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Encouraging the Use of Generic Medicines: Implications for Transition Economies

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Generic drugs have a key role to play in the efficient allocation of financial resources for pharmaceutical medicines. Policies implemented in the countries with a high rate of generic drug use, such as Canada, Denmark, Germany, the Netherlands, the United Kingdom, and the United States, are reviewed, with consideration of the market structures that facilitate strong competition. Savings in these countries are realized through increases in the volume of generic drugs used and the frequently significant differences in the price between generic medicines and branded originator medicines. Their policy tools include the mix of supply-side measures and demand-side measures that are relevant for generic promotion and higher generic use. On the supply-side, key policy measures include generic drug marketing regulation that facilitates market entry soon after patent expiry, reference pricing, the pricing of branded originator products, and the degree of price competition in pharmaceutical markets. On the demand-side, measures typically encompass influencing prescribing and dispensing patterns as well as introducing a co-payment structure for consumers/patients that takes into consideration the difference in cost between branded and generic medicines. Quality of generic medicines is a pre-condition for all other measures discussed to take effect. The paper concludes by offering a list of policy options for decision-makers in Central and Eastern European economies in transition.

Key words: *cost control; drug industry; drugs, generic; health care rationing; legislation, drug; pharmaceutical preparations*

Countries seeking to limit increases in health care spending are constrained by increasing pharmaceutical costs. Pharmaceutical costs are increasing, in part, as a result of changing demographics and advances in medical technologies (1-3). As the proportion of elderly persons grows, pharmaceutical spending also grows, as this group consumes more prescription medicines than any other. New patented medicines, often replacing cheaper medicines on the basis of being more effective, also increase costs. Within this policy environment, generic pharmaceuticals play an important role as an alternative to originator medicines in treating disease. The savings that result from generic medicines can be used to purchase newer, more effective medicines where they exist.

Many of the world's industrialized countries have in place policies encouraging the use of generic medicines, alongside policies that encourage innovation and lead to the fast uptake and use of newer therapies. Our aim was not only to describe some effective policy tools for encouraging generic pharmaceuticals, but also to highlight the market conditions necessary for growth in generic pharmaceutical markets. The evidence presented is predominantly from OECD (Organization for Economic Co-operation and Development) countries, but we also attempt to place our conclusions in the policy context of transition economies as well as medium-income countries. Following a section placing generic medicines into the policy context, we review data and evidence on generic pharmaceutical sales in those countries where generic medicines are most used, the structure of marketing regulation and pricing, market demand incentives, and generic substitution policy in these countries, taking account of the market conditions that allow policy tools to be successful. We also discuss quality assurance regulations as it impacts on the perception of the safety and effectiveness of generic medicines, and point out policy lessons for transition economies and other middle-income economies.

What are Generic Medicines?

A generic drug is identical, or bioequivalent, to a brand name drug in dosage form, safety, strength, route of administration, quality, performance characteristics, and intended use (4). On expiration of the originator product's patent term protection, other manufacturing companies may file submissions to regulatory authorities for approval to market generic versions of the originator medicine. Generic drugs may be marketed under the non-propriety (rINN) name or as a branded generic. Branded generic drugs have names derived from a combination of the manufacturer's name and the non-proprietary name. This

enables the manufacturer to market the product in a way similar to the proprietary product.

Therapeutic and safety equivalence between drug products is assumed, from a regulatory perspective, on the basis of quality equivalence. This is evidenced from bioequivalence and chemical data. Products are considered to be bioequivalent if their rates and extent of absorption do not show a significant difference. In the United States, marketing approval for generic drugs is subject to successful submission of an Abbreviated New Drug Application. Generic drug applications are termed "abbreviated" because they are generally not required to include preclinical and clinical data to establish safety and efficacy (4). "Abridged" applications in the EU require demonstration that the active ingredients in generic pharmaceuticals are qualitatively and quantitatively the same as the originator drug (5).

Large Generic Pharmaceutical Markets

The use of generic pharmaceuticals is most frequent in industrialized countries, where price levels for pharmaceuticals are usually high, the latter being a necessary but not sufficient condition for the promotion and use of generic medicines. In Canada, Denmark, the UK, and the US, sales of generic medicines exceed 40% of total volume of pharmaceutical sales (Table 1) (6,7). The next largest generic drug markets are Germany and the Netherlands.

When measured as a percentage of total spending on pharmaceuticals, the rate of generic penetration is typically lower than the percentage of sales volume. This is attributed to the usually low prices of generic medicines vs branded originator products.

Significantly, the percentage of generic drug sales by value relative to the percentage of generic drug sales by volume differs across the countries (Table 1). In particular, Germany has achieved a high volume of generic sales, with an average price difference between generics and branded in the order of 30% – much lower than the 50% shown for Canada, the 80% for the UK, and the 50-90% for the US. A similarly small spread in average price levels is shown for the Netherlands. This leads to the conclusion that, *ceteris paribus*, generic policies have the capacity to create significant savings in health care systems. In Canada, where the price differential in 1997 was estimated to be 50%, the Canadian Drug Manufacturer's Association estimated that, for 1996, generic pharmaceuticals saved Canadians CDN$875 million, or a saving of 14.6% of total pharmaceutical expenditure (8).

Generic Pharmaceutical Policy Tools

A wide range of policies have been or can be employed to bring about these savings (5,9). These broadly can be categorized as pertaining to the supply-side and the demand-side. Supply-side measures relate to market entry and penetration of generic medicines, as well as issues around pharmaceutical pricing, setting a reimbursement price and determining pharmaceuticals available in a reimbursement (positive) list. Demand-side measures are associated mostly with interventions at prescribing and dispensing levels and, less so, purchasing by consumers. It is difficult, however, to quantify the savings for the health care system attributable to any one of these broad categories, let alone a single policy measure. No country has introduced policies and followed their impact without making further changes to their health system, but some research evidence has been produced that attempts to estimate the savings of specific policies (5). While recognizing that these estimates are subject to other influences, we can identify these policies as having some effect as they appear across countries with strong generic markets.

Supply-side Measures

Regulation regarding marketing authorization. Regulatory approval to market a generic medicine has a direct impact on competition within the pharmaceutical market. Competition is impacted by both the timing of generic approval applications and the length of time for processing such applications. Current legislation in the European Union does not allow preparatory work, such as bioequivalence studies and the submission of samples necessary to register a generic product before patent expiry , although several Eastern European countries do have such a provision (10). In Canada and the US, activities required to secure regulatory authorization to market a generic drug can take place, and applications for approval should be submitted before patent expiry (11). This provision, otherwise known as a Bolar amendment, allows generic firms to compete in the post-patent market almost immediately following patent expiry. This should in theory result in some price competition and lower prices for the substance in question, although the extent of price competition would depend

Table 1. The price differentials between originator and generic drugs and rates of generic dispensing in selected countries in 1999[a,b]

Country	Average difference between originator and generic drug price (%)	Generics as a percentage of total market	
		value (year)	volume (year)
UK	80	18	48
US	50-90 (1997)	11 (1997)	49 (1997)
Canada	50	14	41
Germany	30[c] (1997)	27 (1998)	39 (1998)
Denmark	data not available	35	60
The Netherlands[d]	20	12	31 (specialists) 43 (GPs in 1998)

[a]Unless otherwise stated.
[b]Source: ref. 6.
[c]For "blockbuster" drugs, the difference in price could be as high as 80-90%.
[d]1996 estimates.

on whether the duopoly that exists at the time of first generic entry (brand manufacturer and first generic entrant) seizes to exist as further generic firms enter the market after the expiry of the first generic's market exclusivity period. Nevertheless, without a Bolar amendment in place, branded originator manufacturers are effectively granted an extension of their patent term for the length of time it takes for bioequivalence testing to be undertaken, thus eliminating savings that could accrue during this period.

Drug application approval times are also significant. In the US, the 1984 Hatch-Waxman Act *(http://innovation.phrma.org/studyguides/hwbasics.phtml)* introduced the Food and Drug Administration's (FDA) Abbreviated New Drug Application (ANDA) scheme to attempt to decrease the time required for approval, thus allowing the savings attributable to generic drugs to commence sooner. Under the ANDA, a generic drug seeking marketing approval must have the same active ingredient(s) as the innovator product; must use the same route of administration; must have a similar rate and extent of absorption of the active ingredient; and must be produced in facilities that meet good manufacturing process guidelines (12). Generic manufacturers are not required, however, to include pre-clinical and clinical data to establish safety and effectiveness. As a result of the abbreviated application, the generic drug approval process in the US decreased to approximately 18 months in 1998 (12). Despite the ANDA process, however, the length of approval times for generic drugs exceeds that of new drugs. For the fiscal year 2000, the FDA approval time for a new drug was, on average, 11.6 months, whereas the average generic drug approval had risen to 22.3 months (13). A potential cause of the increase in generic drug approval times may be patent-holders prolonging court battles against proposed generic drugs.

In Canada, reviews of marketing approval applications are conducted at the federal level of government, but each province independently decides whether a new generic drug should be included in their drug plans. This process varies widely across provinces. In British Columbia it takes 84 days on average, whereas in Ontario, the average is 314 days (3). Thus, the system does not achieve an optimally efficient allocation of resources due to the duplication of effort taking place at the provincial level.

Pharmaceutical pricing. Countries with well-established generic pharmaceutical markets may or may not impose regulation on pharmaceutical prices. The US and Germany do not impose price ceilings on new pharmaceutical products, although Germany has a reference price system in place for patent-expired substances. France, Canada, the Netherlands, Denmark, and Italy, do have various regulatory arrangements in place controlling the prices of new medicines and, in France and Italy, the prices of generics. In the UK, the price of a new pharmaceutical product is indirectly regulated as the pharmaceutical price regulation scheme (PPRS) stipulates the rate of return on capital employed in sales to the National Health Service (NHS) (14). Manufacturers have flexibility, however, on how they price each of their products. It is possible for the branded manufacturer to significantly reduce prices of their older products to allow them to fit under the profit threshold while setting a high price on their newer products (15). Despite the relative freedom in pharmaceutical pricing, the UK has introduced price controls on generic products to counteract adverse supply problems that occurred at the end of 1990s, and were partly related to the quality of produced generics (16).

There are additional elements that affect the nature and extent of price competition in a patent-expired market, including the number of entrants and the nature and extent of (price) regulation. The number of manufacturers can greatly influence the degree of price competition, forcing prices even lower. If only a few generic manufacturers market a particular product, there is less price competition and a greater chance of (tacit) collusion on price. As the number of competing manufacturers increases, the greater the competition on price among firms. Two studies conducted in the US confirmed the inverse relationship between the price of a generic drug and the number of competing firms (17,18).

Direct price controls are a common phenomenon, even in generic markets, and several examples are in place to demonstrate this. Countries such as France, stipulate that prices of generics should be 30% lower than the equivalent branded product (19).

In late 1998, the Canadian Drug Manufacturers Association (an association of generic drug manufacturers) and the Ontario government reached a new agreement to encourage more rapid inclusion of newly regulated generic medicines in the Ontario Drug Formulary. Under the terms of the agreement, new generic drugs will come onto the Formulary at a maximum of 70% of the price of the originator drug, down from the previous pricing level of 75% (established in 1994) (20). The second and subsequent products will be added at a maximum 63% of the original cost (down from 65%). In return for accepting lower prices, the generic industry receives more secure access to the Ontario marketplace through regular Formulary updates (20). By setting maximum generic prices, however, the level of price competition in the market may be constrained.

In the UK, a statutory maximum price scheme has been introduced to counter speculation in the generic drug supply chain (14). This covers the most commonly prescribed generic drugs in primary care. However, even subsequent to the introduction of the maximum price scheme, many reimbursement prices are significantly above real market prices as the maximum price does not account for competition between major wholesalers on price (21). As a result, the NHS does not benefit from the full savings that result from competition between wholesalers. An investigation into the extent of discounting offered by wholesalers to pharmacists in the Netherlands led to the introduction of a claw-back applied to the maximum reimbursement price that pharmacists receive (22).

Setting a reimbursement price: reference pricing. To promote the use of generic medicines, one ap-

proach is to regulate reimbursement of pharmaceuticals, as opposed to regulating launch prices. One such option is reference pricing, which involves grouping together similar products and defining a relative price that will be reimbursed by health insurance funds. Thus, if a pharmaceutical product is priced above the reference price, the insured is required to pay the difference in price (23). The degree to which reference pricing encourages generic medicines is dependent on how this policy tool is implemented.

Policy makers wishing to implement reference pricing as a reimbursement mechanism for pharmaceuticals are faced with three main policy choices (9). Firstly, it needs to be decided how the clustering of similar medicines is going to take place. One option is to group medicines with identical active ingredients. Another option is for medicines with therapeutically comparable active ingredients to be grouped together. The third option is for medicines with therapeutically comparable effects (rather than active ingredients) to be grouped together. This latter grouping includes potentially a wide class of medicines that are all effective for the treatment of a given condition.

The second decision that policy makers need to take is to decide whether patented medicines are to be included in the defined clusters. If patented drugs are not included in the groupings, there is much lower impact of reference pricing on increasing generic prescribing and reducing overall spending (24). As long as patients receive reimbursement for newer, patented products, these are the medicines they are likely to choose, and savings will accrue only in choices between generic products. The third policy-related issue relates to the fixing of the reference price. For example, the reimbursement price may be set at the lowest priced drug in the defined cluster (25) or may be based on the average price within the cluster (26).

It is important to note that where originator and generic pharmaceuticals are both included in drug groupings and the price is set at the (average) generic price, the degree to which reference pricing will encourage the use of the generic drug will depend upon the response of the manufacturer of the originator drug. If the price of the originator drug is not lowered from its original price, reference pricing offers a strong incentive for preference of the generic drug (23). If, however, the price of the originator drug is lowered to approach the reference price, this incentive is reduced. If the focus is on savings in pharmaceutical spending, as opposed to more strictly encouraging generics, the lower originator price will have a positive effect.

Consideration must also be made of the effect of the degree of market competition in the market at the time the reference price is set. As previously noted, generic drug prices decrease substantially as more manufacturers enter the market. If the reference price is set at a point where few manufacturers are competing on price, it may have the effect of removing the incentive for further price competition to take place.

In Sweden, the response to the introduction of reference pricing in 1993 was the lowering of prices to the reference price, or below, by most producers. Thus while Sweden still has a relatively low generic penetration, reference pricing is credited for savings of SEK 400-500 million (27).

In Germany, the prices of drugs declined, including the prices of reference pricing groups, but branded drug manufacturers partly compensated for this by increasing the price of non-reference-priced drugs (23). For German Sickness Funds, the savings brought about by reference pricing are estimated to be 1.8 billion per year (28). This equates to 9% of pharmaceutical expenditure. However, in May 2001, legislation was passed suspending the current regulations on reference prices until the end of 2003 (14).

The Canadian province of British Columbia introduced a reference-based system in 1994 in its programs for seniors. It was later applied to social assistance recipients and members of households with high drug costs (though the latter group pay a deductible). The system includes in-patent products and clusters medicines that have therapeutically comparable effects. Grootendorst et al (29) estimated savings of CDN$14.9 million to British Columbia's (BC) Pharmacare expenditure on nitrates prescribed to the population over the age of 65 years during the three and a half years after reference pricing was introduced. The authors noted, however, that the effect of reference pricing needed also to be evaluated in its effect on associated health care and administrative costs.

Demand-side Measures

Policies impacting on the demand for generic medicines may be imposed to elicit a response from physicians, pharmacists, and/or patients. Incentives have been traditionally directed at physicians, although, increasingly, pharmacists are the target of financial incentives (30). The way to influence patients is through a system of cost-sharing that favors generic medicines. This may or may not work, depending on other parameters of the health care system, such as overall price levels for medicines and insurance coverage. With regards to the insurance, in Canada, policies designed to influence patient demand are likely to be ineffective as the majority of the Canadian population have some form of supplementary insurance that covers most of the cost of prescription medicines (31).

Policies directed at physicians — physician budgets. Physician fixed budgets, relevant for primary care physicians, provide an explicit incentive to contain costs, which in turn encourages generic prescribing, among other things. The incentives may be structured to reward physicians who underspend or penalize those that overspend, or both.

Evidence exists from a comparison of general practitioners (GPs) in UK who were limited by a spending budget (fundholders) and those without this restriction. Any savings that fundholders made could be reinvested in the practice. GP fundholding, while it was in place, led to (modest) increases in generic prescribing (32-34). Also, Bateman et al (35) studied the effect of using financial incentives to change generic prescribing behavior of non-fundholding GPs and found that the incentives increased generic prescribing and resulted in the achievement of target sav-

ings, albeit modest. One potential confounder, however, is the fact that fundholding GPs were partly inhibited by the threat of having their future budgets reduced.

Budgets for physicians have also been present for a long time in Germany, up until they were formally abolished in 2001-2002. There, financial penalties were in operation for prescriptions exceeding the budget for pharmaceuticals. The 1993 Public Health Reform Law set a global GP pharmaceutical budget of US$15 billion (36). The amount spent above this limit would be paid from physician's remuneration budgets. After the introduction of this policy, generic medicines increased their market share from 30.8% to 35.8% in number and from 24.9% to 28.5% in value (37). An unwanted side effect of the policy, however, was an increase in the in number of patients transferred to hospitals, to save on GP's budgets (37). The problem with budgets in Germany was that the penalties envisaged in the legislation were never enforced. As a result, adherence to the limits imposed was poor and budgets were eventually abolished only to be reintroduced in 1998 and to be re-abolished in 2001-2002 once again. One important policy conclusion, therefore, relates to enforcement of the actual legislation. In this particular case, failure to enforce it led to its eventual abolition.

Pharmacists' reimbursement policy. For policies encouraging the use of generics to be successful, it is important that pharmacists are reimbursed in such a way as to not discourage them from dispensing the least expensive product. Pharmacists may be receiving discounts and rebates from wholesalers and/or manufacturers. Discounts typically provide incentives for pharmacists to dispense one drug versus another. Discounts are, nevertheless, outside the scope of public policy, unless they are disallowed. This would leave only the regulation of margins to influence pharmacists' dispensing practices.

The European experience, where pharmacy margins are regulated, suggests that pharmacists are typically remunerated by health insurance organizations by means of fixed fees per prescription, progressive (percentage) margins or regressive margins. Flat fees per prescription or fixed percentage margins do not provide an incentive for pharmacists to dispense generic medicines. Under a fixed fee per prescription, the pharmacist receives the same reimbursement for dispensing an original drug as for a generic drug. In countries where pharmacists are reimbursed based on a fixed percentage of the drug's retail price, there is a disincentive to dispense generics (38), as pharmacists receive more in monetary terms for dispensing a branded product, than for dispensing a generic, given the latter's lower retail price. A regressive margin that pays pharmacists a greater percentage of the cost on lower priced pharmaceutical products removes this disincentive, provided that the structure of the regressive margins is such that ensures profitability for generic dispensing.

Experience from the European Union (EU) suggests that most member states are now remunerating pharmacists on the basis of regressive margins and view that as an opportunity to influence generic dispensing positively (39). In most Canadian provinces, pharmacists have an incentive to dispense generics as they are reimbursed by the provincial drug plans for only the cost of the generic drug equivalent, if one exists. Similar arrangements hold in the US for federal or state pharmaceutical assistance programs, such as payment of pharmaceutical benefits of veterans by the Department of Veterans Affairs (40) and Medicaid (41), respectively. The majority of pharmacy remuneration in the US, however, is based on reimbursement limits (42). Pharmacists can, therefore, increase their margins by negotiating discounts from suppliers and there is no (federal or state) government or insurance intervention on margin determination.

Another potential financial incentive for pharmacists is to allow them to keep some or part of the discounts that accrue from dispensing cheaper products. An example of a system that rewards cost conscious dispensing is the Netherlands. Through their Drug Reimbursement Scheme of 1991, pharmacists allowed to keep one-third of the savings made via the use of less costly generic alternative (30). Another option is to establish negotiated income targets for pharmacists.

Information systems. Information systems can play a significant role both at prescribing and dispensing levels. An electronic prescribing database can serve as a quick, simple guide to effective prescribing, and can facilitate accurate, up-to-date knowledge of generic medicines. An international comparative analysis identified two countries, the Netherlands and Australia, where an increase in demand for generics resulted from the introduction of electronic databases supplying physicians with comparative information on price and substitutability between pharmaceutical products (5). In the UK, when a doctor enters a brand name medicine name into the computerized prescription writing system, it automatically fills in the generic name (34). The impact of such a policy is also likely to be dependent on the financial responsibility of the physicians. Without financial incentives, it may be less likely that physicians will access such price comparative data to their patient's benefit.

Generic substitution. Through generic substitution a pharmacist is authorized to dispense the generic version of a medicine even when a GP has prescribed it by brand name. There are various levels of generic substitution. Pharmacists may have wide substitution rights, in other words they can substitute freely for a generic, but their rights may also be limited, which may mean that they need to obtain authorization to dispense a generic or be allowed to dispense a generic in emergencies only. Generic substitution is potentially a significant policy tool in increasing the market share of generic medicines and is allowed in some form in Canada, Denmark, Germany, the Netherlands, and the US (30,43-45). Typically, the physician is given some control to prevent substitution where a particular situation warrants this. Generic substitution rights and pharmacy reimbursement incentives through regressive margins are

two different facets of the same policy that would promote generic use more widely.

Patients usually respond positively in generic substitution, especially when they are presented with the option to purchase and contribute towards the cost of a more expensive branded product by means of a higher (tiered) co-payment. A UK study found evidence that patients do not object to being changed from originator to generic medicines (46). Of 1,917 patients who had their original prescriptions changed from an originator to a generic drug, 90.5% were still taking the generic drug six months later.

The introduction of generic substitution complicates the establishment of liability for adverse drug reactions. With generic substitution, the physician transfers some of his or her professional authority to the pharmacist, and with it the blame for prescribing a cheaper drug if anything goes wrong.

Evidence of the benefits associated with generic substitution can be observed in the Health Maintenance Organizations experience in US. The expansion of managed care and the constant pressure to contain health care costs have led hospital pharmacies to rely increasingly on generic substitution (47). In the US, in 1999, 76.9% of Health Maintenance Organizations required generic substitution when generic products were available (48).

Measures targeting patients/consumers. Patients may also have a say in the case of substitutable medicines. One such way is through the structure of the co-payment system and another is through the reference pricing system. Typically, co-payments are flat fees per prescription, percentage of the prescription cost or deductibles. A flat fee would not, in principle, promote generic use, unless there is a tiered flat co-payment structure in place. In other words, patients would pay less for a generic and more for a branded drug. This system prevails in the US, where Health Maintenance Organizations and indemnity insurance companies view tiered co-payments as a means to leave consumers with the final choice of drug selection. The percentage co-payment can also promote generic use, as, *ceteris paribus*, consumers pay a proportion of the cost of the drug dispensed. Reference pricing also leaves the choice of final drug selection with the consumer, since it reimburses a cheaper generic. Patients who wish to purchase the more expensive brand will have to cover the difference between the reimbursable drug and their drug of choice. This arrangement works well in reference pricing systems that include identical drugs only, whereas it becomes more complicated when interchangeable or therapeutically similar drugs are included in a given cluster.

Summary of Policy Tools Used to Increase the Use of Generics

The policies described above are often used in combination to facilitate a high prevalence of generic pharmaceuticals (Table 2). It can be seen that systems that either facilitate early market entry of generic pharmaceuticals or put in place financial incentives for their use, are best able to achieve the dual aims of increasing the consumption of generic drugs and creating a competitive market in which substantial differences in prices exist between the generic and branded, originator versions of a pharmaceutical product. In Germany, the presence of financial incentives for physicians and pharmacists are offset by fixed reimbursement limits that remove the incentive for generic drug manufacturers to compete on price.

A policy of allowing generic substitution is prevalent in the selected countries. However, generic substitution, although desirable, is not a necessary and sufficient condition for high generic use. For instance, the UK is unique in achieving a high level of generic drug use despite not employing a policy of generic substitution. The UK policy of using generic drug names in medical education programs is credited with setting in place a prescribing behavior over the career of the physician with substantial impact on increasing generic prescribing (49). This policy is also in place in Canada. The high level of generic prescribing in the UK illustrates that other policy tools, particularly at prescribing level, are effective and warrant consideration by policy makers wishing to increase the use of generic medicines.

Quality Control of Generic Medicines

In many countries the perception of the safety and effectiveness of generic medicines is not good. This may be partly due to cultural norms that will require time to reverse. In the Netherlands, the government has run an information campaign with the aim of increasing their knowledge of generic medicine alternatives to originator medicines (9). If consumers harbor doubts regarding the standards of generic drugs, they are often in a position to refuse them. Thus ensuring the quality, safety, and efficacy of generic medicines is an important policy imperative. Generics have in the past been criticized for being substandard or suffering from major quality prob-

Table 2. Generic pharmaceutical policies in countries with high prevalence of the use of generic pharmaceuticals

Policy	Canada	Denmark	Germany	The Netherlands	UK	US
Bioequivalence testing and marketing application conducted prior to patent expiry	yes	no	no	no	no	yes
Reference pricing	yes[a]	yes[b]	yes[b]	yes	no	no
Physician budgets	no	no	yes	no	yes[c]	no
Financial incentives for pharmacists	yes	no	yes[d]	yes	yes	yes
Prescribing information systems	no	no	no	yes	yes	no
Generic substitution	yes	yes[e]	yes[f]	yes[f]	no	yes
Patient co-payments	yes	yes	yes	no	yes	yes

[a]Reference pricing exists in the provinces of British Columbia and New Brunswick.
[b]Excludes patented drugs.
[c]Existed as part of GP fundholding but was discontinued in 1998. Primary Care Groups and Primary Care Trusts (PCG/PCTs) will also have fixed budgets.
[d]Pharmacist remuneration is only slightly regressive.
[e]Pharmacists must dispense the cheapest product, unless otherwise indicated by the physician.
[f]With doctor's permission.

lems. Part of the problem related to poor compliance with Good manufacturing practice guidelines, or gaps in site inspections.

Good manufacturing practice is a set of principles designed to ensure that licensed medicines are manufactured only by licensed manufacturers, whose premises and processes are regularly inspected, and that the products comply with the latest standards of quality, safety, and efficacy. EU guidelines relating to Good manufacturing practice are set out in by the European Community's "Good manufacturing practice – medicinal products for human and veterinary use" (50). These guidelines are enforced as part of the EU legal framework, but responsibility for inspection and authorization lies with authorities in the member states (51).

With respect to imports from non-EU countries, the European Agency for the Evaluation of Medicinal Products has initiated mutual recognition agreements with Canada, the US, Australia, New Zealand, Switzerland, and Japan (52).

Conclusions

Evidence exists from several industrialized countries on policy tools to encourage the use of generic medicines. The evidence from these countries points towards the importance of strategies to facilitate ease of entry into the market for generic pharmaceutical manufacturers as well as policies to influence market demand. Price competition also benefits from unregulated pricing of branded, originator drugs and system of reimbursements to pharmacists that encourages competition on price. Perceptions of patients are also important and thus high standards in quality assurance and are an imperative. However, proxy demand-side policies, particularly policies focusing on physicians and less so on pharmacists, were found to be key in determining the nature and extent of generic use. Establishing policies is also as instrumental as enforcing them.

Finally, in countries seeking to contain pharmaceutical spending or creating more headroom for newer medicines through greater reliance in generic medicines, the above experience from industrialized countries must be adapted and take into account local conditions to guarantee acceptance and ensure performance.

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