Current status of pharmacist influences on prescribing of medicines

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Chemists, druggists, and apothecaries historically were tradespeople who performed similar tasks. Eventually, apothecaries split from the chemists and druggists to become general practitioners, while the other two groups combined to become pharmacists.1

Looking back at the development of pharmacy as a profession, we can see whence we came and where we are going may well be the same place. However, the question of what constitutes prescribing must first be answered in order to evaluate how pharmacists in a variety of practice situations can influence prescribing to improve patient outcomes. If pharmacists become prescribers, they will be subjected to the same influences as any other prescriber.

The processes of prescribing can be expanded from the basic process given by the World Health Organization (WHO).2

Influence of pharmacists on prescribing practices

The influence of pharmacists on prescribing practices can be seen daily in any conceivable practice situation. No health professional is infallible, and the benefits of a variety of clinical pharmacist interventions have been documented.3-9 Some interventions or influences that may seem simple and mundane in advanced health systems such as those in Europe, the United States, or Australia (e.g., medication counseling4,5 or taking an admission drug history)3,4 may produce a major improvement in a developing nation. Indeed, pharmacists should focus on the diseases where they can have the greatest impact in their local environment. For example, this could involve human immunodeficiency virus (HIV) and tuberculosis in developing countries, while developed countries may focus on diabetes, hypertension, and hyperlipidemia.

Clinical pharmacy practice has developed internationally to expand the role of a pharmacist well beyond the traditional roles of compounding and supplying drugs. However, not all countries have the resources to provide these high-level services immediately or train their pharmacists in the requisite skills.

Pharmacists, especially those working in the hospital environment, must often prioritize their time and resources to optimize patient outcomes with limited resources. The level of resources available differs greatly between countries and their respective health systems. For example, providing one pharmacist with entry-level qualifications to a major city hospital in a developed country may not affect regular service delivery, but the same pharmacist in a developing nation may be the only pharmacist in the hospital and provide a major improvement in pharmacy services.

Such comparisons build the continuum of pharmacist services based on availability and complexity of service level able to be delivered (Table 1). However, prescribing can be influenced at all points along this continuum and at varying levels, depending on the resources and training available.

Formulary development

WHO produced the first model list of essential drugs, or suggested formulary for developing nations, in 1977.10 It was then estimated that 12 countries had such a list of drugs; in 2003, this number had grown to over 100. Linking these formularies with standard treatment guidelines (also a role of formularies) has been shown to improve patient outcomes. In other cases, drugs are included on a formulary because clinical guidelines recommend the drug. The existence...
of formularies provides a standard for practice where compliance promotes patient outcomes, especially in developing nations.\textsuperscript{11}

Formularies are also effective in the developed world, where 98% of European hospitals have a drug & therapeutics committee and 95% have pharmacy representation. An average of 1031 drug products and 694 chemical entities are listed on formularies across Europe, with an

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increasing number of hospitals having a formulary. European drug formularies contain some or all of the following to encourage appropriate and rational drug use:

- Hospital drug-use policy,
- Dosage or prescribing information,
- Drug price information,
- Antibiotic prescribing protocols (treating infections),
- Antibiotic prescribing protocols (surgical prophylaxis), and
- Local antibiotic susceptibility.

The American Society of Health-System Pharmacists (ASHP) recommends a formulary system to ensure high-quality and cost-effective drug therapy, with the drugs considered by a multidisciplinary committee to be the most useful in patient care. Pharmacists are considered essential members of this committee and can provide advice to reconcile cost implications with evidence tailored to improve patient outcomes.

Indeed, the Global Pharmacy Survey, which collects a single-point estimate of hospital pharmacy practice, indicated that formularies are required in many countries across the developed and developing world.

**Logistics of the pharmaceutical supply chain**

Unqualified suppliers of medicines or other employees often provide logistics services; however, a pharmacist should be available for consultation at a minimum. Nonpharmacists have these roles in small rural and remote hospitals in developed countries such as Australia, albeit within a national, state, or regional hospital formulary. However, even within a formulary, the major implication of nonpharmacist staff controlling logistics is a lack of understanding of the properties of the drugs, leading to a perception that pharmaceuticals are just another stored item, and consequent inappropriate logistics management. This can lead to inappropriate prescribing, since prescribers will often base their drug choice on the drugs in stock if the drug of choice is not available.

Pharmacists should oversee logistics (even remotely) to ensure appropriate inventories are maintained to meet formulary guidelines and local conditions in collaboration with local prescribers. Pharmacists can therefore assist in informing the specifications for a local formulary as a subset of the systemwide formulary by providing ongoing appraisal and review of prescribing trends based on inventory requests.

**Prescriber education**

Since European drug formularies contain some or all of the hospital policies on drug-use and drug restrictions, they provide an excellent basis for pharmacists to educate prescribers about rational drug therapy. This will influence the prescribers’ drug choices, either directly or indirectly, through increased awareness of the hospital’s policies. Such strategies have also proven effective in developing countries such as Sri Lanka, where prescriber education about formulary restrictions produced improvements in formulary compliance.

The Society of Hospital Pharmacists of Australia (SHPA) practice standards specify that the provision of education and training to other health professionals is an important aspect of a clinical pharmacist’s role. It is also instrumental to increasing the pharmacists’ profile. Academic detailing and other educational interventions by pharmacists have been shown to reduce prescribing and drug costs through physician education.

Correspondents from developing countries bemoan the difficulty of embracing evidence-based practice and suggest it is due to low levels of medical research and the consequent low priority for maintaining current knowledge. Such problems may be a systematic issue, in which practitioners are busy treating patients and have little time for reading and maintaining knowledge currency. This is an area where pharmacist-provided education sessions could distill new developments into current local practice, thereby influencing prescribing practices.

Prescribers should also be educated about the role of pharmacists in health care decision-making. As shown above, clinical pharmacy services improve patient and financial outcomes and can be ignored by clinical experts. The role of the pharmacist as an integral part of the health care team should be promoted, especially in areas of chronic high incidence diseases and emerging diseases. Drug information can also play an important role in providing information to prescribers and patients. In fact, many pharmacists provide drug information as part of the prescribing and medication adherence process, which can often be difficult to source in developing countries.

**Drug order review**

Medication errors and adverse drug reactions cause many preventable adverse events each year across a range of drug classes. Regular pharmacist review of medications through clinical drug order reviews can reduce the risk of medication misadventures and improve patient outcomes.

European hospitals predominantly offer a centralized pharmacy service in which a pharmacist does not visit the wards on a daily basis. The percentage of hospitals providing a centralized service with a daily ward visit decreased in the 2005 survey; however, the percentage of hospitals offering a decentralized service where pharmacists spend over 50% of their time in the wards increased to almost 10%. However, many developing nations do not have access to pharmacists to routinely provide this service.
Pharmacists should best evaluate where to expend their effort for optimal results in situations where there is not enough time or resources to visit the wards daily. In many cases, clinical services can be provided remotely, perhaps as a chart review. While remote services are not ideal, they provide a low level of pharmaceutical care for the patient within the limited available funding associated with developing countries. Such models can also be used in more affluent nations where small hospitals do not have access to dedicated ward pharmacy services. Computerized prescriber order entry can provide an electronic check of compliance with restrictions but lacks the clinical interpretation provided by a pharmacist in cases that are not clear-cut. While electronic prescribing has been shown to reduce error rates and improve formulary compliance, it generates its own alternative sources for errors, requiring different pharmacist interventions.18

Participation in patient rounds

Pharmacist interventions at the patient level can reduce health care visits, costs, and adverse drug effects.14 Interventions utilizing written materials demonstrated significant outcome benefits in Indian patients who had a 50% illiteracy rate.11 European hospitals have an average of five pharmacists and six pharmacy technicians to serve 680 inpatient and 90 day-stay beds per hospital,12 generating an average of 136 inpatient and 18 day-stay beds per pharmacist. Australian standards recommend no more than 30 medical, 40 surgical, or 50 day-stay beds per pharmacist.15 Thus, discrepancies exist between developed countries, depending on the service delivery paradigm and focus of pharmacist activities.

In 2004, the Australian Health Ministers issued a joint communiqué, agreeing on seven patient safety initiatives for implementation by 2006.25 The two relevant to clinical pharmacy services were (1) use of a common medication chart (this has been achieved) and (2) a documented pharmaceutical review process for all medication prescribing, dispensing, and administration (this has not yet been achieved, as debate is continuing over the definition of “pharmaceutical review” and which professions are able to complete one).

The range of pharmacist influences on the prescribing process is summarized in Figure 1.

Pharmacist prescribing

The Global Pharmacy Survey showed very low levels of independent pharmacist prescribing and only slightly higher levels of dependent pharmacist prescribing. This was expected, since pharmacist prescribing in either model is an emerging area of practice. The geographic distribution of pharmacist prescribing models incorporates all areas except North America and Oceania.

In the United Kingdom in 2006, 750 supplementary prescriber pharmacists prescribed 23,000 items. Nurses prescribed almost 5.5 million items during the same time period. These prescriptions were written utilizing an agreed protocol model, where additional supplies of a drug originally prescribed by a medical practitioner were prescribed if a patient’s monitored values were within agreed-upon limits.26 Similar agreements occur in the United States within academic medical centers.

Furthermore, U.K. pharmacist supplementary prescribers with five or more years of experience can convert to independent prescriber status.27 Independent pharmacist prescribers can prescribe any licensed medicine (i.e., products with a valid marketing authorization in the United Kingdom) for any medical condition that the pharmacist prescriber believes is within his or her competence, with the exception of all controlled drugs. Similar prescribing rights are available to pharmacists in Alberta, Canada.28

The influences pharmacists exert on prescribing that are detailed above would be equally applicable, regardless of which health professional actually wrote the prescription. Hence, nonprescribing pharmacists would exert influence on prescribing pharmacists as they would for any other prescriber. It is imperative that the tasks of prescribing and dispensing remain separate.

In general, pharmacists who participate in providing primary care to patients perform patient assessment; request necessary laboratory tests; interpret data related to medications; modify medication therapy care plans; provide patient information, education, and counseling; document the care provided; identify barriers to patient compliance; participate in multidisciplinary reviews; resolve issues that may impede access to medication therapies; and communicate with physicians and other health care team members.29 Writing a prescription is a logical extension of these tasks.30,31 This is more than the substitution of drugs within a therapeutic class (e.g., changing amlopidine to felodipine) or between brands; however, therapeutic substitution can also reduce physician workload and generate cost savings for the health system.32

Conclusion

Many factors influence prescribing and expand the pharmacist’s role from a passive dispenser to an active participant in the therapeutic decision-making team. While one person must write the prescription for a patient based on the team’s decision, it becomes less important if that person is a physician, nurse prescriber, or pharmacist prescriber if the entire therapeutic decision-making process is incorporated into a team approach. The current thrust for pharmacist prescribing in some
Figure 1. Pharmacist influences on the prescribing process.

**Diagnosis made, drug therapy required**
- Drug order review
- Participate in ward rounds
- Prescriber education
- Formulary development

Which classes of drug are appropriate for the diagnosis?

Which single drug class is most appropriate for the patient's clinical situation?

Are any drugs from this class available on the formulary?

Which single drug from this class is most appropriate for the patient's clinical situation?

Is this drug available on the formulary?

Determine appropriate route of administration for the patient's clinical situation

Write the prescription (doctor/pharmacist/physiotherapist/nurse/other)

Is an appropriate formulation available on the formulary?

Determine appropriate dose frequency for the patient's clinical situation

Determine appropriate duration of therapy for the patient's clinical situation

Source and supply the drug (logistics)

Administration

Monitor therapy

Determine appropriate dose &/or concentration

- Prescriber education
- Formulary development
- Logistics

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