertensive drug regimen.

  **RESULTS:** During 1997-1999, 6,096 diabetics with hypertension were identified. The 135 “high-risk” study patients who suffered an MI were compared to an equally matched sample. Of these, 57 patients were on a calcium channel blocker (CCB) combination including 36 patients maintained on dihydropyridines (DHPs). The OR for all CCBs was determined to be 0.502 (95% confidence limit, 0.3095–0.8145). The relative risk of MI in the subset populations on either DHPs (OR=0.577 [0.3303–1.008]) or non-DHPs (OR=0.423 [0.2227–0.8038]) was also less than 1.0.

  **CONCLUSIONS:** No increase in the relative risk of MI could be determined with the use of dihydropyridine CCBs in this population.

- Migraine program impacts coordination of patient care
  
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  **OBJECTIVE:** To develop and implement a program to help coordinate care for members with migraines. The goal was to educate and provide the physicians with resources to help treat and manage these members as well as other patients with migraines.

  **METHODS:** The study population includes commercial, Medicare, and Medicaid managed care members continuously enrolled for 12 months; pharmacy and medical claims data from September 1, 1998 through February 28, 1999 were used. The target population was 177 members. The health plan developed an intervention that included a letter describing the program, member profile(s), an abbreviated treatment guideline, an educational booklet for members, and a physician feedback survey. The intervention was sent to every physician who either prescribed one of the abortive medications or had an office visit or encounter with the member.

  **RESULTS:** The 177 members had an average age of 43; there were 34 males and 143 females. The following results are from June 1, 1999 through November 30, 1999. The average number of abortive prescriptions per member decreased from 18.25 to 16.02 (p<0.01). The average number of facility visits per member decreased from 2.00 to 1.34 (p<0.05). The percentage of members who saw four or more health care providers decreased from 40% to 16% (p<0.001). The average paid per member per month decreased from $426 to $290 (p<0.001). The physicians’ response based on both the written survey and the telephone dialogue was very positive.

  **CONCLUSION:** A disease-management program can successfully coordinate migraine patients’ care. The program was repeated in 2000.

- Cost-minimization analysis of three nitroglycerin drug-treatment strategies
  
  Bell C.*, Semroc GN, Stephens JM, Klingman D, and Dever M
  
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  **OBJECTIVE:** To examine the economic implications of drug stability and potency issues with certain sublingual nitroglycerin (NTG) formulations when compared with lingual NTG spray in treating stable angina.

  **METHODS:** Using an economic model that projects patients’ angina frequency and prescription-refill pattern over time, the analysis estimates the cost difference between sublingual NTG tablets and NTG lingual spray.
The model's perspective is that of the third-party payor (e.g., managed care organization or formulary decision maker) and includes patients with stable angina who are eligible for NTG therapy and are not immediate candidates for invasive treatments (PTCA/CABG). Clinical and economic data were obtained from published sources and via expert panel.

RESULTS: For mild angina patients (defined as those experiencing, on average, one angina episode per week), the model indicated that the two-year prescription cost of treating 100,000 patients with sublingual NTG tablets ranged from $7.5 million to $16.4 million (100-tablet and 4X25 tablet formulations, respectively). Treating mild angina patients with NTG lingual spray resulted in a two-year prescription cost of $3.3 million.

CONCLUSIONS: This study has demonstrated that although the initial cost of NTG lingual spray is greater than sublingual NTG tablets, substantial savings can be achieved by prescribing NTG lingual spray. Subsequent analyses should be performed to demonstrate the economic implications (beyond prescription costs) of patients' self-administering subpotent sublingual NTG tablets, which could have a significant impact on hospital emergency department utilization. The results and implications of this analysis should be verified, prospectively, in typical care settings.

LEARNING OBJECTIVES: Audience participants will learn to:
1. provide an introduction to cost-minimization analyses to evaluate alternative medical interventions;
2. illustrate, with a practical example, how modeling exercises can be used to demonstrate the economic implications of alternative medical interventions;
3. detail the potential economic implications associated with NTG drug therapy for patients with stable angina, especially in light of the storage, stability, and potency issues with certain sublingual NTG formulations; and
4. raise the awareness of patients, health care providers, and decision makers regarding the appropriate use of NTG formulations to treat stable angina.

Adherence to National Cholesterol Education Panel (NCEP) guidelines in a managed care outpatient clinic
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OBJECTIVE: To assess prescribing patterns and measure treatment outcomes in relation to National Cholesterol Education Panel (NCEP) guidelines among patients taking HMG CoA reductase inhibitors in a managed care outpatient clinic.

METHODS: Patients receiving an HMG CoA reductase inhibitor were selected from a pharmacy claims database. Demographic and clinical data were collected by medical-chart review during November 1999 and September 2000. Data were collected from 118 patients. Mean age was 71.4 years; 64% were female; 35% of the patients were being treated for secondary prevention and 65% for primary prevention. Data analysis showed that 42% of patients achieved the low-density lipoprotein cholesterol (LDL-C) goal recommended by NCEP guidelines; 60% of patients achieved their NCEP goal of lower than 160 mg/dL, 50% reached their goal of lower than 130 mg/dL, and only 28% attained their LDL goal of 100 mg/dL or less.

CONCLUSION: The majority of patients studied are not reaching NCEP LDL target levels. The study results will be shared with the medical staff and will serve as a benchmark for a continuous quality improvement program for the treatment of hyperlipidemia.

LEARNING OBJECTIVES: Audience participants will:
1. understand the NCEP guidelines and the importance of treating to LDL–C goals;
2. understand current physician compliance rates to NCEP guidelines; and
3. understand how an Access database can be used to analyze clinical data.

Utilization factors related to the pharmacologic management of overactive bladder disease
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OBJECTIVES: Urinary incontinence (UI) is associated with adverse physical, psychological, and economic outcomes affecting approximately 13 million Americans. UI is underreported and frequently untreated. First-line therapy includes agents decreasing incontinence frequency. This study characterizes utilization and cost of Detrol (DE), Ditropan XL (DI), and generic oxybutynin (OX).

METHODS: Drug markers associated with UI management in the Merck-Medco pharmacy claims database (N=60+M) were used to construct a continuously eligible new-therapy cohort from February 1, 1999 through August 31, 1999. Key utilization and drug-cost measures were evaluated through March 31, 2000.

RESULTS: Sixty-one percent of patients (N=64,284) were 65 years old or older; 74% were female. DE was first-line in 66% of patients, followed by OX (20%) and DI (14%). Drug titration occurred in 5% of DE, 11% of DI, and 8% of OX patients; lower DE titration frequency reflected higher starting doses. Six-month persistence was higher for DE & DI (29%) than OX (19%). Primary-care physicians and obstetrician/gynecologists were more likely to prescribe DE, while DI prescriptions were higher among urologists. Average therapy cost/day (based on average wholesale price and average number of pills per day) was $0.88 for OX, $2.51 for DE, and $2.76 for DI.

CONCLUSION: UI pharmacologic management appears suboptimal, with opportunity to improve utilization. While branded agents may cost more than generics, this study demonstrated 34% higher persistence for these agents. Among branded agents, DE may afford incremental savings ($0.25/day lower than DI). Additional studies are needed to characterize utilization and economic factors regarding management of UI.

LEARNING OBJECTIVES: Audience participants will learn:
1. to characterize the utilization factors related to pharmacologic management of overactive bladder disease;
2. to evaluate the economic factors related to drug therapy with the currently available agents; and
3. to generate research hypotheses to guide further study in this therapeutic area.

Increasing H. pylori awareness: The impact of providing written educational information to targeted patients and their physicians
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OBJECTIVE: To evaluate the educational benefits of providing written disease-state management information to both patients and physicians regarding Helicobacter pylori (H. pylori)-induced ulcers.
METHODS: Claims data were surveyed to identify retired Teamster members who had received more than three prescriptions for acid-suppression agents, including one proton-pump inhibitor, from November 1, 1999 through March 31, 2000. A nine-question patient survey and a five-question physician survey were developed to evaluate member and physician level of discussion regarding H. pylori ulcers. Surveys were mailed to 226 members and 206 prescribing physicians after each had received three previous mailings of H. pylori ulcer information over an eight-week period.

RESULTS: Thirty-four percent of members (n=77) and 20% (n=42) of physicians responded to the survey. Of member respondents who qualified their level of improvement, 89% reported that their gastrointestinal condition improved as a result of patient-education materials, including information on lifestyle modifications and discussions with their physician. Sixty-one percent (n=47) of respondent members reported that they spoke to their physician about the H. pylori patient-education information they received, while 100% of respondent physicians reported that they spoke to their patients about ulcers. Ninety-five percent of respondent physicians reported testing patients for H. pylori, which accounted for a large number of patients with ulcers being identified. Sixty-six percent of the respondent members reported that they shared the H. pylori information with a friend or family member.

CONCLUSION: The H. pylori ulcer survey proved that targeted disease-state educational materials are effective tools in improving patient and physician communication.

LEARNING OBJECTIVES: Audience participants will:
1. recognize that educational programs targeted to patients and physicians positively impact patient outcomes;
2. understand that disease-management programs should focus on patients; and
3. learn that patient and physician surveys are valuable tools for evaluating program effectiveness.

Effectiveness of an automated, electronic therapeutic conversion program

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OBJECTIVE: To evaluate modification in physician prescribing of targeted medications after implementation of an automated conversion program.

METHODS: Patients receiving select proton-pump inhibitors (PPIs), select HMG-CoA reductase inhibitors, and sertraline were targeted for intervention through electronic claims analysis. Claims meeting all criteria for intervention automatically generated a physician prescription letter/form that was electronically faxed to prescribers, or mailed if fax number was not available. The percentage of responses by prescribers and modifications to patient therapies was measured.

RESULTS: During the initial two-month period of program implementation the overall response rate by prescribers was 52%. The response rate when the initial physician letter was faxed to the prescriber was 73%; it was 39% when the letter was mailed to the prescriber. Forty-two percent of the responses resulted in a change in medication therapy. Sertraline dose-conversion requests resulted in the highest conversion rate at 71% to 87%, followed by HMG CoA reductase inhibitor requests at 60% to 79%, and finally PPI conversion at 18% to 19%.

CONCLUSIONS: An automated, electronic-therapeutic conversion program using complex claims analysis, targeting predefined medication therapies with automated faxing of a prescription/letter form to prescribers requesting a change in therapy is an effective method of managing a pharmacy prescription benefit.

LEARNING OBJECTIVES: Audience participants will:
1. learn the process involved in an automated therapeutic-conversion program;
2. discover the benefit of interventions using automated fax technology to communicate to prescribers; and
3. explore the success of this program at converting medication therapies.

Cost-effective outcome of developing and implementing a limited, three category-specific formulary within a small, specialized population

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OBJECTIVE: New York State’s Child Health Plus program is a federally and state subsidized health insurance program for children under 19 who, although not eligible for Medicaid, have a difficult time obtaining primary care and drug coverage because of economic barriers. Plans that offer this no-copayment program to enrolled members are often challenged to provide the mandated services within budget. They seek to provide as broad a drug benefit as possible while controlling drug costs.

METHODS: A medication-utilization review analysis for a small Child Health Plus population conducted by this pharmacy benefit management company identified three therapeutic categories, wherein, if a well-defined formulary were implemented, costs could be reduced considerably and rational drug-therapy options could be preserved. The categories identified were anthistamines (sedating and nonsedating), dermatologicals (steroid, anti-fungal, anti-acne), and antibiotics (macrolides).

RESULTS: On November 1, 1999, this three-category formulary using automated contingent-therapy edits, national drug code (NDC) blocks, and mandatory generic product choices, where clinically appropriate, was implemented in this population of approximately 28,500 members. Within six months, the per member per year cost decreased from $8.87 to $5.33. It is projected that within one year of implementation a 40%, or $100,500, savings will be achieved over baseline in these three therapeutic categories. Overall, an 8% savings will be realized off the total drug budget.

CONCLUSIONS: A well-structured, clinically tailored, three-therapeutic-category formulary can provide a significant cost savings outcome within small, specialized populations.

LEARNING OBJECTIVES: Audience participants will:
1. understand that formularies can be uniquely tailored to the needs of small, specialized populations;
2. learn that significant cost savings can be achieved by implementing a formulary within just a few well-chosen therapeutic categories; and
3. recognize that no-copayment drug plans can save costs without severely limiting the majority of drugs provided within the benefit.

Implementation of a prior-authorization process redesign

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OBJECTIVE: To redesign the current prior-authorization process to facilitate formulary management and cost containment efficiently.

METHODS: The prior authorization (PA) department at Prescription Solutions underwent a redesign in October 1999. The Prior Authorization
Redesign Steering Committee, with membership representing all areas impacted by the PA process, was formed; it championed the formation of the PA Redesign Team and gave them a charter. Highlights of the charter are: Design the PA process to flow smoothly and efficiently from beginning to end, gain 10% productivity improvement while balancing speed, quality, and cost, maintaining budget neutrality, develop performance metrics, and anticipate legal and regulatory requirements. The team met intensively over a period of six weeks. During this time they outlined the current PA process, performed a variance analysis to identify key variances, and developed a design concept and recommendations. Some of the key variances were: Incomplete information on intake of request and direct member reimbursements for nonformulary medications.

RESULTS: Key variances were identified, recommendations were made and competencies were developed. As a result we have created a streamlined process that makes it easier for members and providers to comply with benefit constraints. We have seen an increased number of denials; however, there is a decreased number of first-level appeals.

CONCLUSION: As a result of education of the staff and involved health care providers, the PA process redesign is now a smooth function of formulary and cost management.

LEARNING OBJECTIVES: Audience participants will:
1. learn about Prescription Solutions’ PA process redesign;
2. recognize the changes made in the PA process; and
3. understand the impact of the changes made and the impact they have on the efficiency of the process.

Clinical and economic impact of topical cyclosporine therapy for dry-eye disease

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OBJECTIVE: To assess the impact of topical cyclosporine therapy on dry-eye disease clinical outcomes, resource utilization, and patient satisfaction.

METHODS: Medical charts of 181 dry-eye patients at a large clinical practice were reviewed before and after treatment with cyclosporine topical ophthalmic solution (0.05%) b.i.d. Therapy lasted six months or longer for 33% of patients (range 1–32 months). Data from equal time periods before and after cyclosporine therapy were compared. For 64 out of 181 patients, baseline data were collected for two years.

RESULTS: Patients were predominantly older females (71.3% females, mean age 67.3 +15.9) diagnosed with tear-film insufficiency, who had symptoms for at least one year. Corneal staining scores improved dramatically during the cyclosporine treatment period (from 2.18–0.67 on a 1–4 scale; p<.0001), as did average discomfort scores (from 6.6–2.5 on a 0–10 scale; p<.0001). Of those for whom satisfaction data were collected, 63% (31/49) were satisfied with cyclosporine therapy. Patients showed dramatic declines in the number of “for cause” physician visits, as well as in prescriptions for concomitant medications such as NSAIDs, antihistamines/mast cell stabilizers, antibiotics, and antibiotic/steroid combinations.

CONCLUSION: Topical cyclosporine therapy is clinically effective and results in less ancillary drug use, fewer physician visits, and high patient satisfaction.

LEARNING OBJECTIVES: Audience participants will:
1. learn about the impact that cyclosporine therapy has on dry-eye disease clinical outcomes and medical-resource utilization in a large clinical practice setting;
2. gain an appreciation of the range of ancillary medications used by dry-eye disease patients in an attempt to treat their condition; and
3. better understand the effects of cyclosporine therapy from the patient’s perspective.

Medical and pharmacy cost outcomes of a quantity level limit on the 5-HT1 agonists (triptans) by a managed care organization

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OBJECTIVE: To determine the overall impact on health care utilization and costs through implementation of a quantity-level limit on the triptans and dihydroergotamine nasal spray.

METHODS: A quantity limit was placed on the triptans and dihydroergotamine nasal spray to allow coverage for maximum doses for four attacks per month. We compared the utilization and costs of triptans, prophylactic medications, and other analgesics for the six months prior to and six months after implementation of the quantity limit. In addition, utilization and costs of medical claims for hospital and emergency room visits, primary care physician (PCP) visits, and neurologist visits for migraineurs were analyzed during the same time periods.

RESULTS: The quantity limit saved $245,864 ($726,793 including cost avoidance) during the six months after initiation. Utilization and costs associated with the triptans and other analgesic medications decreased. Utilization of prophylactic therapy increased but was actually associated with a decrease in cost. There was a minimal increase in utilization and costs of PCP visits, emergency room visits, and neurologist visits.

CONCLUSION: Setting quantity limits on the triptans and dihydroergotamine nasal spray effectively changed the utilization of pharmacologic therapy with minimal shift in the utilization of other health care resources, resulting in a savings of $10.55 per member per month for triptan users.

LEARNING OBJECTIVES: Audience participants will learn:
1. a strategy for controlling utilization of migraine therapies;
2. a process for evaluating the overall impact of utilization-management initiatives; and
3. the importance of analyzing medical and pharmacy data together.

Consumer preferences for methods of constraining costs and enhancing the quality of their pharmacy benefit

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OBJECTIVES: To identify the features of a pharmacy benefit plan that consumers find most important, constraints in the design of a pharmacy benefit that consumers find most tolerable, and correlates of these preferences with consumer demographic characteristics.

METHODS: Surveys were administered to 297 persons selected on the basis of convenience. Subjects ranked nine components of any pharmacy benefit plan (e.g., breadth of provider network, out-of-pocket costs) based on importance. They also ranked six types of restrictions (on “tolerability”) they may face in attempts by insurers to control the cost and enhance the quality of prescription-drug utilization. Differences in the overall mean rankings between the items was ascertained by Kendall’s coefficient of concordance and confirmed post hoc
by Wilcoxon ranked sum tests. The impact of demographic variables on subject preferences was determined with the use of Mann-Whitney U and Kruskal-Wallis one-way analysis of variance (ANOVA) tests.

RESULTS: Analysis revealed significantly distinct ratings of importance and acceptability of pharmacy benefit components and restrictions, respectively. Certain subject demographic characteristics contributed significantly toward consumer preferences. For example, females are more highly concerned than males about the location of their pharmacy and elder consumers more concerned about information they receive about their plans and limits on days supply, while subjects in poorer health find formulary restrictions less acceptable than those in better health.

CONCLUSIONS: Insurers and sponsors need to target certain members for education about how their pharmacy benefit plans work and should also consider consumer preferences when designing member benefits and marketing their plans to prospective members.

LEARNING OBJECTIVES: Audience participants will:
1. recognize the factors on which consumers place the most importance in the design of their pharmacy benefit plan;
2. identify managed care tools used for improving rational drug utilization that consumers find most palatable;
3. describe the impact of consumers' current plan enrollment status, age, gender, race, education, income, and perceived health status on their preferences in pharmacy benefit design; and
4. incorporate survey data to develop strategies to educate members about their pharmacy benefits and marketing plans aimed at retaining current plan members and attracting new ones.

Do consumers agree on how to fund a Medicare prescription drug benefit?

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OBJECTIVE: To identify consumers' preferences for methods to fund a Medicare prescription drug benefit and assess the level of agreement on these preferences between persons of various demographic groups.

METHODS: The 297 subjects, selected through nonrandomized procedures, responded to a survey asking them to rank six alternatives for funding a Medicare prescription drug benefit. The items spanned a broad range of funding alternatives ranging from raising taxes to increasing the age for which persons become eligible for Medicare benefits. A Friedman's test was used to determine whether the differences in the alternatives' mean rankings achieved significance. The level of agreement between persons belonging to various demographic and socioeconomic groups was ascertained from Mann-Whitney U and Kruskal-Wallis one-way ANOVA tests for dichotomous and polychotomous variables, respectively.

RESULTS: The critical chi-square generated from the Friedman's test was highly significant, indicative of distinct preferences for various alternatives to fund a Medicare prescription drug benefit. A Mann-Whitney U test revealed significant differences between males and females, while Kruskal-Wallis ANOVA demonstrated different preferences for funding the Medicare prescription benefit between persons of various age groups, educational degrees earned, and race/ethnicities.

CONCLUSIONS: Overall, subjects most preferred increasing "sin" taxes as a method of funding a Medicare prescription drug benefit and preferred reducing coverage for other medical services covered under Medicare the least. Industry consultants and leaders in managed care pharmacy should heed the desires of society at large when developing proposals to address a Medicare prescription drug benefit.

LEARNING OBJECTIVES: Audience participants will:
1. learn about consumers' preferences for various alternatives to fund a Medicare prescription drug benefit;
2. identify the level of consensus that exists among subjects in identifying methods to fund a Medicare prescription drug benefit;
3. describe the relationship between subject sociodemographic characteristics and their preferences to fund a Medicare prescription drug benefit; and
4. apply the knowledge derived from survey results into equitable and effective policy.

Evaluation of medication classification systems

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INTRODUCTION: Administrative claims are commonly used to help health care decision makers evaluate plan performance and determine standards of care. Medication class codes are often used to select observations of interest. This study compared the structure of four medication-classification systems (MCS) and determined whether classification discrepancies exist for antidepressants.

METHODS: Three proprietary and one nonproprietary MCSs were evaluated for classification structure. The number of national drug codes (NDC) listed across MCSs was compared, and queries were made to determine percentages of NDC codes that were common to all MCSs and those that were unique to one. Concordance of antidepressant classification among the MCSs was examined.

RESULTS: The level of specification varied from broad medication classes that grouped large numbers of chemical entities to classifications consisting of unique compounds. The number of NDCs ranged from 70,618 to 149,608 across the MCSs. Only one MCS was limited to NDCs for legend drugs. The others contained pseudo-NDCs and NDCs for over-the-counter medications and durable medical supplies. Classification of antidepressants varied widely. In some instances tricyclic antidepressants were classified under the general term “antidepressant,” while others were grouped by chemical structure. Newer atypical antidepressants were classified into categories such as “miscellaneous,” “miscellaneous antidepressant,” and “antidepressant, other.”

CONCLUSIONS: These results demonstrate that a single chemical entity can be classified multiple ways. Accordingly, selecting observations blindly by medication class can result in misclassification. Prior to selecting observations by medication class, it is important to examine the classification system in detail.

LEARNING OBJECTIVES: Audience participants will:
1. become familiar with proprietary and nonproprietary MCSs;
2. appreciate structural differences between MCSs; and
3. understand the limitations of observation selection based upon medication class.

Does laparoscopic nissen fundoplication reduce medication utilization?
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OBJECTIVE: To determine the efficacy of laparoscopic nissen fundoplication (LNF), a surgical procedure for the treatment of gastro-esophageal reflux disease (GERD), by evaluating medication discontinuation post-surgery.

METHODS: Members of a large managed care organization who underwent LNF in 1997-1999 were retrospectively identified through medical claims by ICD-9 codes and then crossed with pharmacy claims to identify those receiving gastrointestinal (GI) medications (proton pump inhibitors [PPIs], H2 antagonists [H2], Propulsid) between January 1, 1997 and October 1, 2000. Data were evaluated with regard to number of members discontinuing/continuing GI treatment post-surgery, duration of continued treatment, and therapeutic drug changes for those continuing therapy.

RESULTS: Forty-seven members had LNF; prior to surgery 38 (81%) members had a GI drug claim and 9 (19%) members were excluded based on lack of drug claims. Of the 38 members with drug claims, 12 (32%) members discontinued GI therapy post-surgery. Of the 26 (68%) members with GI drug claims post-surgery, 15, 13, and 16 members continued GI drug therapy for 0–3 months, 3–6 months, and greater than 6 months post-surgery, respectively. Of the members who continued GI drug therapy longer than 6 months post-surgery, 14 (88%) remained on the same medication; 1 (6%) stepped-up therapy (H2 to PPI); and 1 (6%) was unknown.

CONCLUSIONS: LNF appears to be an effective treatment for GERD, indicated by reduction of GI medication utilization post-surgery. For those members requiring therapy post-surgery, many remained on the same therapy for at least six months. Therapeutic drug changes for members continuing treatment were minimal.

LEARNING OBJECTIVES: Audience participants will:
1. Identify the efficacy of LNF surgery with respect to medication utilization;
2. Evaluate appropriateness of duration of continued drug therapy; and

Effective intervention to alter antibiotic prescribing habits

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OBJECTIVE: To decrease inappropriate antibiotic prescribing for respiratory conditions, thereby lowering rates of antibiotic prescriptions and costs.

METHOD: An intervention program targeted physicians who wrote the most antibiotic prescriptions for respiratory conditions, from a customer panel of commercial and Medicare patients. In a series of eight mailings sent every three weeks, the physicians received Centers for Disease Control information about antibiotic resistance and clinical situations when antibiotics should not be used. The intervention took place from fourth quarter 1999 through first quarter 2000.

RESULTS: Data collected on 88 targeted physicians during fourth quarter 1999 through first quarter 2000 were compared to data from fourth quarter 1998 through first quarter 1999. During the study, paneled membership increased from 134,377 to 159,435. Total antibiotic prescriptions written for respiratory infections decreased from 11,383 to 11,223, representing a 16.68% decrease in prescriptions per member per month (RxPMPM) (0.0847 to 0.0704). Total antibiotic costs decreased from $212,257.54 to $211,686.36, representing a 15.95% decrease in cost per member per month ($PMPM) (1.5796 to 1.3277). Concurrently, comparable national prescription utilization declined 4.16%. Scatter plots comparing mean change in RxPMPM and $PMPM demonstrated that 78% of the targeted physicians decreased antibiotic prescribing, 70% decreased antibiotic prescribing further than national, and 66% lowered antibiotic costs.

CONCLUSION: The direct mail partnership program positively influenced antibiotic prescribing behavior for respiratory conditions. The intervention yielded a four-fold greater decrease in total antibiotic prescriptions written by the targeted physicians as compared with national. The intervention impacted the majority of physicians, resulting in decreased antibiotic prescriptions and lower related costs.

LEARNING OBJECTIVES: Audience participants will:
1. Learn about an intervention to influence antibiotic prescribing habits;
2. Understand the methods used to evaluate effectiveness of pharmacist interventions; and
Risperidone and olanzapine utilization and expenditures within the Texas Medicaid Program

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OBJECTIVE: To describe trends in the use and expenditures of risperidone and olanzapine within the Texas Medicaid Program.

METHODS: A retrospective cohort analysis was conducted using 21 months of Texas Medicaid pharmacy claims data.

RESULTS: A total of 37,528 risperidone and 20,340 olanzapine patients were included in the study. The mean age was slightly higher for risperidone patients (52.7 years versus 50.7 years, \( p < 0.001 \)). Proportional use within children and geriatric patient groups was higher for risperidone. Results of the analyses included the following comparisons between risperidone and olanzapine patient groups, respectively:

1. mean cost per day, all patients ($4.56 vs. $8.62 \( p < .001 \));
2. mean cost per day, patients aged 35–44 years ($6.84 vs. $10.41 \( p < .001 \));
3. mean dose per day, all patients (2.52 mg vs. 10.65 mg);
4. mean dose per day, patients aged 35–44 years (4.60 mg vs. 13.92 mg);
5. mean length of treatment (221.3 days vs. 239.2 days \( p=0.01 \));
6. mean medication possession during the first 120 days of therapy (75.0 days vs. 77.5 days \( p=0.01 \));
7. prevalence of patients using concomitant medications (67.8% vs. 69.0%);
8. mean cost per patient for concomitant medications utilized during the study ($833.77 vs. $933.33 \( p<0.01 \));
9. rate of switching to the other study agent (7.8% vs. 10.3%).

Relative differences in treatment measurements are not clinically notable. Moreover, on a mean cost per day basis, olanzapine was 89% more expensive than risperidone. Thus, significantly lower costs per day for risperidone, as compared to olanzapine patients, would suggest greater cost-effectiveness with risperidone.

LEARNING OBJECTIVES: Audience participants will:
1. understand the demographic patterns of use of atypical antipsychotic medications, within the Texas Medicaid Program;
2. understand the trends in expenditures, both on a cost per day and total costs basis, for two atypical antipsychotic agents within a publicly funded prescription benefit program;
3. compare the treatment lengths for patients newly started on one of two atypical antipsychotic agents within the client population; and
4. compare the compliance rates of patients newly started on one of two atypical antipsychotic agents within the client population.

Impact of quantity limits on migraine medications: analysis of utilization and total health care costs in a midwestern health plan
OBJECTIVE: To determine how quantity limits on abortive migraine medications reduce total health care costs and improve patient care by increasing the utilization of prophylactic therapy and preventing medication-induced rebound headaches.

METHODS: Quantity limits were implemented October 1998 to allow coverage of 12 tablets of triptan therapy per month. Patients continuously enrolled October 1997 through September 1999 with a diagnosis of migraine headache were followed on the pharmacy and medical claims system. One-year pre-implementation data were compared with one-year post-implementation data. Both the per migraneur per month cost and utilization (n=1,446) were assessed for triptan therapy, prophylactic therapy, visits, and emergency room visits.

RESULTS: Using a paired t-test, there was a $21.24 ($99.35 vs. $78.11) decrease in per migraneur per month cost for triptan therapy (p=0.001, n=1,446). The monthly utilization of triptan therapy decreased by 0.075 scripts filled per member per month (PMPM) (p=0.001, n=1,446). The monthly cost of prophylactic therapy increased by $4.62 per migraneur per month (p=0.001, n=1,033). The monthly utilization of prophylactic therapy increased by 0.042 scripts filled PMPM (p=0.004, n=1,033). There was no statistically significant difference between the pre-implementation and post-implementation time periods in frequency or cost of office visits or emergency room visits.

CONCLUSION: Implementation of migraine quantity limits and review of utilization and cost data helps to identify migraneurs who may be suboptimally treated. Providing a mechanism to ensure decreased utilization of abortive migraine medications improves appropriate use of prophylactic therapy while providing a net health care savings of $311,287 annually.

LEARNING OBJECTIVES: Audience participants will:
1. learn the differences between prophylactic and abortive therapy for the treatment of migraine headaches;
2. recognize the value of quantity limits on abortive migraine medications to improve patient care and decrease total health care costs;
3. understand the meaning of total health care costs and the difference between pharmacy and medical costs; and
4. learn how to implement their own migraine quantity limit program.

National prevalence of Escherichia coli resistance to trimethoprim-sulfamethoxazole: managed care implications in the treatment of urinary tract infections

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OBJECTIVE: To determine the prevalence of resistance to trimethoprim-sulfamethoxazole (TMP/SMX) throughout the United States from October through December 1999.

METHODS: Clinical isolates from 43 states and the District of Columbia were tested for their susceptibility to TMP/SMX by broth microdilution at the MRL central laboratory.

RESULTS: Of the 5,883 E. coli isolates collected, resistance to TMP/SMX was 17.4%, compared to 3.2% for ciprofloxacin. Resistance to TMP/SMX was widespread and differed regionally as follows: East North Central (16.4%), East South Central (9.5%), Mid Atlantic (14.4%), Mountain (21.8%), New England (13.3%), Pacific (21.8%), South Atlantic (19.7%), West North Central (14.5%), and West South Central (23.9%). Of the ZIP codes covered in this study, 73% had a TMP/SMX resistance rate of 10% or greater; 43% had a resistance rate of 20% or greater.

CONCLUSIONS: Current Infectious Disease Society of America guidelines for treatment of urinary tract infections (UTIs) recommend that in areas where TMP/SMX resistance is greater than 10–20%, alternative therapy such as a quinolone should be used first line. To achieve optimal patient outcomes when implementing telephone treatment of UTI, regional resistance rates should be considered when recommending first-line agents.

LEARNING OBJECTIVES: Audience participants will:
1. understand how to evaluate HTN care in a managed care plan;
2. learn how to plan an HTN quality-improvement program;
3. gain an appreciation of clinical guidelines and how they can be implemented in managed care; and
4. assess the use of existing data to evaluate the quality of care.

Identifying hypertension patients for quality improvement: Is HEDIS enough?

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OBJECTIVES: (1) To assess treatment patterns, outcomes, and opportunities for improved hypertension (HTN) care to meet HEDIS 2000 standards; (2) to identify quality improvement (QI) program components by comparing treatment patterns with JNC-VI recommendations.

METHODS: Teams representing pharmacy, medical, and QI departments evaluated HTN care in three managed care plans covering 675,000 lives in Florida, Texas, and Wisconsin. Pharmacy and medical claims databases were used to identify HTN patients (N=1,248,860) and compare treatment patterns with JNC-VI recommendations. Random chart reviews were conducted to gather blood pressure (BP) control status and other clinical data (N=1,327).

RESULTS: The prevalence of HTN ranged from 8%–24%. Single-agent therapy was the most common drug regimen (55%–65%). The most commonly used drug classes were diuretics (21%–27%), angiotensin-converting enzyme (ACE) inhibitors (18%–25%), beta blockers (19%–25%), and calcium channel blockers (15%–24%). Chart reviews revealed high proportions of uncontrolled BP (59%–66%). Approximately 42%–59% of diabetics were receiving an ACE inhibitor, and 74%–81% failed to achieve adequate BP control (prevalence rate of diabetes was 14%–23%). Between 44% and 55% of congestive heart failure patients were treated with an ACE inhibitor; beta blocker use post-myocardial infarction ranged from 57%–71%.

CONCLUSIONS: Adequate management of HTN remains a clinical challenge, especially in the diabetic population. On the strength of these data, a QI program that aims to improve BP control through increased awareness, optimal pharmacotherapy, and improved compliance is being implemented in these plans.

LEARNING OBJECTIVES: Audience participants will:
1. understand how to evaluate HTN care in a managed care plan;
2. learn how to plan an HTN quality-improvement program;
3. gain an appreciation of clinical guidelines and how they can be implemented in managed care; and
4. assess the use of existing data to evaluate the quality of care.
OBJECTIVE: To compare the prevalence of hypertension in managed care settings following the HEDIS 2000 Technical Specifications versus a more broad pharmacotherapy-based identification method.

METHODS: We used a large nationwide managed care database of pharmacy and medical claims to identify hypertension patients using two criteria: (1) HEDIS 2000 Technical Specifications, with a modified age criteria; and (2) HEDIS 2000 + pharmacotherapy-based approach. A 2x2 Chi-square test was performed to assess the statistical significance of any observed differences between the two selection methodologies.

RESULTS: Over 3.3 million covered lives are represented in the database, representing six health plans. During 1999, 365,444 individuals (prevalence=11%) were identified as having hypertension using the age-modified HEDIS 2000 criteria. Over the same timeframe, an additional 129,548 were identified as having hypertension using the HEDIS + pharmacotherapy approach, a 35% increase over the HEDIS method (p<0.001). Using this method, the final prevalence rate of hypertension in this population was 14.93%.

CONCLUSIONS: By following only the HEDIS 2000 technical specifications for identifying hypertension, and using those criteria for quality-improvement (QI) intervention purposes, health plans may be understating the prevalence of the condition. A more broad identification approach supplementing the HEDIS method with pharmacy claims as a proxy can significantly increase the number of individuals targeted for education and other interventions. Doing so may increase the likelihood of success of such interventions.

LEARNING OBJECTIVES: Audience participants will:
1. learn about the HEDIS 2000 Technical Specifications for hypertension;
2. recognize the value of pharmacy utilization in identifying hypertensive patients for QI interventions; and
3. be able to utilize a pharmacy claims-based identification protocol in designing future hypertension programs.

Effect of ADHD on work status and work productivity: A survey of caregivers

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INTRODUCTION: Attention-deficit/hyperactivity disorder (ADHD) is the most commonly diagnosed psychiatric disorder among children in the United States. However, the social and economic costs of ADHD are not well understood.

OBJECTIVE: To examine the impact of childhood ADHD on caregivers’ work status and work productivity, and on patients’ health care use.

METHODS: A telephone survey of 154 caregivers of ADHD-diagnosed children. Caregivers were identified from membership in CHADD (Children and Adults with Attention-Deficit/Hyperactivity Disorder).

RESULTS: The mean number of ADHD-diagnosed children per caregiver was 1.3 (range 1–4); 60% of the children were in 6th grade or lower. The reported mean numbers of prior year ADHD-related visits to practitioners, psychiatrists, psychologists, and counselors were 2.0, 3.7, 2.9, and 6.6 visits, respectively. In the three months prior to the telephone survey, 18% of these visits were for unscheduled emergencies; 63% of caregivers reported some change in their work status as a result of their child’s ADHD. Of the latter, 15% changed type of job, 46% reduced hours worked per week, and 11% stopped working completely. During the four weeks prior to the survey, caregivers reported having lost an average of 0.8 days from work and being 25% less productive, for an average of 2.4 days attributed to their child’s ADHD. Together, this is equivalent to a 39-day reduction in caregiver productivity per year.

CONCLUSIONS: These results support the idea that childhood ADHD adversely affects caregiver work status and work productivity. Effective management of childhood ADHD may help to mitigate costs borne by employers and health care systems.

LEARNING OBJECTIVES: Audience participants will:
1. recognize the extent of health care resource utilization by children with ADHD;
2. learn how childhood ADHD impacts caregivers’ work status; and
3. understand the extent to which a child’s ADHD can affect caregivers’ work productivity.

Impact of a geriatric drug-utilization review and prescriber intervention on prescribing habits and pharmacy benefit costs

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OBJECTIVE: To determine the impact of a health-improvement-company-initiated prescriber intervention using identified markers of inappropriate medication use in the elderly on prescribing habits and pharmacy benefit costs versus a control.

METHODS: A retrospective drug-utilization analysis was performed for a large health plan, using pharmacy claims data from June 2000 to August 2000. The geriatric population was stratified by age and randomized into an active intervention or control group. In the active intervention population, 10 criteria of inappropriate medication use in the elderly were used to identify patients and prescribers for review. The investigators clinically evaluated the medication profiles identified. In the intervention group, the top 100 prescribers by number of claims per prescriber received a mailed letter, an educational sheet, and patient profiles for that prescriber with specific recommendations for review. The control group received no intervention. Three months following the intervention date, the active and the control group claims data were reevaluated for the same criteria. The data were then analyzed for change in prescribing habits and pharmacy benefit cost per member per month.

RESULTS: Results of this intervention and analysis will provide valuable insight on the impact of geriatric-specific drug-utilization review and the effectiveness of prescriber interventions. It is expected that the outcomes of this analysis will show a decrease in inappropriate medication use in the elderly and have little impact on costs.

LEARNING OBJECTIVES: Audience participants will:
1. identify inappropriate medication use criteria that are clinically significant in the geriatric population;
2. learn how using these criteria in a geriatric population can impact prescribing habits and bring cost benefit; and
3. determine the impact of differing types of prescriber intervention on changing prescribing habits.

Comparison of side effects associated with selective serotonin re-uptake inhibitors (SSRIs) in a health maintenance organization

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OBJECTIVES: Audience participants will:
1. be able to utilize a pharmacy claims-based identification protocol in designing future hypertension programs.

Abstracts from Poster Presentations at AMCP’s 13th Annual Meeting & Showcase
OBJECTIVE: To assess utilization patterns, frequency of side effects, and cost of side effects associated with SSRI treatment.

METHODS: Electronic medical records and medication profiles were retrospectively reviewed. Inclusion criteria were patients over 18 years old with a new prescription for an SSRI who were continuously enrolled for at least one year and who had a diagnosis for depression. The perspective was that of the health maintenance organization (HMO).

RESULTS: Of the 337 patients who met the inclusion criteria, 96 (28%) had 101 medication changes made after initial therapy—including 33 additions of medication, 31 switches to another antidepressant, 28 discontinuations of therapy due to side effects, and 9 dose changes. About 40% (137 patients) had at least one side effect associated with an SSRI noted in their medical record. The most common side effects reported were insomnia/poor sleep, diarrhea, nausea, and sexual dysfunction. Costs to treat side effects included medication changes (96 patients), physician visits (32 patients), lab tests for dosage adjustments (6 patients), and emergency room visits (3 patients). Sensitivity analyses indicated that the direct medical costs associated with the treatment of side effects ranged from approximately $11–$17 per patient. There were no statistical differences in utilization patterns, overall frequency of side effects, or costs of side effects between the SSRIs compared in this study.

CONCLUSIONS: Although 40% of patients noted at least one side effect of the treatment, the direct medical costs associated with the side effects were relatively small. Future studies might investigate the indirect and intangible costs of these side effects.

LEARNING OBJECTIVES: Audience participants will:
1. understand the prevalence of side effects associated with SSRI use;
2. learn the types of direct medical costs associated with the treatment of side effects; and
3. recognize what other types of costs associated with side effects might be important to consider.

Asthma management in a Medicaid managed care plan

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INTRODUCTION: Asthma is the number one non-pregnancy-related diagnosis for inpatient service utilization by Neighborhood Health Plan of Rhode Island (NHPRI) members. Asthma drugs are the second most frequently ordered category of pharmaceutical agents. Contributing factors to the high prevalence rate of asthma among NHPRI members include poverty, inner-city residency, high percentage of children under the age of 21 years, and high percentage of adult smokers.

METHODS: Through clinician and member education, NHPRI seeks to improve members’ self-management skills and decrease the need for “rescue” treatment. The plan conducts drug utilization evaluations (DUE) and gives feedback to clinicians on their prescribing and member-utilization patterns. An annual member survey provides feedback to the plan on quality of life and functional status.

RESULTS: Inpatient admission rates for asthma decreased from 10.04 per thousand members (1997) to 5.92 per thousand members (1999). The use of inhaled anti-inflammatory medicine by “at-high-risk” asthmatics increased from 56.12% to 61%. Member survey results show almost a 10% increase in their confidence to control asthma and their ability to sleep through the night. The intervention increased the self-management skills of Medicaid members with asthma through the use of peak flow meters, asthma action plans, education, and appropriate medication use; improved the quality of their life and functional status; and decreased the need for emergency inpatient admissions.

LEARNING OBJECTIVES: Audience participants will:
1. understand the role of DUE in disease-management programs;
2. learn about the importance of improving self-management skills for patients with a chronic disease, and how these impact outcomes in a managed Medicaid population; and
3. recognize the value of a coordinated team approach (clinician, pharmacist, nurse, patient, etc.) in managing chronic diseases.

Effective five-day short-course gemifloxacin (GEMI) therapy of acute bacterial sinusitis (ABS)

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INTRODUCTION: Currently available quinolones have a minimum therapy duration in ABS of 10 days. GEMI is an enhanced-affinity quinolone with high efficacy in seven-day therapy (87.7% clinical and 93.5% bacteriological success at follow-up).

METHODS: The efficacy of five-day versus seven-day GEMI therapy was compared in a double-blind, randomized controlled trial in adult patients with ABS. Primary endpoint: clinical success (CS) in the protocol population at follow-up (FU, Day 18-25). Secondary endpoints: CS at end of therapy (EOT, Day 9-11) and bacteriological success (BS) at EOT and FU based on data from a limited number of centers.

RESULTS: 421 patients received GEMI 320 mg o.d. for five days (n=218) or seven days (n=203). Treatment groups were well matched for demographics/baseline characteristics. CS at FU = 87.3% (158/181) for five-day versus 86.9% (152/175) for seven-day GEMI. The 95% CI (–6.54, 7.41) around the observed difference (0.44) showed five-day to be as efficacious as seven-day therapy (±10%). BS at FU = 94.4% versus 90.5% (17/18, 19/21) for five- and seven-day GEMI, respectively. High CS and BS rates were confirmed for both GEMI regimens: CS at EOT = 93.1% five-day versus 96.2% seven-day (176/189, 177/184); BS at EOT = 94.4% five-day versus 100% seven-day (17/18, 21/21). Both regimens were well tolerated.

CONCLUSIONS: Five-day GEMI o.d. was as efficacious as seven-day GEMI. A five-day regimen offers convenience benefits over other currently available therapies. A short-course sinusitis therapy may also enhance patient compliance and thus delay the emergence of antimicrobial resistance.

LEARNING OBJECTIVES: Audience participants will:
1. learn that short-course (five-day) therapy of ABS can be effective if a potent antimicrobial is used;
2. learn that this may provide the opportunity for increased patient compliance; and
3. learn that short-course therapy may reduce the potential for the selection of antimicrobial resistance.

Effectively treating pneumonia as an outpatient: implications for the managed care pharmacist

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OBJECTIVES: The objectives of this study are to: (1) identify community acquired pneumonia (CAP) managed care and/or Medicare patients who are candidates for outpatient care on oral therapy using a recently endorsed severity stratification model; and (2) explore opportunities for the managed care pharmacist in implementing guidelines for outpatient pneumonia treatment.

METHODS: A retrospective multicenter benchmarking study was conducted in 29 institutions to identify CAP patients who are candidates for outpatient treatment. The Pneumonia Outcomes Research Team (PORT) methodology, endorsed by the Infectious Disease Society of America (IDSA), was applied to 1,694 patients ultimately admitted. Treatment and outcomes were evaluated.

RESULTS: 32.0% of admitted patients are candidates for outpatient care based upon signs and symptoms at presentation (severity classes I, II, or III). Admitted low-risk patients have a length-of-stay of 4.3 days yet met clinical improvement criteria on day one of admission. Selected antibiotics are generally consistent with national guidelines. However, a large proportion (28.6%) of low-risk patients in the emergency department receive levofloxacin, which is recommended as a second-line agent for the immune-suppressed or high-level resistance, compared to 10% receiving macrolides, recognized first-line therapy.

CONCLUSION: A significant proportion of pneumonia care currently administered in the inpatient setting can and likely will be transitioned to outpatient settings. Variation in antibiotics exists, with large proportions of potentially inappropriate agents prescribed. As hospitals begin to discharge low-risk CAP patients, managed care pharmacists will be required to ensure appropriate treatment consistent with formulary restrictions and national guidelines.

LEARNING OBJECTIVES: Audience participants will:
1. understand what types of CAP patients are appropriate for outpatient care;
2. understand severity-adjusted treatment recommendations for the patient with pneumonia who is treated as an outpatient;
3. recognize how decisions made in emergency rooms affect ultimate outpatient antimicrobial therapy; and
4. be able to identify a role in assuring appropriate care for CAP patients formerly treated as inpatients.

Medication management of allergic rhinitis: four years of medical group experience

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OBJECTIVE: Medications used to treat allergic rhinitis rank third among all therapeutic classes in both per member per month (PMPM) costs and utilization within MedClinic Medical Group (MCMG). A comprehensive medication management program for allergic rhinitis was designed to ensure appropriate, cost-effective prescribing in this therapeutic class.

METHODS: The program included allergic rhinitis guidelines developed in collaboration with the Allergy Department, provider education and profiling, and patient newsletters and allergy kits. The key message to providers and patients was appropriate use of nasal corticosteroids (NCS) and "prn" prescribing of non-sedating antihistamines (NSA). Preferred agents were selected and all medications were tracked.

RESULTS: Over the four-year study period MCMG had an increase in NCS use and a decrease in NSA use. To date the utilization ratio of NCS: NSA is 1.12:1, compared to a national ratio of 1:1.79. The per member per year (PMPY) cost ratio of NCS: NSA is 1.22 compared to a national average of 1:2.3. The average cost per prescription for NSA has decreased with increased "prn" use and the average cost per prescription of NCS has increased. Overall, the PMPM costs increased due to an increase in utilization; however the average cost per prescription decreased. Also seen was an increase in market share for all preferred products.

CONCLUSION: A comprehensive medication management program for allergic rhinitis can lead to appropriate cost-effective prescribing and subsequent cost avoidance through increased use of NCS and prn use of NSA.

LEARNING OBJECTIVES: Audience participants will:
1. describe components of a medication-management program;
2. understand the model used to calculate cost avoidance; and
3. learn about ways to increase NCS use and decrease NSA use.

Prescribing patterns of fentanyl transdermal system and oxycodone hydrochloride controlled-release tablets in a state Medicaid population

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OBJECTIVE: To compare the prescribing patterns of two long-acting opioids with the manufacturers' full prescribing information (PI).

METHODS: The California Medicaid (Medi-Cal) claims database was used to examine the prescribing patterns of fentanyl transdermal system and oxycodone HCl controlled-release tablets prescriptions for malignant and nonmalignant pain from January 1, 1997 to August 31, 1999.

RESULTS: Medi-Cal patients received 57,009 fentanyl transdermal fentanyl prescriptions, of which 56% were for treatment of nonmalignant pain. Medi-Cal patients received 44,764 oxycodone HCl controlled-release prescriptions, of which 74% were for treatment of nonmalignant pain. Nonmalignant diagnoses associated with both long-acting opioids were similar; common diagnoses included lumbago, human immunodeficiency virus (HIV), chronic airway obstruction, congestive heart failure, chronic renal failure, and backache. Results indicated that the mean numbers of transdermal fentanyl patches per prescription for malignant, nonmalignant, and combined diagnoses were 0.40, 0.45, and 0.43 respectively. The last figure (0.43) corresponds to the application of one patch every 2.3 days. For oxycodone HCl controlled-release, the mean numbers of units per day were 3.2, 3.5, and 3.4 tablets, respectively.

CONCLUSIONS: Both oxycodone HCl controlled-release and fentanyl transdermal system exceeded the manufacturer's recommended prescribing information; this excess was more pronounced, however, with oxycodone HCl controlled-release. The number of oxycodone HCl controlled-release tablets prescribed per day exceeded the manufacturer's PI by 70%, whereas the number of fentanyl transdermal system patches per day exceeded the PI by 30%.

LEARNING OBJECTIVES: Audience participants will:
1. understand the manufacturers' prescribing information for two commonly prescribed long-acting opioids; and
2. learn about the common diagnoses associated with opioid use in nonmalignant pain; and
OBJECTIVE: To compare pharmacy and medical utilization among patients diagnosed with irritable bowel syndrome (IBS) and age- and gender-matched non-IBS patients in a large capitated health maintenance organization (HMO).

METHODS: Sample included continuously eligible adult commercial enrollees with a primary diagnosis of irritable colon (ICD-9-CM 564.1) in 1998. Subjects had to be free of any IBS diagnosis in the two years prior to their 1998 index date. IBS patients were age and gender matched to equal numbers of controls without IBS. Pharmacy and medical claims were obtained for 24 months before and 6 months after their index date.

RESULTS: The mean age of the IBS patients (n=1,803) was 51 years; 69% were females. Two to four times more IBS patients than controls received proton-pump inhibitors (PPIs), antidepressants, antispasmodics, and antidiarrheals. IBS patients have on average $49/month in prescription costs compared to $30/month for controls, translating into an excess of over $1 million during the study period, of which 42% was directly related to selective serotonin reuptake inhibitor and proton-pump inhibitor use.

In the two-year period prior to initial diagnosis, IBS patients had almost twice as many office visits and 60% more prescriptions than controls. In the six months post-diagnosis, regression analyses revealed that IBS patients had a larger increase (p<0.01) in the number of inpatient visits (+57%), outpatient visits (+56%), and prescriptions (+26%) than controls.

CONCLUSIONS: IBS patients, before and after receiving their initial IBS diagnosis, are high users of medical services and drugs. This is the first study that describes in detail the drug and medical utilization of newly diagnosed IBS patients in a managed care environment.

LEARNING OBJECTIVES: Audience participants will:
1. learn about the classes of drugs that IBS patients most frequently use; and
2. be able to benchmark the utilization level of their IBS population against that of a large U.S. plan.

Effectiveness of physician profiles on prescribing trends for selective serotonin reuptake inhibitors

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OBJECTIVE: This study evaluated the effectiveness of physician profiles on prescribing trends for selective serotonin reuptake inhibitors (SSRIs).

METHODS: Physician prescribing profile reports were implemented in November 1998 at a 160,000-member staff-model managed care organization (MCO). The 500+ physicians of the MCO receive the reports on a quarterly basis. All marketed SSRIs were on the health plan formulary at the same copayment level. However, the high relative cost of fluoxetine compared to the other SSRIs necessitated highlighting this drug class in the quarterly physician prescribing reports. Pharmacy claims data from January 1997 through December 1999 were assessed to
evaluate changes in SSRI utilization and expenditures before and after physicians began receiving their prescribing reports. The MCO data were compared with national published trends.

**RESULTS:** After implementation of the physician profile reports, fluoxetine prescription utilization decreased by 12.6% per member per year (PMPY) in the health plan, a marked difference from the 24.5 PMPY increase nationwide. Fluoxetine expenditures decreased by 12.8% PMPY (an annual savings of $79,000 for the MCO). Nationwide, fluoxetine expenditures increased 8.6% from 1998 to 1999. MCO market share for the less expensive SSRIs was below national rates (53.7% versus 55.4%, respectively) in 1997. In 1999, the MCO market share for the less expensive SSRIs exceeded national data (67.8% versus 64.5%, respectively) and continues to grow in 2000.

**CONCLUSION:** Physician prescribing profiles were successfully implemented to encourage increased prescribing of the less costly SSRIs and to control rising prescription expenditures without altering the formulary or the copayment status.

**LEARNING OBJECTIVES:** Audience participants will:
1. understand the process of and challenges for implementing physician prescribing profiles;
2. identify relevant measures for evaluating the effectiveness of physician-prescribing profiles and comparisons with national trends;
3. recognize the potential impact of using physician-prescribing profiles to enhance formulary compliance; and
4. develop physician-prescribing profiles for their organization.

■ Effect of sample closets on the prescribing practices of a small physician group practice

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**OBJECTIVE:** To determine the effects of a controlled sample closet on physician prescribing patterns over a period of six months.

**METHODS:** One of two sample closets at the study site was converted to contain only formulary-preferred medications, covering nine drug classes, including generic antibiotics. This closet was used for managed care patients only; the unrestricted closet was used for cash-paying, Medicare, Medicaid, and other patients who required an alternative to formulary-preferred medications. Prescribing patterns were analyzed using claims data from HMOs for the six-month time period for both 1999 and 2000.

**RESULTS:** Claims data collected showed that the utilization of preferred agents in the closet increased by an average of 9% across eight of the nine drug classes with an approximate range of -3%–25%. In the ninth class of medications, antibiotics, use of generic antibiotics rose about 3%. Despite the overall increase in the utilization of preferred agents the total number of prescriptions written for the nine classes decreased approximately 32%.

**CONCLUSION:** By limiting the medications in a sample closet to preferred agents, the physicians, in most cases, wrote a greater number of prescriptions for these agents over nonpreferred products. The total number of scripts is lower possibly due to physicians giving sample medications—for example, antibiotics—to patients for the full course of treatment, rather than writing a prescription.

**LEARNING OBJECTIVES:** Audience participants will:
1. learn about the process and challenges of setting up a controlled sample closet;
2. recognize the impact that sample medications have on physician prescribing patterns; and
3. understand the importance of the changes made in the utilization of preferred agents.

■ Quantitative assessment of psoriasis patients’ preference for different topical vehicles

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A study was undertaken to determine whether topical vehicle selection affected patients’ tendency to comply and persist with selected treat-
Managing the dermatology formulary requires inclusion of topical medications in multiple different vehicles. Patient acceptance of the vehicles used in topical therapy contributes to adherence to the treatment plan and subsequent outcomes. The newest vehicle formulation is a foam preparation that is non-greasy, easily applied, and residue-free; thus, it is more appealing to patients than cream or ointment preparations. We sought to quantify patients’ preference for this and other vehicles commonly used to treat psoriasis. Focus-group sessions were held with patients with psoriasis to determine patients’ perceptions of the advantages and disadvantages of different topical psoriasis therapies. This information was used to derive a “treatment adversity measure” to assess different topical therapies.

Twenty patients with psoriasis sampled different topical psoriasis medications and completed the “treatment adversity measure” for each. The quantitative analysis confirms physicians’ qualitative impression that vehicle characteristics are important to patients.

The foam preparation was much preferred over cream, ointment, gel, and emollient preparations and may provide an opportunity to achieve improved compliance with topical corticosteroid treatment in a managed care environment.

LEARNING OBJECTIVES: Audience participants will:
1. understand the importance of proper topical vehicle selection for dermatology patients;
2. become familiar with patients’ perceptions of topical vehicles; and
3. understand how patient preference can affect compliance and outcomes.

New trends in antibiotic utilization for Kentucky Medicaid plan following appropriate usage program

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INTRODUCTION: The Center for Disease Control (CDC) has identified antibiotic resistance as a public health concern and supports efforts to address this serious problem. The purpose of this study was (1) to evaluate the impact of a 4th Quarter 1999–1st Quarter 2000 appropriate usage antibiotic program using CDC educational materials for a selected Kentucky Medicaid population, in the areas of patient and provider awareness of antibiotic resistance as it relates to inappropriate antibiotic utilization, and (2) calculate changes in utilization patterns and costs associated with first- and second-line antibiotics in the ambulatory-care environment.

METHODS: Educational programs using CDC-based appropriate antibiotic usage materials as the foundation were implemented in 4th Quarter 1999, targeting 53 providers in one of eight Kentucky State Medicaid regions. A provider satisfaction survey was developed and, upon study completion, administered to targeted physicians during 1st Quarter 2000. Claims data analysis was performed comparing baseline measurements from 4th Quarter 1998–1st quarter 1999 to 4th Quarter 1999–1st Quarter 2000 within the identified region. Comparisons were also evaluated using the other Medicaid regions in Kentucky that were not included in this initiative.

RESULTS: Survey analyses (64% response rate) documented a significant increase in patient and provider awareness of the health care problem of inappropriate antibiotic use with a 74% improvement of patient awareness and 94% improvement in physician prescribing habit awareness. Receptivity and acceptance of CDC Appropriate Antibiotic Usage program and provider educational materials was 59% and 100%, respectively. First-line antibiotic utilization increased approximately 1% in the targeted region, compared to an approximate 4% decline in the other Kentucky Medicaid regions. This increase was also similar when comparing the targeted region with national statistics. The antibiotic cost savings calculated from changes in the first quarter of 2000 compared to the first quarter of 1999 was approximately $169,000.

CONCLUSION: Based on results of this appropriate antibiotic utilization program, educational interventions to providers in a Kentucky Medicaid region improved patient and provider awareness of problems related to inappropriate antibiotic prescribing and providers were accepting of an appropriate-use initiative using CDC educational materials. In addition, effective educational programs yielded increases in first-line antibiotic utilization and decreases in second-line antibiotics that were commensurate with substantial cost savings.

LEARNING OBJECTIVES: Audience participants will be able to:
1. describe national trends in antibiotic utilization and compare with the Kentucky Medicaid population;
2. explain, describe, and implement a successful appropriate-antibiotic utilization program using CDC-based educational materials; and
3. explain and describe selected barriers to an appropriate-antibiotic utilization program.

Technology assessment in large medical groups and health maintenance organizations

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INTRODUCTION: This analysis compares the characteristics and processes of technology assessment (TA) in large medical groups and health maintenance organizations (HMOs).

METHOD: The survey populations were large medical groups and large HMOs (100,000 or more at-risk lives). Mail and telephone questionnaires were implemented.

RESULTS: In medical groups, TA involves physicians (100% of the time) and finance staff (85% of the time). In HMOs, medical functions (91% of the time) and pharmacy functions (83% of the time) participate in TA. Medical groups conduct TA throughout the product lifecycle. More than other types, injectable drugs undergo TA review in medical groups and HMOs. 44% of medical group respondents and 90% of HMO respondents seek outside assistance for TA. Medical groups use TA to develop clinical practice guidelines. HMOs use TA to determine coverage.

CONCLUSIONS: The need to manage legal and financial risk while focusing on clinical practice and patient care drives TA in medical groups. A need to define legally defensible benefits drives TA in HMOs.

LEARNING OBJECTIVES: Audience participants will:
1. learn about the technology assessment process in medical groups and HMOs;
2. understand the role of TA in the P&T process; and
3. recognize the value of TA for risk management and coverage determinations.

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Depression is a common and debilitating condition, affecting up to 21.3% of women and 12.7% of men in the United States at some point in their lifetimes. At any given time, 10–14 million Americans suffer from major depression, and of those who initially experience a major depressive episode, more than half will eventually develop another.

The direct costs of treatment for major depression (including hospitalization, drug treatment, and outpatient services) combined with the indirect costs (such as decreased workplace productivity, excess absenteeism, and suicide) are significant. Greenberg and colleagues estimated the total costs of depression in the United States in 1990 at $43.7 billion; more than half of that amount was related to indirect costs. Direct costs for the disorder are high because persons with depression use significantly more health care services than persons without depression. One study showed that the mean annual treatment cost per primary care patient with depression ($4,246) was significantly higher than that per patient without depression ($2,371).

Patients with depression also experience an impaired quality of life. Wells and colleagues determined that these patients reported worse physical and social functioning, more pain, and worse current health; they spent more days in bed than patients with chronic medical conditions, such as hypertension, diabetes, angina, back problems, or gastrointestinal problems. Patients diagnosed with major depression are almost five times more likely to suffer at least one disability day (defined as being bedridden for at least part of the day or being unable to perform usual activities due to the illness) than are people without depression, and more than three times as likely to miss work because of their condition.

The objective of this paper is to review data relevant to discussions of comparative costs associated with antidepressant treatment, based on published articles (as identified in a Medline search), meeting presentations, and independent market research. The paper is motivated in part by the author’s observation that managed care organizations have not infrequently recommended paroxetine as a preferred agent.

**Antidepressant Pharmacotherapy**

The conclusions of the 1991 National Institutes of Health Consensus Panel on Diagnosis and Treatment of Depression in Late Life were re-examined by Lebowitz and colleagues in...
Depression in Managed Care: Costs of Selective Serotonin Reuptake Inhibitors

The investigators determined that, because of the complexity and impact of depression, aggressive approaches to recognition, diagnosis, and treatment are warranted to minimize suffering, improve overall functioning and quality of life, and limit inappropriate use of health care resources. Appropriate treatment of depression in the primary care setting has generally been associated with lower overall health care utilization.12 Pharmacotherapy, either alone or in conjunction with psychotherapy, plays an important role in the treatment and recovery of patients with depression.21 Once depression has been diagnosed, the clinician should select the initial therapy based on the symptoms, the level of dysfunction, and prior episodes of depression.22 The patient's age, comorbid conditions, and specific presenting symptoms should be taken into account by the physician when diagnosing and managing major depression.23 Rational selection of antidepressant medication also should include consideration of potential adverse effects and drug-drug or drug-food interactions. Acute-phase pharmacotherapy is recommended for six to eight weeks, with a continuation phase for six to nine months after remission.11, 14

Tricyclic Antidepressants versus Selective Serotonin Reuptake Inhibitors

Approximately two-thirds of patients with major depression will respond to antidepressant therapy.15 The most commonly prescribed antidepressants are the tricyclic antidepressants (TCAs) and the newer-generation selective serotonin reuptake inhibitors (SSRIs), which include fluoxetine, paroxetine, and sertraline. Recently, citalopram became the fourth SSRI approved in the United States for the treatment of depression. Drugs in these two classes are widely regarded as effective in the treatment of depression; however, the SSRIs are associated with improved tolerability.12, 15

Although TCAs are less expensive than the SSRIs, they have deleterious side effects, including anticholinergic and cardiovascular side effects, and poorer long-term tolerability, which may ultimately result in higher overall treatment costs. The most common adverse effects of SSRIs include sexual dysfunction, nervousness, insomnia, drowsiness, fatigue, sweating, headache, and tremor. With the exception of sexual dysfunction, these effects generally are not severe enough to make the patient noncompliant and often subside as treatment continues. A major concern of therapy with the SSRIs is the potential for drug-drug interactions because of their effect on the cytochrome P450 system. This possibility is especially important in patients with cardiac disease, who often are taking multiple medications.16–24 Caution is urged when SSRIs are coadministered with drugs such as phenothiazines, Type 1C antiarrhythmics, and other antidepressants.

Patient Adherence

Patient adherence is a critical factor in determining the success, and ultimately the cost, of antidepressant therapy. Premature discontinuation of drug therapy is a major cause of relapse in patients who suffer from major depressive disorder.26–27 Discontinuation rates because of adverse effects are higher with TCAs than with SSRIs.28–31 The side effects of the TCAs may cause patients to abandon treatment before reaching an adequate dosage and treatment duration. In addition, studies have suggested that antidepressant medications, particularly the TCAs, often are inadequately prescribed with respect to dose and duration, especially by nonpsychiatric physicians.12, 32 This inadequacy may lead to a greater likelihood that patients on TCAs will discontinue antidepressant therapy early.33, 34 Another element of therapy that may affect compliance is the dosing schedule. The simplified administration schedules of the SSRIs compared with older classes of antidepressants may help...
Depression in Managed Care: Costs of Selective Serotonin Reuptake Inhibitors

SSRI Prescriptions Filled with More than One Tablet or Capsule per Dose and Associated Cost

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<th>Paroxetine</th>
<th>Fluoxetine</th>
<th>Sertraline</th>
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<tr>
<td>Average daily dosage</td>
<td>23 mg</td>
<td>30 mg</td>
<td>101 mg</td>
</tr>
<tr>
<td>Percentage of prescriptions filled with more than one tablet</td>
<td>16%</td>
<td>50%</td>
<td>45%</td>
</tr>
<tr>
<td>Average daily cost/patient</td>
<td>$2.01</td>
<td>$3.08</td>
<td>$2.38</td>
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<tr>
<td>Average 30-day cost/patient</td>
<td>$60.30</td>
<td>$92.40</td>
<td>$71.40</td>
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improve patient compliance and reduce physician and pharmacist time, thereby potentially reducing overall cost of therapy.

Cost Analysis of SSRI Therapy

As health care providers become more aware of the total costs for treating depression and less concerned about the simpler issue of drug-acquisition costs, the SSRIs are used more often as first-line therapy for depression and other psychiatric illnesses. The question of which particular SSRI would improve the economic outcome of treatment is challenging because of the lack of prospective comparative trials. Available data demonstrate that direct drug and overall costs associated with SSRI therapy may differ depending on which SSRI is prescribed. The cost drivers for SSRI therapy include dose titration and stratification, costs for concomitant drugs, duration of therapy, and drug acquisition costs.

Dose Titration

For several antidepressant medications, the starting dose is almost always less than the target (or therapeutic) dose. When prescribing TCAs, for example, it is common practice to begin with modest doses (such as 25 to 50 mg per day) in order to minimize adverse events like anticholinergic side effects or orthostatic hypotension. Over subsequent weeks, the dose is increased to the therapeutic range (which usually exceeds 100 mg per day). Newer generation antidepressants such as venlafaxine and nefazodone also require gradually increased dosing strategies. The process of dosage increase is referred to as dose titration. Recent work using Medicaid claims to examine antidepressant utilization by nursing home residents suggests that automated pharmacy data are reasonably accurate measures of dosing patterns.

Titration can affect the cost effectiveness of SSRIs because of the expense associated with dosage adjustments. Higher dosages are associated with greater drug costs (particularly if multiple tablets are required to achieve the efficacious dose) and with increased provider time. Titration to achieve adequate dosage delays effectiveness and may result in premature discontinuation because the patient gets discouraged or in excessive utilization of medical services while the patient is awaiting a response.

In a retrospective study of SSRI-associated utilization and costs in 744 patients enrolled in a network-model HMO, Sclar and colleagues showed dose titration to be the primary predictor of health care utilization associated with SSRI therapy for depression. Dose titration rates were 16% for fluoxetine, 28% for paroxetine, and 40% for sertraline. The authors reported significantly lower overall treatment costs for fluoxetine compared with the others. This study, however, contained biases in patient selection and design that may have led to the higher titration rate for paroxetine compared with that of fluoxetine. In the Sclar et al. study, differences were evident in average patient age, ratio of male to female patients, and degree of primary versus specialty care providers between the groups. This study did not control for baseline severity or consider that fluoxetine was more likely to be used as first-line therapy. Higher hospital costs in the paroxetine and sertraline groups accounted for the increased overall costs compared with the fluoxetine group, which indicates that differences in disease severity and comorbid physical conditions may have been responsible for any cost variations between the groups.

More current observations indicate that the dose-titration rate for paroxetine is comparable to or even lower than that for fluoxetine and lower than that for sertraline. Russell et al. studied depression-related claims from more than 2,300 patients and reported a significantly lower rate of titration with paroxetine (36% of patients; p=0.001) than with fluoxetine (44%) and sertraline (48%). The titration rates for fluoxetine and sertraline were statistically similar.

A large-scale study funded by the Food and Drug Administration (FDA) at a large northwestern HMO reported that 64% of patients taking fluoxetine required doses higher than the recommended starting dose, compared with only 47% of patients taking paroxetine. This study analyzed antidepressant utilization for any indication. Another analysis of SSRI prescriptions in a primary care medical group revealed similar titration rates for fluoxetine (n=177) and paroxetine (n=175),
Depression in Managed Care: Costs of Selective Serotonin Reuptake Inhibitors

### Relationship between Dose Titration and Direct Drug Costs for SSRI Therapy in a Managed Care Setting

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<th>Paroxetine</th>
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<tr>
<td>Average daily dosage</td>
<td>21 mg</td>
<td>25 mg</td>
<td>81 mg</td>
</tr>
<tr>
<td>AWP for recommended daily starting dose</td>
<td>$1.85/20 mg</td>
<td>$2.16/20 mg</td>
<td>$1.94/50 mg</td>
</tr>
<tr>
<td>Actual daily AWP</td>
<td>$1.95</td>
<td>$2.61</td>
<td>$3.16</td>
</tr>
<tr>
<td>Actual AWP for 30-day supply</td>
<td>$58.50</td>
<td>$80.70</td>
<td>$94.80</td>
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Notes: AWP is average wholesale price. SSRI is selective serotonin reuptake inhibitor.

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Notes: AWP is average wholesale price. SSRI is selective serotonin reuptake inhibitor.

20% and 22%, respectively, and a higher rate for sertraline (n=98; 28%). The titration rate was 40% for TCAs (n=373) and 33% for other antidepressants (n=119). Patients in this study were members of one of two managed care plans that had open formularies with no restrictions on SSRI selection. Preliminary data from a long-term care setting showed a lower rate of dose titration with paroxetine (18%) compared with other SSRIs (24% for sertraline and 29% for fluoxetine). The rate of dose titration with sertraline is consistently the highest in the class, suggesting that this drug is associated with the highest costs for titration.

#### Multi-Tablet Doses

Russell and colleagues examined SSRI treatment courses and costs and found that the higher total cost of treatment with fluoxetine ($1,385 ± $2,221) compared with paroxetine ($1,231 ± $1,690) and sertraline ($1,203 ± $1,555) was related to significantly higher pharmaceutical costs, not expenses for other depression-related health care. Mean pharmaceutical costs were $586 ± $430 in the fluoxetine group, $446 ± $342 in the sertraline group, and $419 ± $320 in the paroxetine group (p<0.001 for fluoxetine). In this study, costs for hospitalization, outpatient care, and laboratory services were similar for all three SSRIs.

Pharmaceutical costs were significantly higher in the fluoxetine group compared with the paroxetine and sertraline groups because a significantly higher percentage of patients taking fluoxetine required multicapsule therapy (about 35%) compared with patients taking paroxetine or sertraline (about 18% and 22%, respectively). Data from an outpatient psychiatric pharmacy also demonstrated that daily dosage and the combination of pills necessary to achieve the effective dose were important factors in determining SSRI costs. The author analyzed physicians’ prescribing habits for SSRIs for any diagnosis (n=4,074) and found that only 16% of patients on paroxetine took multiple tablets, whereas about half of the patients on fluoxetine and sertraline received multiple tablets (see Table 1, page 144). The mean daily dosage of paroxetine was 13% higher than the recommended starting dose compared with 53% higher for fluoxetine and 100% higher for sertraline.

In the FDA-funded study, almost 90% of the patients taking paroxetine received dosages that were maintained with a single tablet (40 mg/day), compared with only 37% of patients taking fluoxetine (20 mg/day). Similar results were reported by Baum. In this study, almost every patient receiving paroxetine was prescribed a daily dosage that required taking only one tablet compared with about 85% of patients taking sertraline and 60% of those taking fluoxetine.

Recently, the manufacturer of fluoxetine introduced a 40-mg capsule of this SSRI, but this higher capsule strength is priced similarly to two 20-mg capsules.

#### Concomitant Drugs

The cost of concomitant psychotropic drugs used in the treatment of depression (such as anxiolytics and/or sedatives/hypnotics) must also be considered in the cost analysis of SSRI therapy. Navarro and colleagues examined SSRI utilization for any indication in two managed care models and reported a variation in costs between the two plans for concomitant medication to treat adverse effects. In a staff-model HMO, paroxetine was associated with slightly higher costs for concomitant anxiolytic therapy compared with fluoxetine and sertraline. According to the authors, this outcome was unexpected because paroxetine is associated with the lowest incidence of anxiogenic side effects among the available SSRIs. The authors suggest that this result may be attributable to the fact that patients with anxiety receive concomitant anxiolytic therapy and are prescribed paroxetine because it does not worsen anxiety symptoms. In the independent provider association, paroxetine was associated with
the least expensive cost for anxiolytics and sedatives/hypnotics, whereas sertraline was associated with the highest cost for these concomitant medications. A study on the utilization of SSRIs in a managed care plan in Hawaii showed that total costs for concomitant medications were comparable for all SSRIs.\(^{40}\)

**Duration of Therapy**

Conflicting evidence has been published regarding the effect of duration of SSRI therapy on health care costs. Thompson et al. examined SSRI treatment courses for depression and divided utilization into five categories: early discontinuation (n=229), switching/augmentation (n=244), upward titration (n=311), partial compliance (n=251), and three-month use (n=122).\(^{10}\) Longer duration of therapy was associated with the lowest overall treatment costs. Most of the prescriptions studied were for fluoxetine (88%); paroxetine was not available at the time of the analysis. In the study conducted by Russell and colleagues, the relationship between length of therapy and overall treatment costs was not evident.\(^{42}\) The critical consideration is that the duration of therapy for all SSRIs is often shorter than the target for antidepressant maintenance therapy recommended in national treatment guidelines for depression.\(^{43, 44, 48}\) For instance, in their examination of antidepressant use and costs in an HMO, Johnson et al. found that although the dose of SSRIs used to treat patients was generally adequate, the mean duration of use was shorter than recommended.\(^{41}\) Inadequate treatment duration may result in high relapse rates for depression.

**Drug Acquisition Costs**

Among the SSRIs approved for depression, citalopram and paroxetine have the lowest acquisition costs based on average wholesale prices (AWPs), about 23% and 12% less, respectively, than fluoxetine.\(^{41}\) Analysis of antidepressant prescribing in a Medicaid managed care setting demonstrated how AWP and dose titration contribute to the actual monthly cost. Smith and Sherrill calculated the mean daily cost using AWP and average daily dosage and reported that the average cost of paroxetine was 37% lower than that of fluoxetine and 65% lower than that of sertraline, because the maintenance dose of paroxetine was closest to the recommended starting dose (see Table 2, page 145).\(^{19}\)

Discussion of acquisition costs associated with SSRI therapy must acknowledge that the newest entry in this class, citalopram, is priced lower than drugs that have preceded it to market; this has been the trend in pricing the SSRI class to facilitate market penetration. Although citalopram is competitively priced, dose titration may influence treatment costs for patients receiving this product. The recommended daily starting dosage of citalopram is 20 mg, but the 40-mg tablet strength has been shown to be significantly more effective in treating depression.\(^{52, 54}\) Of the five citalopram studies included in materials submitted by the manufacturer to the FDA, four showed no difference in efficacy of 20 mg compared with placebo, and three showed no difference in the efficacy of 40 mg compared with placebo. Another report recommended 40 mg/day as the usual dosage for citalopram.\(^{55}\) Thus, comparative research with all SSRIs is recommended to determine the dose titration rate for patients on citalopram and its effect on treatment costs.

**Pill Splitting**

Some organizations have introduced tablet-splitting policies to control pharmaceutical costs within the SSRI class. Such policies are unappealing to patients and may result in improper dosing. One study investigated the accuracy of tablet splitting among 94 healthy patients who were each asked to split 10 25-mg tablets of hydrochlorothiazide.\(^{56}\) Almost all patients (97%) expressed a preference for commercially available lower dose formulations over the use of split tablets, and 77% said they would be willing to pay more for lower dose formulations. In addition, 41% of the 1,752 manually split tablet portions deviated from the ideal tablet weight by more than 10%, and more than 23% deviated by more than 15%.\(^{14}\) The acceptable level of deviation specified by the United States Pharmacopeia is ±10%. Even when a tablet splitter was used, accuracy of tablet splitting was poor (more than 37% deviated by more than 10%). Elderly patients have particular difficulty splitting tablets.\(^{57}\)

A recent study investigated tablet splitting among 12 psychotropic medications, including paroxetine and sertraline, and identified the potential for cost savings. Results indicated that if all eligible prescriptions were used in split dosages, consumers could save about $1.45 billion annually. If the pill splitting were limited to paroxetine and sertraline, the savings would equal approximately $920 million.\(^{18}\) Another study conducted by Fawell et al. investigated tablet splitting in patients prescribed fosinopril sodium, an angiotensin-converting enzyme inhibitor. Of 105 patients in the study, 47 split their tablets and 58 did not. Results for the two groups were similar in median compliance: 90.5% for tablet-splitters and 91.7% for those patients not splitting tablets. Results also indicated a 50% reduction in annual acquisition costs for those patients splitting fosinopril tablets.\(^{19}\)

It is arguable whether patient issues with tablet splitting may negatively influence compliance and dosage levels because patients may opt to take whole tablets every other day instead of half tablets daily as prescribed.\(^{16}\) These data suggest tablet-splitting policies may require further research in clinical and economic outcomes, because the degree of compliance with antidepressant therapy is directly proportional to efficacy and treatment cost.\(^{26, 30}\)

**Managed Care Issues**

Differences among the SSRIs in key cost drivers may influence...
formulary decisions and positioning. According to one audit of
formulary position for SSRIs, paroxetine was listed as a pre-
ferred SSRI on 85% of HMO and pharmacy benefit management
(PBM) formularies, fluoxetine appeared as a preferred SSRI in
23% of formularies, citalopram on 62%, and sertraline on 64%.8

Another important consideration in the managed care set-
ing is patient satisfaction, which has taken on a greater rele-
ance as patients have assumed more responsibility for their
own care. A recent survey of 1,454 managed care patients with
depression found that 61% of patients taking paroxetine were
highly satisfied with their antidepressant medication, a signifi-
cant difference compared with 48% of those taking fluoxetine
and 43% of those taking sertraline.8 The study, which found
that patients generally perceive their depression treatment to be
inadequate, also reported that a smaller percentage of patients
taking paroxetine (26%) experienced decreased school or work
productivity because of depression, compared with patients
taking sertraline (40%) or fluoxetine (49%).

Conclusion
The data are both limited and subject to publication bias.60 One
can, nonetheless, draw a few conclusions and form some impres-
sions about medications for treatment of depression in a managed
care environment.

When overall health care utilization and expenses are consid-
ered, SSRI therapy is associated with comparable or lower costs
compared with the lower-priced TCAs. The SSRIs are now used
widely as first-line therapy because they are as effective clinically
as the TCAs, have fewer side effects, are easier to administer, and
are safer in overdose situations. Data that reflect current prescrib-
ing and clinical and economic outcomes of SSRI therapy are
derived from retrospective claims analysis and demonstrate that
costs associated with SSRI therapy may be based on dose titra-
tion, the need for multiple tablets, cost of concomitant medica-
tions, drug acquisition cost, and duration of therapy. Fluoxetine
and paroxetine are associated with the lowest incidences of dose
titratin. Single-tablet maintenance regimens are most likely to be
achieved with paroxetine therapy. Conflicting results have been
published regarding the costs of concomitant medications. Of the
SSRIs, citalopram and paroxetine are associated with the lowest
acquisition costs based on AWP.

Duration of therapy for SSRIs is often shorter than the recom-
mandations for antidepressant maintenance therapy found in
national treatment guidelines. Treatment duration is an area for
continued research and physician education. Further investiga-
tion into the comparative treatment costs of SSRI therapy is
required because current evidence suggests that nonpharmaceu-
tical costs associated with available products are similar and that
variations in drug costs may influence overall economic out-
comes for the treatment of depression.

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Depression in Managed Care: Costs of Selective Serotonin Reuptake Inhibitors

An Assessment of the Effectiveness of a Nonsteroidal Anti-inflammatory Drugs Algorithm in an Integrated Health Care System

OBJECTIVE: To assess an algorithm designed to make recommendations for step-wise prescribing of nonsteroidal anti-inflammatory (NSAID) drugs.

DESIGN: Retrospective review of the pharmacy and medical records of 1,604 patients over a three-year period.

SETTING: A physician staff-model managed care system with approximately 150,000 members in the southern United States (IHSHP).

MAIN OUTCOME MEASURES: Utilization of NSAIDs over a three-year period, per member per month (PMPM) cost, NSAID acquisition cost, costs of treating NSAID-related adverse events.

RESULTS: The utilization of NSAIDs per member per month for both brand-name and generic NSAIDs decreased significantly after implementation of the algorithm. The mean PMPM cost to the plan for NSAIDs also decreased significantly. However, while the NSAID acquisition cost for the plan decreased, the charges associated with treating NSAID-related adverse events showed an upward trend over the same period.

CONCLUSIONS: The algorithm urged physicians to encourage patients to use over-the-counter NSAID medications as initial treatment. To the extent that the algorithm reduced the physicians' and pharmacists' involvement in the pharmaceutical care of the patient, the algorithm may have exposed patients to risks associated with inappropriate self-medication. In addition, the decrease in NSAID costs may have been offset by the increases in costs associated with treating NSAID-related adverse events.

KEYWORDS: NSAIDs, algorithm, guideline, pharmaceutical care, self-medication, adverse events, medical data, pharmacy data

Driven by financial considerations such as revenue shortfalls and budget deficits, health care organizations have tried many methods of limiting health care expenditures. With regard to prescription medications, a variety of cost-containment approaches, such as the use of protocols and guidelines, have been pursued. By encouraging physicians to prescribe less-expensive medications without sacrificing health outcomes, health care organizations can achieve considerable savings in drug costs. One category in which managed care organizations and other medical systems have devised increasing restrictions is nonsteroidal anti-inflammatory drugs (NSAIDs) and other analgesics. This study was conducted to evaluate the effectiveness of an NSAID algorithm (which also included an NSAID financial-disincentive program) in an integrated health care system. It should be noted that Cox-2 NSAIDs were not marketed during the period of analysis. Therefore, the term NSAIDs as used in this paper implies Cox-1 NSAIDs only.

The NSAID Algorithm

In order to provide appropriate, cost-effective therapy for musculoskeletal pain, the Drug Information Service in the Department of Pharmacy of an integrated health system health plan (IHSHP) prepared a class review of NSAIDs in March 1995. The Drug Information Service Center consulted with the divisions of rheumatology, gastroenterology, and nephrology. A literature review indicated that NSAID agents are, in large patient populations, clinically equivalent in efficacy, safety, and adverse-event profiles. Based on this review and the approval of the pharmacy and therapeutics committee of the IHSHP, a pharmacy/medical staff team took the following measures:

- Created an algorithm for the step-wise use of NSAIDs. This algorithm identified generic NSAIDs as the initial agents of choice or “preferred products” and others as “nonpreferred.” The nonpreferred NSAIDs were to be used in sequence only after failure, lack of efficacy, or intolerable adverse events with the drugs of initial choice (see Figure 1, page 150).
- Intervention X: Educated physicians about the algorithm through meetings with primary care physicians and through the distribution of newsletters. The newsletters were distributed to health care practitioners and educational meetings were scheduled from July 1, 1995, forward. Finally:

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Authors

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The NSAID Algorithm

Osteoarthritis/Rheumatoid Arthritis/Musculoskeletal Pain (otherwise healthy patients)

- Initiate ibuprofen therapy
  (adequate trial: max. dose up to 2,400 mg daily for two weeks)

  - ibuprofen failure
    (lack of efficacy or significant adverse effect)

  - naproxen failure
    (adequate trial: max. dose up to 1,500 mg daily for two weeks)

  - naproxen failure
    (lack of efficacy)

  - naproxen failure
    (GI adverse events)

  - naproxen failure
    (renal insufficiency)

- indomethacin
- piroxicam
- sulindac
- flurbiprofen
- nabumetone
- etodolac
- oxaprozin

- naprosyn EC

*Over-the-counter medication.

- the period spanning July 1, 1994, through June 30, 1995, identified as phase I (or the preintervention phase);
- the period of physician education spanning July 1, 1995, through June 30, 1996, identified as phase II (educational phase); and
- the period from July 1, 1996, through June 30, 1997, identified as phase III (the financial disincentive phase).

While X1 was the only intervention implemented during phase II, its implementation continued along with that of X through phase III. The specific objectives of this study were to determine:

- the costs associated with NSAID use through the use of both pharmacy and medical claims data;
- the effectiveness of the algorithm based on the calculated savings or loss to the IHSHP associated with the implementation of the NSAID algorithm; and
- the costs of possible adverse events, including gastrointestinal (GI), renal, and hepatic/pulmonary/cardiac complications as evidenced by hospitalizations or emergency room visits that might be attributed to NSAID utilization.

No control group was included in the design because the NSAID algorithm was implemented throughout the health plan for all members with a prescription drug benefit rider. This quasi-experimental retrospective study is a modified pre-post design with two interventions, X1 and X2. Retrospective review of the pharmacy and medical records occurred after the implementation of both interventions.

Computerized pharmacy claims data (prescription fill/refill data) were used to evaluate utilization and exposure to treatment. Considerable literature supports the use of computerized pharmacy claims data as a reliable source of true drug exposure. Also, Steiner and Prochazka have concluded that prescription refill data may be used in population-based studies to evaluate utilization. In this study, prescription drug pharmacy records were obtained from the IHSHP.

Inclusion and Exclusion Criteria

Inclusion criteria for the chart review were age (older than 12), enrollment in the IHSHP drug benefit program, and NSAID therapy, evidenced by the IHSHP pharmacy claims data. Health plan employees and their immediate family members were excluded because the copayment structure for those individuals was significantly different.

NSAID-related adverse events, particularly those involving the liver, kidneys, and the GI tract, were included in the analyses. Adverse GI events caused by a therapeutic agent are identified in the International Classification of Diseases, 9th Revision (ICD-9) code system by “e-codes” which accompany the ICD-9 code for the particular adverse event. In an effort to identify patients with renal events, a wide range of diagnostic codes related to renal failure was used, similar to the strategy used by Guthmann et al. The same strategy was used to identify patients with hepatic disorders.

Objectives and Research Design

The primary objective of this study was to evaluate the effectiveness of the NSAID algorithm from the perspective of the health plan by evaluating both medical and pharmacy claims data. The analysis took into consideration the total NSAID-related health care costs (both the pharmacy and the medical components) for NSAID users in the IHSHP over a three-year period. This three-year period was divided into three study phases:

- Intervention X1: Implemented a financial disincentive one year after the physician-education programs went into effect. This disincentive increased out-of-pocket cost-sharing for patients requesting nonpreferred NSAIDs. Specifically, patients who elected to fill or refill prescriptions of nonpreferred NSAIDs were required to pay a standard copayment and any excess amount if the product cost exceeded $40.00.

  The algorithm and the two interventions (X1 and X2) are hereafter referred to as the NSAID algorithm. A variety of mechanisms, such as written communication (in the form of quarterly newsletters), personal visits to satellite clinics, and group educational programs were used to continue and reinforce the use of NSAIDs preferred by the plan.
Data Analysis
The dependent variables in this study were the frequency of health care services used by patients and the charges incurred for those services. Drug costs used in the analyses were acquisition costs to the IHSHP pharmacy. Medical charges were indicated by the financial charges incurred by the patients. Comparisons were made on the frequency and costs of NSAID products and medical services, both in the aggregate as well as on a per-patient basis for the three observational periods. All costs incurred during the years 1994 through 1996 were adjusted using a rate of 5% to reflect 1997 dollar values.

The pharmacy claims and medical claims data from the IHSHP were merged. SPSS for Windows 8.0 software was used for data analysis on a Microsoft Windows 98 platform. An alpha level of 0.05 was used for inferential statistical tests.

Results
A total of 1,604 patients met the inclusion criteria. Of these, 1,055 (65.8%) were female and 549 (34.2%) were male. The mean age of the population was 50.41 years (s.d.=15.27). The median age was 50.36 years. The youngest patient was a 13-year-old female and the oldest was an 89-year-old male.

Of the 32,820 prescriptions dispensed during the three-year period, 13,517 (41.2%) were for NSAID products. Table 1, page 152, illustrates the number of NSAID prescriptions dispensed by study phase as well as the mean number of prescriptions per member and costs per member.

The results show that the algorithm was effective in reducing the number of NSAID prescriptions PMPM. The results also demonstrate that the cost to the plan decreased by almost 67% from the preintervention phase compared to the year after the financial disincentive was implemented.

The results in phases II and III were significantly different. The implementation of intervention X continued through phase III along with that of educational component X. Because the study design does not permit the effect of the financial-disincentive strategy to be dissociated from the educational intervention, it is difficult to attribute this effect to any one strategy. However, it seems that the financial-disincentive portion of the algorithm provided a greater impetus to reduce NSAID acquisition costs for the plan. The continued role of physician education is certainly a contributing factor.

In addressing the total NSAID-related health care costs, adverse events were determined by examining the ICD-9 codes of the patients. The ICD-9 manual, which was used to identify medical conditions, lists diagnosis codes for the GI tract, in addition to other conditions. Codes ranging from 530 (diseases of the esophagus) through 537.9 (diseases of the gastroduodenum) were used to identify GI events. No evidence of NSAID-induced renal or hepatic adverse events was found in the IHSHP population in the three years under review.

In the IHSHP medical claims database, 229 patient records (14.27%) indicated that the patients had experienced a GI adverse effect after receiving an NSAID prescription. The literature discussing adverse events attributable to NSAIDs indicates that 15%–25% of NSAID users develop GI-related adverse effects. Thus the study result (14.27%) falls within the range of past studies. Further analysis showed that 36 patients—11 in phase I (0.68% of the total), 14 in phase II (0.87%), and 11 in phase III (0.68%)—had a serious GI event, defined as either hemorrhage or perforation of the GI tract. While the configuration of the study design makes it difficult to attribute a cause-and-effect relationship between NSAIDs and the GI adverse events, it is reasonable to assume that at least some of the adverse events were attributable to NSAIDs. The incidence of serious GI events in these data (from 0.68% in phases I and III to 0.87% in phase II) falls well within the published literature values ranging from 0.02%–1.4%.

Of the 36 patients who experienced serious GI adverse events, 15 patients were hospitalized. The average charge per patient per hospitalization was $4,038.17 and the average length-of-stay was 3.53 days per patient.

Post-hoc Medical Chart Review
Medical charts of patients suffering from serious and nonseri-
ous GI adverse events were reviewed on a post-hoc basis. The charts were reviewed to see whether the attending physician had made a remark in the medical record indicating that the adverse event was NSAID-related. A sample of 33 charts from the 36 patients with serious GI adverse events, and 54 charts from a total of 217 with less-serious GI adverse events were evaluated. Only those charts available at the main clinic and hospital were obtained; charts from satellite or regional clinics were not part of the post-hoc analysis. The charts were not randomly selected; thus the process could potentially produce bias. Table 2, above, illustrates the results of this chart review.

Of the 36 patients who suffered serious GI adverse events, charts for 3 were not available. Charts from 9 of the 21 patients (42.86%) indicated that NSAID use was the cause of the serious GI complication. Sheets of medical records for specific dates were missing for 12 of the 33 patient records reviewed. Only one chart indicated that H. pylori was the cause of GI distress.

From a total of 217 patients who suffered less-severe GI adverse events, 54 charts (25%) were reviewed for the post-hoc research. Table 2 indicates that in the opinion of the attending physicians, four patients suffered from NSAID-related GI adverse events. No mention was made as to the cause of the GI distress in 23 charts. Data used for the retrospective study indicate GI-related ICD-9 codes in the medical records on specific dates. However, corresponding records were found to be missing from 27 of the 54 charts reviewed.

In addressing the issue of NSAID-related health care costs, the study used subset analyses for the utilization of antiulcer medications, H-2 receptor antagonist prescriptions (often prescribed for patients receiving NSAIDs), use of medical services, and the costs associated with GI adverse events after the first NSAID prescription. The prescription cost data for NSAIDs, H-2 receptor antagonists, and antiulcer drugs such as Prevacid, Prilosec, omeprazole, Carafate, sucralfate, and Cytotec obtained from these subset analyses, and the charge data for medical services, were aggregated to generate NSAID-related health care costs per phase (see Table 3, page 153). Medical events preceding the date of dispensing the first NSAID prescription (in this database) were disregarded. NSAID-related health care costs per phase were the sum of the cost of NSAID prescriptions, the cost
An Assessment of the Effectiveness of a Nonsteroidal Anti-inflammatory Drugs Algorithm in an Integrated Health Care System

Cost Analysis of the NSAID Algorithm at IHSHP

<table>
<thead>
<tr>
<th>Phase</th>
<th>Category</th>
<th>N</th>
<th>Mean $\text{c}$</th>
<th>Unit of Time</th>
<th>Annual Total ($)</th>
<th>Annual Total</th>
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<tr>
<td>I</td>
<td>NSAIDs</td>
<td>1,604</td>
<td>$6.72</td>
<td>PMPM</td>
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<td>PMPM</td>
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</tr>
<tr>
<td></td>
<td>Services$^a$</td>
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<td>Services$^a$</td>
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<td>Services$^b$</td>
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<td>$1,607.88</td>
<td>Annual</td>
<td>$17,686.67</td>
<td></td>
</tr>
</tbody>
</table>

$^a$Annual charges for services utilized by patients with nonserious GI adverse events.
$^b$Annual charges for services utilized by patients with serious GI adverse events.
$^c$Mean dollar amount per patient per unit of time.

Epidemiology of NSAID-Related Adverse Events

The adverse events commonly reported in the literature that are attributed to NSAIDs are those of the GI tract, kidney, cardiovascular system (elevation in blood pressure), and liver. The epidemiological values mentioned for renal as well as hepatic adverse events are based on a longer cumulative exposure to NSAIDs than the exposure duration for the IHSHP population in this study. For renal adverse events, the exposure is in the range of one event for every 100,000 patient-years. Also, for hepatic complications, the epidemiologic data suggest that 3.7 NSAID-related hepatic events occur for every 100,000 NSAID users. The analyzed data fall short of achieving these population-exposure numbers, because studying 1,604 patients over three years provides a sum of only 4,812 patient-years. In light of these epidemiological incidence rates, episodes of renal or hepatic adverse events were unlikely to be observed in the database. Hence, these events were not seen in the total NSAID-related health care costs. Table 3 shows the NSAID-related health care costs by phase.

Results from Table 3 show that a difference exists in NSAID-related health care costs when comparing the three phases. The major cost savings are attributable to the reduction in NSAID costs for the plan. However, an increase in charges associated with the adverse events-related utilization of medical services from phases I and II to phase III is evident: Charges for services utilized by those with nonserious GI adverse events increased by 58.69% when phase I ($25,820.42) and phase II ($40,975.29) were compared, and by 135% when phase I ($25,820.42) and phase III ($60,676.74) were compared. However, the charges for services used by the 36 patients with serious GI adverse events decreased by 7.97% when phase I ($28,283.15) and phase II ($26,028.86) were compared and by 37.47% when phase I ($28,283.15) and phase III ($17,686.67) were compared. Figure 2, page 151, provides a graphic illustration of savings accrued through reduced NSAID use and charges associated with serious and nonserious adverse events.

The final cost analysis of the NSAID algorithm as seen in Table 3 indicates that under the NSAID algorithm, total costs for phase III were $88,064.24 lower than total costs for phase I (the preintervention phase). It is noteworthy that NSAID-related health care costs decreased consistently from phase I through phase III.

To better understand the decrease in NSAID utilization and costs, the use of generic drugs was evaluated. For phase I, generic NSAID prescriptions were dispensed to 79.48% of the
patients (n=1,275 of 1,604), compared to 83.23% of the patients in phase II (n=983 of 1,181), and 90.50% of the patients in phase III (n=886 of 979). The mean number of generic prescriptions dispensed PMPM was 0.26 (s.d.=0.27) during phase I, 0.32 PMPM (s.d.=0.29) in phase II, and 0.21 PMPM (s.d.=0.16) in phase III. These differences were statistically significant when any two phases were compared.

In evaluating the use of generic NSAIDs by phase, a mean ratio of generic prescriptions to total NSAID prescriptions dispensed was calculated. The results showed that during phases I, II, and III, the utilization of generic NSAID prescriptions (as a proportion of total NSAID prescriptions) increased from 72% to 76% to 88%.

The cost of a supply of some over-the-counter (OTC) NSAIDs was lower than the copayment required for prescription NSAIDs. This could have driven some patients to use OTC NSAIDs. More important, the algorithm required that physicians recommend the use of OTC NSAIDs to their patients before providing prescription agents. Therefore, physician recommendations have potentially resulted in the use of OTC NSAIDs and hence reduced use of prescription agents, either generic or brand-name. Thus, reduced use of prescription NSAIDs may have potentially reduced the patient population identified through the prescription claims data.

# Discussion

As intended, the NSAID algorithm was associated with a major decline in NSAID expenditures for the health care plan. This decline resulted from a reduction in the prescribing of NSAID drugs, and an increase in the proportion of generic NSAIDs as opposed to brand-name NSAIDs. Additionally, part of the decline in NSAID expenditures was attributable to a shift in cost from the health care plan to the patient.

The differential copayments caused some of this shifting of costs. A higher copayment was used for brand-name products than for generic products. This approach not only shifted the cost but also stimulated the use of generic products. The first step in the algorithm called for using OTC NSAID products because there is no documentation of OTC NSAID products, the proportion of serious adverse events did increase slightly, from 0.7% to 1.1%.

An exploratory analysis of the data was conducted to see whether those patients who were recorded as having had a serious or nonserious adverse event received an NSAID prescription drug. During phase III, there were 11 serious adverse events; of the patients involved, only 3 received an NSAID prescription during phase III. During phase III there were 113 nonserious adverse events; 104 patients did not obtain a NSAID prescription drug based on the plan’s prescription drug record. It is not known how many of these patients shifted to OTC NSAID products because there is no documentation of OTC purchases. However, many may have used OTC NSAID products, given that that switch was the first step in the algorithm.

These exploratory results also showed a reduction in the number of adverse reactions (both serious and nonserious) experienced by patients who received a prescription NSAID product. Only 3 patients had a serious adverse event and 9 had a nonserious event when taking a prescription NSAID product during phase III, down from 14 serious adverse events and 105 nonserious adverse events during phase II. Most likely, many patients who experienced a nonserious adverse event were taking an OTC NSAID product.

The graphical presentation of the costs shows a linear increase in adverse-event charges from phase I to phase III. This trend leads to the question of whether adverse-event charges will continue to grow with the use of the algorithm. Obviously, the plan needs to monitor this cost shift very closely. If the algorithm is to be successful, adverse event costs must soon level off or decline. It is important to bear in mind that adverse event costs may have been increasing independently of the algorithm; there is only one predata point (phase I) before implementation of the algorithm.

The literature on algorithms and practice guidelines indicates that health care institutions and organizations use these tools to achieve uniformity in the delivery of health care services. Obviously, one goal is to implement an algorithm that is cost effective and enhances or at least maintains the health of patients. The goal of uniformity is to remove variance in the delivery of services with the hope that the variance in health

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**An Assessment of the Effectiveness of a Nonsteroidal Anti-inflammatory Drugs Algorithm in an Integrated Health Care System**
care outcomes will also be reduced. If this is accomplished, an accompanying reduction in costs usually occurs.

With the rising trend in adverse event costs, it is questionable whether the variance in the delivery of health care services has been reduced. Examination of the algorithm provides some probable reasons for the possible increase in variance. First, because OTC NSAID products can be purchased from a variety of retail outlets, not only pharmacies, the involvement of a pharmacist may be limited, and in some instances even eliminated, in the health care delivery process. Even if patients did purchase their OTC NSAID products from a pharmacy, pharmacist monitoring and counseling may not have taken place. The probability of having the OTC NSAID recorded on the pharmacy’s patient drug profile is also low. For practical purposes, the algorithm probably reduced the community pharmacist’s role in monitoring for adverse events and counseling patients on proper use of the product. This may increase the variance in patient health care outcomes.

Second, the health care plan cannot document what the patient has purchased and used when patients take OTC NSAIDs. In essence, drug-utilization review at the plan level is more difficult because the database is missing the OTC NSAID information. The health care plan has lost some control, which may increase the variance in health outcomes for patients. Lack of this documentation and information has effectively reduced the physician’s ability to monitor patient care. This loss of control applies not only to monitoring for adverse effects of NSAIDs, but also to monitoring for drug-drug interactions.

Obviously, confounding factors in this process are the lower dosage strengths of OTC NSAID products compared to prescription NSAID products, the extent to which physicians give OTC NSAID drug information to patients, and how patients accept and use the products. If patients are using lower doses because of the lower strength of the OTC product, the safety factor may be increased. However, if patients perceive that OTC products are safer than prescription products, they may use more of the OTC product than they would of a prescription NSAID. This scenario is more likely if the OTC product does not provide sufficient relief at lower doses.

Still another uncertainty exists concerning whether physicians recommend the same dosage for the OTC products as they do for prescription products. This raises questions about compliance, because lower strength dosage units will require patients to take multiple tablets and capsules of the OTC products to get the same effect as that of the prescription drug. Finally, patients may select different OTC products than those suggested by the physician because of personal preference, lower costs, availability from a retail outlet, or other reasons. The overall effect of all these possibilities has the potential for adding variance to the use of NSAID products.

The study did show that education alone (phase II) had minimal impact on physician prescribing of NSAID products. When financial incentives for patients (phase III) were required, the change in prescribing behavior regarding brand-name NSAID use was more noticeable. However, for phase III, it was impossible to separate the effects of the education intervention from those of the financial incentives; thus, education and the financial disincentive probably complemented each other.

The study could not determine if OTC NSAID use was the cause of the increasing trend in adverse event costs, primarily because there is no record of OTC NSAID use. Pharmacy claims data do not contain this information; consequently, this is one shortcoming of the study. Studies that evaluate algorithms that encourage the use of OTC products should employ a methodology that quantitatively measures OTC use.

References

Quality Improvement, Risk Management, and Patient Education: Tools to Reduce Medication Error

by Linda L. Norton

Medical and medication errors are serious problems in the United States and throughout the world. These errors have a huge economic impact on health care patients and payors alike: the cost of medical and medication errors in the United States has been estimated to be nearly $30 billion per year and may be nearing $40 billion per year. The costs of these errors are counted in more than just dollars: There are estimates that between 44,000 and 98,000 Americans die each year as a result of medical errors. The exact number of deaths attributable to medication and prescription errors, such as prescriptions used incorrectly and problems with over-the-counter medications, is not known. But we have enough evidence to know that the problem is large and warrants attention not just from the federal government but also from patients, health care providers, and the organizations that manage care. For example, estimates from the federal government place the number of deaths attributable to preventable medication errors at 7,000 per year. A 1977 article reported that 50% of all prescriptions are used incorrectly. And one 1995 article reported that about 10% of hospital admissions were related to problems from medication use.

Medical errors are health system issues, and solutions to the problems must also be system-based. One of the factors that makes the issue of medication errors so problematic is that they too are system errors, but the system is extremely diverse. These errors and adverse events occur in all types of patients, in all types of settings; their proximal causes can be associated with physicians, pharmacists, nurses, caregivers, or patients. In fact, a study of 1,000 nonhospitalized patients showed that 42 patients experienced side effects of medication use, with 23 of the 42 patients (54%) experiencing a preventable adverse event. Hearing these statistics on the news and reading them in articles and continuing education programs can help health care providers define the significance and magnitude of the problem, but the statistics alone do not point to specific solutions or provide tools for change.

Terms such as quality, safety, consistency, and others have precise definitions. These are shown in Table 1, page 157.

**Accreditation**

Accreditation cannot guarantee patient safety. Accreditation is, in most cases, a statement from an accrediting body such as the National Committee for Quality Assurance (NCQA) or the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) that the product, service, or organization meets or
Quality Improvement, Risk Management, and Patient Education: Tools to Reduce Medication Error

Definitions

• Quality: “superiority in kind.”
• Consistency: the “harmony of conduct or profession.”
• Safety: “to protect against failure, breakage, or accident” (requires doing it right and doing it every time)
• Error-free: avoidance of an act or accident that “fails to achieve what should be done.”
• Accreditation: “conferring approval or recognition for conforming to, or meeting standards.”


exceeds selected requirements. For example, NCQA accreditation can provide a strong statement on the quality of an organization, at least when quality is judged on standards such as access to care and service, qualifications of providers, maintenance of health, early detection of illnesses, and care during both acute and chronic illnesses. While these requirements are quite rigorous, and may be indications of quality, they are not guarantees of safety from medical error. Error-free care is safe, consistent, quality care that is comprehensive; it is care that is done right, and it is a system characteristic.

What Managed Care Organizations Should Expect from Providers

When a managed care organization (MCO) submits a request for proposal (RFP) to providers of health care, what are its expectations? If an MCO is accredited by NCQA, its members are assured that the organization has met certain standards. If the MCO contracts with a medical facility that has been accredited by JCAHO, it can be assured of compliance with preset standards. But what assurances are there when an MCO contracts with a chain of pharmacies, or laboratories, or a physicians' group? Are there hallmarks for quality, consistency, safety, and error-free care for these groups? Each of these groups meets specific requirements for licensure, but licensure is usually only a statement that the licensee has the minimum qualifications required to practice—that is, the provider or facility has passed an examination or inspections and continues to maintain the license. A universal statement of excellence in care for all of these groups does not exist. However, there are indicators of a company's commitment to improving care by decreasing the risk of failure or error and improving the quality of care through the provision of consistently error-free care.

In the absence of a universal statement of excellence in care, an RFP that asks for evidence to support positive answers to the following questions will help MCO's ensure that high standards are maintained. These standards for improving the quality of care and patient safety and decreasing risk from system failure and error should be priorities of the responding organization:

• Can the organization and its contract companies predict and prevent most failures within the medication-use system and the larger health care system?
• Can the organization and its contract companies identify the root cause(s) of failures in the medication-use system and the larger health care system?
• Does the organization offer training on continuous risk management to health-service providers with whom it contracts?
• Do the companies that contract with the organization work with the MCO and others to provide continuous risk management?

In aerospace, aviation, and other industries with very low tolerances for errors or systems failures, the answer to these questions is yes. For many of the organizations that provide health care coverage in the United States the answer to these questions is no. This is a profound statement on the condition of risk management, quality improvement, and medication error-reduction in the United States.

Error-Prevention Programs

Error-prevention programs in industry have been successfully operating for decades, identifying areas where potential problems or system failures may occur and developing alternatives with lower error or failure potential. In some cases, error or failure prevention cannot be guaranteed and back-up systems have been developed. In health care, error prevention is still in its infancy, but often tools and techniques that have been effective in one environment can be successfully transferred to another.

Risk-management, quality-improvement, and error-reduction tools and processes that were developed for use in the military have been quite helpful in different areas that have similar needs. Techniques that have been used by commercial airlines and the aerospace industry and at the National Aeronautics and Space Administration (NASA) have been suggested as reasonable options for error reduction in health care. In both the space program and health care, risk is managed so that potential problems can be identified, the chances for successful projects or procedures can be increased, project failures or errors can be averted, and resources can be used efficiently. The transfer of processes and techniques seems particularly promising when the environments are compared and the criteria for a successful risk-management plan are reviewed. Risk can be managed in a disciplined environment that facilitates continual assessment of risk including potential problems, failures, or errors; prioritization of risk; implementation of strategies for mitigating risk; and research to increase the understanding of risk.

Fortunately, most health care settings currently meet, or can meet, these requirements. Reducing risk and medication errors requires resources and continuous commitment to the effort. It also requires system-based quality-improvement and risk-management tools. Many of these tools are available, making the process of selecting the appropriate
Quality Improvement, Risk Management, and Patient Education: Tools to Reduce Medication Error

<table>
<thead>
<tr>
<th>Event Severity</th>
<th>Likelihood of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible</td>
<td>Moderate</td>
</tr>
<tr>
<td>Devastating</td>
<td>Remote</td>
</tr>
<tr>
<td>Probable</td>
<td>Moderate</td>
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</tbody>
</table>

Abbreviated Risk Matrix

- Identify a risk and name it.
- Analyze the risk severity using a risk matrix. If the risk is low, stop the risk-analysis process. If the risk is high, continue.
- Plan a process for reducing or eliminating the risk.
- Mitigate the risk by following the risk-reduction process. If necessary, go back to the plan step to develop a new process. If the process works, analyze the level of risk reduction. Develop a new process if a greater reduction is needed.
- Track the risk to ensure that it remains at acceptable levels. If the risk increases, begin the cycle again.

Another risk-management tool that has promise in health care is a quality tool called Failure Mode and Effect Analysis (FMEA). It is a technique used to ensure that all reasonably conceivable failures will be uneventful. The FMEA analysis was developed to investigate problems or "negative quality" and is usually used in the planning or early design phases of new products or systems. However, at times, FMEA and a related technique, Failure Mode and Effects Criticality Analysis (FMECA) are used to decrease the impact of systems maintenance.

When FMEA is applied to a new design or process, critical thinking is encouraged. Early in the development and planning stages of a product or process, participants in the analysis are encouraged to predict what parts of the product or process might go wrong or fail. They are also asked to consider how badly the product or process might go wrong, and what should be done to prevent the failure. In industry, cross-functional teams of engineers might work together on these analyses. Failure Modes Effect Analysis teams:

- Analyze the function and scope of the product or process.
- Identify areas for potential failure, defining the effects of the potential failure (when applicable), including frequency and severity, and determining the cause of the potential failure (when applicable).
- Prioritize the potential failures based on cost, safety, quality, and other attributes.
- Determine detection methods and corrective actions, and when risks are high, develop a control or back-up system or plan.
- Observe while maintaining and updating the analysis and control plan.
- Document the process for wide distribution and use.

Once again, this analysis is designed to answer the questions, "What can go wrong?" and "How bad can it be?" The similarity between FMEA and the "Identify, Analyze, Plan, Track, Control" system circle from NASA is striking. This is not surprising since FMEA has its roots in an early military quality-control process, and quality programs, by design, are intended to identify, analyze, plan, and implement improvement actions through a continuously cycling process. Under the right conditions, with management and employee support, either of these programs has the potential to be an effective error-reduction tool in health care. However, in non-health care settings, several lessons on quality programs have already been learned. These lessons may also be helpful in health care settings, several lessons on quality programs have already been learned. These lessons may also be helpful in health care settings.
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Care settings. They are:
1. Quality must be defined by the consumer.
2. Systems are responsible for errors.
3. Long-lasting internal and external partnerships are essential.
4. Appropriate and accurate data for analyses is vital.
5. Improvement does not occur in a vacuum.
6. Collaboration is the basis of teamwork.
7. Leadership for the improvement process must be developed.
8. Employees and management must be involved from beginning to end.
9. Strategic planning is imperative.
10. Long-lasting improvement occurs incrementally.

Error-Analysis Programs

Sometimes, even in the presence of excellent risk-management and quality-improvement programs, something still goes wrong. And, if that something is large enough and a serious error occurs, it is important to find out why the error occurred and what can be done to prevent another similar error. But looking behind the scenes to identify the source of a problem can be an expensive, time-consuming, frustrating ordeal. The ordeal can be doubly difficult if the process or people involved are not familiar to the investigator. To help visualize a few of the difficulties in determining the underlying causes of errors in health care, try remembering back to when you were young. Did you ever walk into a dark room, flip the switch, and find that nothing happened? It was probably startling. Since your knowledge of electrical circuitry was limited, you probably immediately blamed the lamp or the switch; you were focused on the proximal cause of the problem. As you got older, you might have learned a little more about electricity and electrical circuits. If a light would not come on, even after you replaced the bulb, you probably went looking for the fuse or circuit box. You were considering a larger problem—a system problem. If replacing the fuse or flipping the breaker did not fix it, it was time to think globally. Maybe the lack of light was related to a bigger issue; maybe the power company was having trouble at the plant. If so, this was the source of the problem or the root cause. Locating the source of the problem—the root cause—is the intent of root-cause analysis.

Applying root-cause analysis requires a broad knowledge of the system and the events leading up to a problem or error. In the absence of a thorough understanding of the cause-and-effect relationship between the problems and symptoms, determining the root causes of the problems will be almost impossible. In health care, when considering inpatient care or outpatient treatments such as dialysis, hundreds or even thousands of events occur in the course of a single day of patient care. Each event can result in an error; each event can “fail to achieve what should be done.” Many of these errors or failures, much like the failure of the lamp to produce light, can be the result of any one of a number of problems. Root-cause analysis can help to uncover the underlying problems, rather than simply lay blame on the most convenient cause.

Analyzing systems-based cause-and-effect relationships is the heart of root-cause analysis. The basic premise is that altering a proximal cause such as changing a light bulb may not solve the problem, and if the reason the light bulb burned out was a short in a circuit (i.e., a system problem), changing the bulb would not result in a long-term solution. To get an effective long-term solution, the circuit/root cause must be identified and addressed. But in health care, before a root cause can be identified, the organization must know that the intent is to locate the true cause(s) rather than a contributing cause. And members or employees of the organization must know which errors to report and when, how, and to whom to report the errors.

Root-cause analyses are usually conducted on sentinel events. However, depending on the organization’s needs, they may also be conducted on nonsentinel events. When an event is reported and the decision is made to perform a root-cause analysis, one process that can be followed is to assemble an analysis team, gather relevant equipment and data, and analyze...
the relevant material to determine contributing factors and finally the root cause(s). The team usually consists of a facilitator who is in charge of the analysis and is experienced in root-cause analysis, a team leader who is an expert in the topics surrounding the event, an inclusive and multidisciplinary group of people involved with the event, and others from the department.

Root-Cause Analysis
1. As the analysis begins, the facilitator and team leader determine what equipment and information is available and what needs to be gathered and protected.  
2. Each member of the team independently records events leading to the error, including the circumstances of the error and events that followed the error or actions that were taken because of the error.  
3. In a series of meetings, the team develops a complete sequence of events and identifies all corrective actions taken. The team should consider the activity in which the event occurred and human, equipment, environmental, and external factors. They should also consider checks and balances or barriers that should or could have prevented the error. After reviewing each factor and condition, they should identify the ones that may have contributed to the error.  
4. The list of contributing events, conditions, or barriers is organized into logical sequences or groupings for further analysis. The sequences or groupings can be used to develop a flowchart of the events and conditions that might have contributed to the error.  
5. The team reviews, rearranges, and, if necessary, alters the chart to determine how or why a sequence of events or grouping might have contributed to the error. Additional data should be gathered and reference texts and articles should be consulted as needed. By consensus, the team should designate each sequence or grouping as contributory or noncontributory. Contributing factor(s) that do not have future contributing factors are identified as root cause(s) of the event. Ideally, the team should have time to ponder the flowchart and revise it if needed.  
6. If the team has reached consensus, corrective actions are identified, and a report is generated. The report will usually contain a table that details the team’s findings and suggestions. This table is sometimes called an action plan (see Figure 2, page 159).  
7. If the team is still in consensus after reviewing the action plan, the report is distributed as appropriate and the corrective process begins.

Actions for Pharmacy
All sections of the health care system should be cultivating systems-based actions to improve quality, reduce risk, and predict and prevent errors. But in addition to these programs the Institute of Medicine and a host of state, federal, and independent organizations and individuals have made specific suggestions for reducing medical and medication errors. From this growing body of literature, there appears to be a consensus. Pharmacy needs to make some internal changes to improve quality, consistency, safety, and the error-free rate; but pharmacy also must work with payors, administrators, providers, support staff, and others using quality-improvement and error-reduction tools to develop processes that will identify and predict system errors and root causes of actual and potential events. Organizations such as the National Coordinating Council for Medication Error Reporting and Prevention have also made recommendations that can help move these processes along, but each facility will need to develop processes that will work in its own environment at costs that will allow the facility to continue to operate.

The report of a recent interdisciplinary conference on medication error presented the results of a workshop during which participants were asked to identify medication-use system (MUS) problems, identify characteristics of an ideal MUS, and provide a list of conditions required for the success of the ideal MUS. The problems list included issues related to organizational, social, professional, environmental, technological, economic, and patient-specific problems. Features of the participants’ ideal system included:
- a system designed by patients to meet the needs of patients;
- adequate, integrated, useful technology;
- adequate preparation, tracking, and storage facilities for medications;
- appropriate patient management with built-in performance measures; and
- balance between quality, access, and cost of care supported by research and evaluation using continuous quality improvement (CQI).

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Necessary Conditions for Success of the Ideal Medication-Use System

<table>
<thead>
<tr>
<th>Members of the Health Care Community</th>
<th>Actions Required</th>
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<tbody>
<tr>
<td>Patients</td>
<td>Assume some responsibility for health and medication goals</td>
</tr>
<tr>
<td>Providers, payors, patients, and the pharmaceutical industry</td>
<td>Must be involved, understand, and support the system</td>
</tr>
<tr>
<td>Health care providers</td>
<td>Cooperative collaboration</td>
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</tbody>
</table>

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Proposals for Improving Safety in the Medication-Use System

<table>
<thead>
<tr>
<th>Proposed Systems Changes</th>
<th>Proposed Actions for Pharmacists</th>
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<tbody>
<tr>
<td>Computerized prescriber order entry</td>
<td>Be a safety advocate.</td>
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<tr>
<td>Bar coding to identify medications</td>
<td>If it “feels” wrong, it may be wrong—ask for clarification.</td>
</tr>
<tr>
<td>Unit-of-use packaging</td>
<td>Double-check doses, entered orders, and calculations against originals.</td>
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<tr>
<td>Performance benchmarks and standardization of processes</td>
<td>Check sound-alikes, look-alikes, decimal points, abbreviations, and</td>
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<td></td>
<td>unique or special protocols.</td>
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<tr>
<td>Match jobs with strengths (jobs matching psychological profile)</td>
<td>Do not ignore warnings, alerts, or stop orders.</td>
</tr>
<tr>
<td>Simplify tasks to reduce dependence on individual skills</td>
<td>Know about patient allergies and previous adverse reactions.</td>
</tr>
<tr>
<td>Electronic dispensing linked to drug-use review and</td>
<td>Develop a systematic process for taking verbal prescriptions and</td>
</tr>
<tr>
<td>pharmacist interventions</td>
<td>reviewing prescriptions/orders.</td>
</tr>
<tr>
<td>Establish processes for error recovery</td>
<td>Develop error-reducing work patterns and know your limits and the</td>
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<td>limits of the system.</td>
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<tr>
<td>Educate patients</td>
<td>Keep up with professional and clinical knowledge and learn how to</td>
</tr>
<tr>
<td></td>
<td>use appropriate references.</td>
</tr>
<tr>
<td>Use of technology to improve information at point-of-care and</td>
<td>Counsel patients and provide drug information specifically for</td>
</tr>
<tr>
<td>services to remote locations</td>
<td>patients.</td>
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The report specified three necessary conditions for the success of the ideal system (see Table 2, above). Interestingly, the list of conditions included almost all sectors of the health care community and used verbs such as understand and support. Although conditions in today’s health care system may not accommodate an entirely new MUS, a number of recommendations have been made that contract pharmacies and pharmacists can implement in the short term (see Table 3, above).

Member-Education Programs

The last time you bought a new car, did you take it back to have a few little things fixed? The last time you traveled on a major airline, was the trip flawless? The opportunities for error are so plentiful that even when appropriate quality tools are used, errors slip through the system. In fact, in some industries economic constraints require that some errors—usually ones that are difficult to predict, do not occur with great frequency, and are not mission-critical—are acceptable. In the direct-patient-care component of health care, it is difficult to describe an error that is not mission-critical. Avoiding medication errors is part of maintaining good health. However, even when the health care system uses the right quality tools and has appropriate follow-up to previous errors, protecting a single patient from medication errors can be difficult. Protecting two million patients enrolled in a managed care plan from medication errors can seem impossible. There are too many opportunities for error and too few health professionals.

There is, however, another option. Patients can be empowered to become active participants in their own health care, to be responsible for asking questions, and, to some degree, to be accountable for doing what is needed to maintain good health and prevent medication errors. That is part of the idea behind the SMART (Senior Medication Awareness Training) Coalition of California, a grass-roots organization founded four years ago by two senior citizens after hearing of the potential problems within our medical system, the impact of the problems on patients, and the $76 billion price tag.\textsuperscript{27, 28}

Coalition members recruit senior citizens and senior organizations and train them or their members to present information on medication errors and error prevention. Trained volunteers, mostly senior citizens, present the coalition’s program at senior centers, churches, and almost anywhere they are invited, as long as senior citizens are there. The program has been adopted by a retired
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teachers' organization, several state agencies, a nationwide health care organization, and, most recently, a nationwide association for retired persons.

The program presentation is designed to take about one hour to complete. After a brief introduction and explanation of the program, participants learn about the significance of medication-related problems, watch a short videotape entitled "To Lead a Better Life," and learn helpful medication tips and five key questions or actions that can help protect them from medication errors. There are also medication tips that instruct seniors to make sure that they understand the directions for taking their medications, to take their medication exactly as directed, to ask what to do if they forget to take a dose and not to share medications, and give a variety of other helpful medication tips.

Seniors are also instructed to tell all of their health care providers what medications they are taking and what health problems they have. To aid seniors in this effort, program participants receive a SMART card. The card folds into a credit-card-size case and has areas for basic information such as name, address, physicians' names, vaccination information, emergency contact information, and medical problems. The heart of the card is a section in which to record medication names, doses, directions, comments, and a listing of the five key questions or actions:

• What is the name of this medication, and what is it supposed to do?
• How and when do I take it, and for how long?
• What food, drink, and other medications and activities should I avoid while taking this medication?
• Are there any side effects, and what do I do if one occurs?
• Be sure to inform your pharmacist and physician of any other medications, including over-the-counter products and herbas you are currently taking and any allergies you may have to particular medications.

The coalition's program has been presented to more than 8,000 seniors. The program has some evidence of success: 82% of participants in a pilot study stated that after completing the one-hour training program, they would be more likely to ask questions of health care providers. The coalition is planning a study to determine whether the program is effective in reducing medication-related problems and the cost of care.

The Agency for Healthcare Research and Quality (AHRQ) also provides information for patients on medical and medication errors. Their publication, "A Patient Fact Sheet: 20 Tips to Help Prevent Medical Errors," explains the significance of medical errors and where they can occur. It emphasizes that errors can happen when doctors and patients have trouble communicating. The first helpful tip is "The single most important way you can help to prevent error is to be an active member of your health care team." A few of the other hints listed under the heading "Medicines" include:

• Ask for information about your medications in terms you can understand—both when your medicines are prescribed and when you receive them.
• When you pick up your medicine from the pharmacy, ask: Is this the medicine that my doctor prescribed?
• If you have any questions about the directions on your medicine labels, ask.
• Ask your pharmacist for the best device to measure your liquid medicine. Also, ask questions if you're not sure you know how to use it.
• Ask for written information about the side effects your medication could cause.

The AHRQ document also provides tips and questions for reducing errors during hospital stays and surgery and other steps patients can take to help ensure error-free care.

Similarly, other publications have presented recommendations to help patients use medications safely. All of the lists of hints and programs instruct patients to let providers know if they have a problem, but one goes a little further and also instructs patients to:

• inform their caregivers about the positive effects of medications;
• check with their pharmacist if the appearance of their medication has changed;
• keep medications in the original vial;
• find out if it is acceptable to break, chew, or mix medications;
• keep their medications away from their pets' and other medications and other chemicals; and
• reminds women that if they are pregnant or breast-feeding they should inform their health care providers before taking any medication.

Overall, the ideas and the support for helping patients help themselves and for making patients informed members of the health care team is growing. But many patients will still need to be informed, be trained, and receive tools before they can be reliable members of the team.

■ Conclusion

The level of risk from medication errors depends on the medication and the type of error. However, in general, the risk potential is high. The potential severity of an error can be devastating, and under the current medication-use system the likelihood of an error is probable, even though the frequency may be rare. In the interest of patient safety, MCOs and their contracted health care providers need to develop plans and programs to: (1) reduce or eliminate the risk of errors, (2) mitigate the risk following the planned risk reduction process, and (3) follow up to ensure the effectiveness of the process. In addition to having error-reduction programs, health care organizations must analyze errors that occur, and those that are prevented, to uncover the root cause of the error or potential error. Then, using programs much like those used for quality assurance and risk reduction, actions to change the system surrounding the error should be taken.
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Overall, to reduce the risk of medication errors in their covered populations, MCOs can:
• develop system-based programs for in-house use,
• selectively contract with companies with risk-reduction systems in place,
• provide programs to providers of care to help them adopt or develop their own systems-based program, and
• provide education programs to members.

The consistent and effective use of quality assurance, risk management, and patient-education tools can help each member of the managed care community participate in risk reduction and quality improvement and ultimately reduce the toll of medication errors.

References

7. Norton LL. Medical and medication errors, their impact and proposals for quality improvement and ultimately reduce the toll of medication errors.
Upon completion of this continuing education program, participants will be able to:

1. Explain the purpose of accreditation and accreditation standards and their limitation.
2. Differentiate quality, consistency, and safety.
3. Discuss tools for assuring quality and predicting failure within systems.
4. Describe a process for conducting a root cause analysis.
5. Discuss actions pharmacy and pharmacists can take to reduce medication errors.
6. List steps that patients can take to help prevent medication errors.

SELF-ASSESSMENT QUESTIONS

1. The number of deaths attributable to preventable medication errors has been estimated to be:
   a. 7,000 per year.
   b. 44,000–98,000 per year.
   c. 70,000 per year.
   d. none of the above.

2. Accreditation:
   a. provides a guarantee of safety.
   b. is limited to organizations with 100% error-free care.
   c. is defined as conferring approval or recognition for conforming to standards.
   d. None of the above

3. ISO 9000, PDCA, and FMEA are all:
   a. acronyms for projects at NASA.
   b. tools for quality improvement or risk management.
   c. based on systems developed by the military.
   d. all of the above.

4. Risk can be managed in environments that do all of the following except:
   a. prioritize risk.
   b. perform research to increase the understanding of risk.
   c. implement strategies to mitigate risk.
   d. assess risk on a semi-annual basis.

5. Risk-matrix design is based on:
   a. event severity and likelihood of occurrence.
   b. corrective mechanisms and cost.
   c. attributes and strategies.
   d. none of the above.

6. FMEA was developed and is used:
   a. exclusively for design analysis to eliminate negative quality.
   b. exclusively for maintenance to document exceptional quality.
   c. primarily for maintenance to locate negative quality.
   d. primarily for design analysis, but can be used in systems maintenance.

7. Root-cause analysis is designed to locate the true cause of sentinel events so that the responsible individuals can be punished.
   a. True
   b. False

8. At the completion of a root-cause analysis, an action plan is developed that can be designed to document:
   a. corrective actions, follow-up plans, and follow-up dates.
   b. completion date, completion indicator, and completion sign-off analysis.
   c. root cause and the person assigned to oversee the corrective actions.
   d. all of the above.

9. The basic idea behind the SMART Coalition training program is:
   a. patients can be empowered to become active participants in their own health care.
   b. physicians and pharmacists should provide no-cost and low-cost care to seniors.
   c. senior volunteers should provide brown bag and medication-review sessions.
   d. none of the above.

10. Based on information from a multi-disciplinary conference, conditions that are necessary for the success of “the ideal” medication-use system are:
    a. patients assuming some responsibility for health and medication goals.
    b. health care providers working in cooperative collaboration.
    c. both a and b.
    d. none of the above.
DEMOGRAPHIC INFORMATION (not for scoring)

11. In what type of setting do you work?
   (Leave blank if none of the responses below applies.)
   a. HMO
   b. PPO
   c. Indemnity insurance
   d. Pharmacy benefits management
   e. Other

12. Did this program achieve its educational objectives?
   a. Yes   b. No

13. How many minutes did it take you to complete this program, including the quiz? (Fill in on answer sheet.)

14. Did this program provide insights relevant or practical for you or your work?
   a. Yes   b. No

15. Please rate the quality of this CE article.
   a. Excellent   c. Fair
   b. Good   d. Poor

INSTRUCTIONS

This test affords 1 hour (0.10 CEU) of continuing pharmaceutical education in all states that recognize the American Council on Pharmaceutical Education. To receive credit, you must score at least 70% of your test answers correctly. To record an answer, darken the appropriate block below. Mail your completed answer sheet to: Academy of Managed Care Pharmacy, 100 N. Pitt Street, Suite 400, Alexandria, VA 22314. If you score 70% or more, a certificate of achievement will be mailed to you within eight weeks. If you fail to achieve 70% on your first try, you will be allowed only one retake. The ACPE Provider Number for this lesson is 233-000-01-002-H04. This offer of continuing education credit expires April 30, 2002.

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11. ☐A ☐B ☐C ☐D ☐E
12. ☐Yes ☐No
13. Minutes ________________
14. ☐Yes ☐No
15. ☐A ☐B ☐C ☐D

Participant Identification: Please type or print.

Social Security #:  Work Phone #:
For Identification Purposes Only

Date:

Name:  LAST  FIRST  MIDDLE

Company:

Address:  STREET (with Apt. No.) or P.O. Box  CITY  STATE  ZIP

State & Lic. No.:  STATE  LICENSE NO.

Member Type:  ☐ Active  ☐ Supporting Associate  ☐ Student  ☐ Nonmember

Signature:  I verify by my signature above that I have completed this examination independently.
Merger and Acquisition Activity in the Chinese Pharmaceutical Industry

Editor's Note: Managed care pharmacists view the pharmaceutical industry through a powerful lens as they seek the best products to improve the health status of their enrolled populations. Recently, pharmacists have had to ponder how the pharmaceutical industry will fare as it undergoes its most profound change since its origination in the early 1900s. They see the global pharmaceutical giants consolidating, actively marketing existing product lines, developing new promising biotechnological agents, and preparing for political battles over looming price controls in the United States.

While the United States remains the largest and most profitable market for pharmaceuticals, much of the industry's transformation is in reality the preparation for the rapid expansion of the global marketplace—in particular, expansion in the developing world.

Before 1949, China was considered the "sick man of Asia"—a characterization no longer true in infectious disease patterns, nor economically. As this nation's gross national product (GNP) advances—as with other third-world nations with growing middle-class populations—the demand for modern medicines naturally follows. The global pharmaceutical giants are coming to recognize the importance of opportunities presented abroad, which may eventually impact their strategies for the U.S. market.

— J. Warren Salmon, Ph.D., JMCP Contributing Editor

Mergers and acquisitions (M&As) are an ever-growing phenomenon of the current worldwide pharmaceutical industry, and firms in the People's Republic of China are no exception.1 In this most populous nation of the world, M&As are likely to profoundly restructure the pharmaceutical industry—and the changes will be compounded by changes in China's overall business environment related to its World Trade Organization (WTO) entry.2

The pharmaceutical industry is very important to China, as it is to any developing nation, partly because it holds the potential to contribute to public health. Moreover, the pharmaceutical industry can be one of the most profitable industries in an economy. If a domestically anchored set of firms can compete with the usually more costly products imported from the global pharmaceutical giants, the developing nation's balance of payments can be contained, while economic development advances. This brief article is a guide to understanding current developments in the Chinese pharmaceutical industry.

Background

It is well known that China has been in transition from a centrally planned to a market-based economy since the beginning of the 1990s. The national government has been trying to push "the enterprise-structure-modernization" movement to establish property rights and to separate ownership from management. Almost all pharmaceutical firms in China, except foreign-owned ones, are state-controlled, meaning some measure of state ownership, mostly more than 51% stock share. Two stock exchanges were established in 1989 and in 1990. There are now more than 50 pharmaceutical companies listed on them, including ones with government ownership.

The Chinese pharmaceutical industry consists of a synthesis sector and a traditional-Chinese-medicines sector. In 1996 the output of chemicals synthesized was 85 billion RenMinBi, or rmb, ($10.3 billion) and the output of traditional Chinese medicine was 19.8 billion rmb ($3.9 billion), both rather small by U.S. standards of volume.3 The latter sector has collaborative potentials for the development of biologicals with the global pharmaceutical firms in pharmacognosy and pharmaceutics for the extraction of active ingredients, making new formulations, dosage, and delivery forms.

More than 7,000 companies generate this pharmaceutical output—almost 10 times the number of firms in the United States, while the total output in China is one-sixth that of the United States. In 1995, the 10 leading pharmaceutical companies in China accounted for 10% of the total output of the entire industry.

As a developing nation, the Chinese pharmaceutical industry lags significantly behind both technologically and economically. However, pressures grow stronger every year to produce sufficient medications for the more than one billion people who seek advanced drugs and have been economically advancing in order to buy them. The Chinese economy is said to be growing over 7% annually. Scrip magazine notes that, although per capita drug spending is expected to be only U.S. $6 in 2000, China's enormous population means that the total market value compares well with the rest of the Pacific Rim.3 The richest 90 million urban Chinese have preferred foreign brand-name drugs, and are willing to pay far more than is charged for alternatives from Chinese firms; drug consumption of urban residents is rapidly rising.3

M&A Activity

Previously, national producers of pharmaceuticals had a virtual monopoly, until Chinese economic reforms, world trade relaxation, and changes inside the industry gave way to a more competitive situation. M&A as a trend appeared in China in the 1980s and gained speed in the following decade. Small-scale production in the Chinese pharmaceutical industry is ready to give way to a new concentration and centralization. In the 1990s, there were 15–40 M&A cases each year, and the number is growing annually.

Local government departments in charge of the pharmaceutical companies within their administrative districts initiate about one-third of the mergers. In these cases, usually all state-controlled pharma-
ceutical companies within a district are united into one company, usually called a group. There are many Sino-foreign joint ventures—in 1993, 612 joint ventures were formed. But no mergers took place between foreign pharmaceutical companies and Chinese manufacturers, except combinations with some Hong Kong-based companies. For example, the Zhong Ce, a company from Hong Kong, has brought together more than five mainland pharmaceutical companies in the past few years.

Clearly, the Chinese pharmaceutical industry has not kept pace with the larger economic globalization, with some barriers against foreign-owned pharmaceutical companies still to be broken down.

With President Clinton's signing of the trade law on October 11, 2000, granting China permanent normal trade relations, China now has the opportunity to be integrated into the world economy, joining the WTO with the European Union approval.

Because of China's size and trading power, the United States insists it eliminate subsidies and trade barriers, which protect sensitive state-run industries. Such modifications with the United States and European powers will likely transform the Chinese pharmaceutical market over time.

All of the recent mergers in China were finalized without new infusions of capital. More than half of the acquisitions do not require financial compensation from the acquirer, except that the acquirer must bear the debt of the acquired company. About two-thirds of the takeovers are of failing enterprises. Unlike within the worldwide pharmaceutical industry, very few of the mergers in China have been between so-called "leading companies." Two exceptions are Lukang Pharmaceutical Company and Xinhua Pharmaceutical Company, which merged into Xinhua Lukang Pharmaceutical Company; and Xinchang Pharmaceutical Co. Ltd., merging as Zhejiang Pharmaceutical Co. Ltd. (Group).

Analyzing the Pharmaceutical Industry in China

A study on M&A activities among pharmaceutical companies in the People's Republic of China was conducted by Hongjun Yin, with a major conclusion that the function of government, both the central government and the local governments, was critical to its understanding. Government has been the initiator, shareholder, policymaker, approver, and supervisor because of remnants of administrative methods inherited from central planning and because most of the pharmaceutical companies are state-owned.

Notwithstanding this, the central government has been facilitating a restructuring of the pharmaceutical industry to improve its competitive ability in the face of international pressures. Two structural problems remain. First, many companies have similar lines of products and strive as governmental entities for the low-profit/low-technology regional market divisions. Second, too many companies (and too many small ones) remain, making it difficult for them to compete effectively against international pharmaceutical giants.

Nevertheless, local governments support M&A behavior in the industry following the call of the central government, and to ameliorate local economic situations, such as provincial advancement and employment growth. Several leading provinces have defined the pharmaceutical industry as a key industry in the local economy and seek to have it lead in the future national pharmaceutical market.

Future Trends

With WTO entry, China will further develop its capital markets, and capital formation will proceed among its pharmaceutical companies, as well as with its financial institutions. Thus, the M&A activities of drug companies may approach Western patterns. National policy concerning the Chinese pharmaceutical industry aims to sell off most of the smaller companies, while keeping control over the several large companies to foster competition with the international giants. Foreign investors may have new opportunities to purchase or form joint ventures with the small companies.

Whether the influence of government over business will wane in the future, and how quickly, will depend on China's leaders' determination to build a market-oriented economic system and to what extent government reforms will be implemented successfully. Generally speaking, government's close intervention meets with vigorous challenges, as the private sector gains strength daily. With greater numbers of domestic economists, among others, appealing for deeper reforms, there is likely to be a forward movement to promote the marketing of state-owned enterprises, thus propelling the transformation of the domestic pharmaceutical industry. Strategic problems for drug companies remain to be resolved on the difficult road ahead. The modernization of China's health care system, however, will be concomitant with such advances in its pharmaceutical industry, and serve to facilitate a broader distribution of modern medicines to the populace.

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References

he Institute of Medicine’s November 1999 report on medical errors brought the nation’s attention to the prevalence of medication errors in the institutional setting. This widely cited report drew attention to the related question of medication errors in the ambulatory setting. The health care community has done little to date to address the question of reducing medication-errors in the ambulatory setting. We believe that is because, unlike institutional settings, the ambulatory environment has no systematic superstructure that can easily be examined and revamped to improve patient safety.

The Academy of Managed Care Pharmacy (AMCP) and the U.S. Pharmacopeia have initiated a project that we believe could positively impact the medication-error rate in the ambulatory medication-use system.

The goal of the project would be to reduce the “noise” that arises from the multitude of alerts that pharmacists receive at the point of service that indicate a potential drug/drug interaction. Current drug-utilization review programs that identify drug/drug interactions tend to be so comprehensive that they discourage professional attention. The volume of these alerts can encourage a busy pharmacist to override alerts; indeed, some pharmacies and computer systems do not even require a pharmacist to review the alerts. For those instances when an online prospective drug-utilization review identifies a drug/drug or drug/class interaction that has the potential to cause serious harm to the patient, we propose the establishment of a system of hard edits that will require the documentation of a pharmacist intervention on behalf of the patient before the prescription can be filled and dispensed.

To be practical in an online pharmacy setting, these edits must focus only on the most important interactions, not on all potential interactions.

This approach calls for several steps:

- establishing standardized evidence-based criteria that can be used to classify drug/drug interactions that have the potential to cause serious harm;
- designating an authoritative body of professionals to reach consensus on which drug/drug interactions meet the established criteria for “serious harm;” and
- gaining the collaboration of vendors that develop online drug-utilization review criteria, programs, and systems.

The success of this effort will depend on the participation and cooperation of a number of stakeholders.

**Student P&T Competition Underway**

AMCP has launched a challenging new opportunity for AMCP Student Chapter members interested in a career in managed care pharmacy: the AMCP National Student Pharmacy and Therapeutics (P&T) Competition.

Modeled after the University of Illinois (UIC) AMCP P&T local competition, the National P&T Competition is designed to give pharmacy students an opportunity to hone their analytical skills and to help them prepare for real-world P&T experiences. Through a case-study exercise, student participants will learn the importance of effective communication skills, working collaboratively with their colleagues, and using up-to-date and in-depth clinical knowledge for making sound formulary decisions.

Most important, the competition is designed to help students understand the impact of formulary decisions on the quality and cost-effectiveness of patient care and therapeutic interventions.

To be eligible for participation, AMCP Student Chapters must first stage a local competition at their pharmacy school. Winning teams of the local competitions will then be invited to participate in AMCP’s national competition. Teams will be judged on their written and oral presentations, teamwork, critical thinking, logic, problem-solving skills, and ability to use clinical data to develop and support their rationale.

Joy Zarlenga, vice president of the UIC Chapter, and the person in charge of the competition this year at UIC, said, “The P&T competition has become the main event of our UIC chapter and helps to build chapter membership through its outreach to the entire pharmacy student body. This competition demonstrates that student leaders can enthusiastically organize and conduct projects that foster learning outside of the classroom.”

Professor Jack Salmon, faculty advisor to the UIC chapter, said, “Students learning in this format on their own initiative and in teams is wonderful to behold.” He added that the student P&T competition impresses AMCP members from local managed care settings who make the event possible by participating as judges. Salmon stated, “An additional benefit is the resultant student interaction and the opportunity to network with real-world pharmacy practitioners from the ranks of AMCP.”

**Acknowledging Achievement: New Award Programs Established**

The Board of Directors of AMCP asked the Past Presidents and Founders Advisory Council to recommend a strategic approach for AMCP and the Foundation for Managed Care Pharmacy (FMCP) to pursue the re-establishment/establishment of recurrent awards for excellence. The Board took this step to help the Academy, as it enters its second decade, develop a sound basis for recognizing those who have made significant contributions to managed care pharmacy. The awards given in the past by FMCP recognized exemplary professionalism and dedication to AMCP through the Leadership Award, sponsored by Novartis, and the Spirit of Volunteerism Award. Part of the Board’s motivation in asking for consideration by the Council was to weigh several suggestions that had
been made for additional awards. Not wanting to create so many awards that none would be taken seriously, the Board triaged the question to its senior Council. The Council’s recommendations were endorsed by the Board unanimously.

Beginning in 2001, AMCP and FMCP will present three annual awards to managed care pharmacy professionals:

- **The AMCP Distinguished Service Award** recognizes an AMCP member for exceptional and sustained volunteer service and commitment to the Academy. Candidates must have at least five years of extraordinary volunteer service to AMCP and must have been involved in activities critical to the achievement of AMCP’s mission.

- **The re-established AMCP Spirit of Volunteerism Award** recognizes an AMCP member who has demonstrated the highest level of volunteerism during the most recent Academy year. Candidates must have demonstrated exemplary and outstanding service to AMCP during this period; have engaged in volunteer activities that have resulted in highly successful AMCP programs, projects, or services for Academy members; and be an AMCP member.

- **The FMCP Award for Achievement** recognizes an individual for sustained, exemplary, and distinguished service to the profession of managed care pharmacy practice. Candidates must be professional role models who are making or have made significant and sustained contributions to the advancement of the profession of managed care pharmacy in a clinical or administrative practice. Nominations will be accepted from both within and outside Academy membership.

When elaborating upon the decision-making process for the awards strategy, AMCP Executive Director Judith Cahill stated, “The Academy was eager to find the most appropriate way to recognize judicious leaders in the field of managed care pharmacy for the many outstanding contributions they have brought to the advancement of the managed care pharmacy profession. The Past Presidents and Founders Advisory Council was the apt body to perform this analysis, as these members know the field well and are in a prime position to provide the Board of Directors with strategic insight.

It is our hope that these awards will not only acknowledge those individuals who deserve recognition, but will also serve as both an inspiration and a challenge to others whom we hope will work to follow in the footsteps of the award.