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BACKGROUND: There is increasing interest in studying trends in drug utilization because drug costs are the fastest growing sector of the health care system.

OBJECTIVES: To focus on the trends in the utilization of and expenditures for cardiovascular drugs in Canada by drug class and by province over a six-year period.

METHODS: Data from the IMS Health Canada CompuScript Audit database were used for this study from the period of February 1996 to January 2002. Patterns of drug utilization and expenditures in Canada were described for cardiovascular drug classes, individual agents within classes and by provincial analyses.

RESULTS: Substantial increases in both the utilization of and the expenditures for cardiovascular medications have occurred in Canada over the last six years. Newer medication classes such as angiotensin converting enzyme inhibitors and statins now comprise the majority of cardiovascular drugs prescribed, along with continued high use of diuretics. Increases in some drug classes, such as angiotensin converting enzyme inhibitors, statins and beta-blockers, appear to be based on trial evidence or guidelines. However, marketing may play a larger role in the increases in use of angiotensin receptor blockers and specific drugs, such as amloidipine besylate and atorvastatin, because their increased utilization cannot be explained by major clinical trial evidence and/or practice guidelines.

CONCLUSIONS: Changes in patterns of cardiovascular drug utilization and expenditures in Canada may be associated with clinical trial evidence, clinical practice guidelines, policy changes and/or marketing initiatives.

Key words: Drug utilization; Heart disease; Medication; Practice pattern

Cardiovascular disease (CVD) remains the leading cause of premature death and disability in Canada in men and women, representing a major societal and population burden (1). Primary and especially secondary prevention of CVD with medications have been emphasized in Canadian practice guidelines to prevent future adverse cardiac events and mortality. Several clinical trials that have been published in the last six years provide strong evidence to support the routine use of several classes of prescription drugs. Recent evidence from the Long-term Intervention with Pravastatin in Ischaemic Disease (LIPID) trial, published in 1998 (2), and the Heart Protection Study, published in 2002 (3), provides additional evidence.
strong support for the use of statins in a wide variety of patients with CVD. Substantial clinical evidence has accumulated now to support the use of beta-blockers in congestive heart failure patients with the publication of the Metoprolol CR/XL Randomized Intervention Trial in Congestive Heart Failure (MERIT-HF) (4), the Carvedilol Prospective Randomized Cumulative Survival (COPERNICUS) study (5), the Cardiac Insufficiency Bisoprolol Study II (CIBIS-II) (6) and the carvedilol trials (7). The publication of the Heart Outcomes Prevention Evaluation (HOPE) trial (8), which used ramipril for the prevention of cardiac events in high-risk patients, expanded the potential use of angiotensin converting enzyme inhibitors (ACEIs) to a very broad population, in contrast to previous disease-specific evidence in acute myocardial infarction (AMI), diabetic nephropathy, non-diabetic renal disease, hypertension and congestive heart failure (8-10).

Several Canadian and American cardiovascular guidelines have also been published in the last six years, which may impact cardiovascular drug use in Canada. Guidelines for AMI support the chronic use of acetylsalicylic acid, beta-blockers, ACEIs and statins (11,12). Guidelines for congestive heart failure recommend routine use of ACEIs and beta-blockers, and in those with severe heart failure, spironolactone and/or digoxin (13,14). Hypertension guidelines, which traditionally recommended relatively cheaper diuretics and beta-blockers as first-line therapies, have more recently revised their recommendations, based on recent trials, to include more expensive ACEIs and calcium antagonists as possible first-line agents (15,16). There is also an increasing trend for recommending combination therapy if there is only a partial response to monotherapy, compared with previous recommendations of switching to alternative monotherapy if the initial treatment was only partially effective (15). Guidelines for the management of dyslipidemia have specifically recommended the use of statins for many groups of patients at high and very high risk of heart disease, even without elevated lipid levels (17,18).

Another factor that may impact cardiovascular drug use in Canada is the change in the population over time. From 1996 to 2001, the median age of Canadians increased by 2.3 years, from 35.3 years to 37.6 years, reaching an all-time high. This increasing age is due to the decline in the birth rate, the ageing population, and particularly, the ageing of the baby boomer generation. Between 1991 and 2001, the population aged 45 to 64 years increased by 36%, due to the baby boomer entering into this age group. With this large segment of the population ageing, an increase in the use of cardiovascular drugs is likely as this group develops heart disease (19).

The objective of the present study is to focus on the trends in the utilization of and expenditures for cardiovascular drugs in Canada by drug class, province, and in relation to the changes in new clinical trial evidence and guideline information over a six-year period. This information is not disease-specific, but reflects overall rates and illustrates trends in changes over time in utilization of drug classes and individual drugs in the treatment of cardiovascular disease.

METHODS

Data sources

Data from the IMS Health Canadian database was used for this study. IMS Health Canada's CompuScript Audit database (IMS Health Canada, Canada) is a source of prescription data obtained by measuring, through an audit, the number and value of prescriptions dispensed by retail pharmacies throughout Canada.

The target population comprises close to 6800 retail outlets (pharmacies) across Canada. The sampling design used is stratification. The retail outlet population is stratified by province, type of outlet (independent or affiliated with a chain) and size (small or large). Sample stores are selected from over 4400 reporting stores by applying a variety of criteria regarding such characteristics as prescription type and volume, consistency of reporting and payment type. This represents about two-thirds of all retail pharmacies in Canada. Data for the audit are collected monthly by electronic means from the sample comprising approximately 2800 drug stores distributed proportionally within each strata. An additional control is conducted to ensure good representation from the various chains of stores. After passing through various quality control checks, the sample data are projected to the universe in each province and provincial totals are summed to provide a national estimate. Maximum overlap between the waves is maintained to ensure increased reliability of the projected trends from one period to another. The estimator used is the Horvitz-Thompson estimator.

The data collected can be used to ascertain prescription volume by product (or class) and the market share for trending purposes, providing a measure of product utilization. Also available is the cost of the prescription as dispensed (including all mark-ups and the pharmacist’s professional fee). IMS Health Canada has drug utilization data for a 72-month period. This study included data from the period of February 1996 to January 2002. IMS Health Canada does not measure population-wide, patient-specific data. However, measuring a large sample of pharmacies and extrapolating the data to the overall population generates estimates of drug utilization in each province.

Statistical analysis

Descriptive statistics were used to report on the data for cardiovascular drug utilization. The utilization of cardiovascular drug classes described include beta-blockers, calcium antagonists, statins, ACEIs, angiotensin receptor blockers (ARBs), diuretics, nitroglycerin and oral anticoagulants. For each class of drugs, the trends are described by number of prescriptions and total cost of prescription claims (as extrapolated to the total population). The utilization of drugs was summarized nationally and for each province by month and year (1996 to 2001). National monthly utilization data, by province and by agent within each class were used to generate figures illustrating the changes in the trends for each drug class over the six-year study period. Absolute changes in drug utilization and expenditures were assessed, as well as the relative per cent changes in these parameters. For combination products of beta-blockers, ACEIs or ARBs with diuretics, these products were included in the total numbers for the single entity drug product.

RESULTS

The national pattern of cardiovascular drug utilization is shown in Figure 1 and trends in drug expenditures in Figure 2. Figure 1 shows that utilization of all cardiovascular drug classes is increasing, with the exception of nitroglycerin, for which utilization remains flat. The top three prescribed cardiovascular drugs in Canada are diuretics, ACEIs and statins, with the largest increase in usage seen with statins over the time period of the study. Figures 2 and 3 show increasing expenditures for cardiovascular drugs over time, with substantial increases in the expenditures for statins, ACEIs and ARBs. The remaining drug classes show stable expenditures, including classes of
relatively high utilization but relatively low cost medications, such as diuretics and beta-blockers. While the calcium antagonists are the fifth highest drug class by utilization, they are the third highest drug class by cost. The total cardiovascular drug expenditure in Canada has more than doubled over the six-year study period.

Table 1 shows the utilization of drug classes per 100,000 population per year by province. When adjusted by population, utilization of several drug classes is highest in the province of Quebec. Diuretics remain the most commonly used cardiovascular drugs in each individual province, with the exception of Newfoundland and Labrador and Prince Edward Island, where ACEIs slightly surpass the utilization rate of diuretics. In most provinces, ACEIs are the second most commonly used cardiovascular drugs, with beta-blockers as the third most frequently used agent. In a few provinces, this order is reversed. Of note, calcium antagonists are the third most commonly used cardiovascular drug in Quebec, Ontario and Manitoba. A gradient appears to exist for many drugs, with higher utilization in Eastern Canada.

Table 1 also shows the drug utilization ratio for each drug class between the province with the highest number of prescriptions and the province with the lowest number of prescriptions. This ratio is as high as 5.41 for the newer drug class of ARBs, and as low as 2.13 and 2.21 for more established drugs such as anticoagulants and sublingual nitroglycerin (SLNTG), respectively.

Table 2 shows the cardiovascular drug expenditures per 100,000 population per year by province. Similar to utilization, the drug expenditures are higher per population in Quebec than in the other provinces. However, the specific drug classes that comprise the highest costs are different than the most frequently used cardiovascular drugs. ACEIs, statins and calcium antagonists make up the top three cardiovascular drugs by cost for all of the provinces.

Utilization within each cardiovascular drug class was determined to detect trends in utilization of the specific agents. In general, the utilization patterns are consistent with the patterns for expenditures of the drugs. Data on the utilization patterns is presented in the following section.
### TABLE 1
Average number of cardiovascular drug prescriptions per 100,000 population* per year by province, from 1996 to 2001

<table>
<thead>
<tr>
<th>Province</th>
<th>Anticoag</th>
<th>NITRO</th>
<th>SLNTG</th>
<th>BETA</th>
<th>CA</th>
<th>ACEI</th>
<th>ARB</th>
<th>DIUR</th>
<th>STATIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>NL/PEI</td>
<td>5398</td>
<td>8655</td>
<td>3051</td>
<td>41,401</td>
<td>29,707</td>
<td>55,751</td>
<td>3186</td>
<td>55,053</td>
<td>19,847</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>5196</td>
<td>9213</td>
<td>3032</td>
<td>39,749</td>
<td>29,578</td>
<td>36,949</td>
<td>6284</td>
<td>47,358</td>
<td>21,298</td>
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<tr>
<td>New Brunswick</td>
<td>5627</td>
<td>8915</td>
<td>2450</td>
<td>33,461</td>
<td>28,946</td>
<td>33,459</td>
<td>2620</td>
<td>42,178</td>
<td>21,112</td>
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<tr>
<td>Quebec</td>
<td>9343</td>
<td>8536</td>
<td>3290</td>
<td>45,126</td>
<td>44,722</td>
<td>44,141</td>
<td>13,139</td>
<td>61,986</td>
<td>42,585</td>
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<tr>
<td>Ontario</td>
<td>4850</td>
<td>3470</td>
<td>2977</td>
<td>20,654</td>
<td>20,739</td>
<td>25,899</td>
<td>3437</td>
<td>29,329</td>
<td>17,402</td>
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<td>Manitoba</td>
<td>5484</td>
<td>4899</td>
<td>2768</td>
<td>20,961</td>
<td>21,280</td>
<td>31,360</td>
<td>8329</td>
<td>64,898</td>
<td>16,837</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>9158</td>
<td>5517</td>
<td>2141</td>
<td>28,264</td>
<td>27,363</td>
<td>43,628</td>
<td>8329</td>
<td>64,898</td>
<td>16,995</td>
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<tr>
<td>Alberta</td>
<td>5304</td>
<td>3246</td>
<td>1488</td>
<td>14,259</td>
<td>13,884</td>
<td>21,815</td>
<td>5048</td>
<td>25,860</td>
<td>11,614</td>
</tr>
<tr>
<td>British Columbia</td>
<td>4383</td>
<td>3157</td>
<td>1801</td>
<td>14,762</td>
<td>12,691</td>
<td>19,864</td>
<td>2428</td>
<td>23,584</td>
<td>10,883</td>
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<tr>
<td>NL/PEI</td>
<td>5398</td>
<td>8655</td>
<td>3051</td>
<td>41,401</td>
<td>29,707</td>
<td>55,751</td>
<td>3186</td>
<td>55,053</td>
<td>19,847</td>
</tr>
</tbody>
</table>

Data from IMS Health Canada. *Population data from 2001 Statistics Canada Census (19). Ratio highest/lowest† is the ratio of drug class utilization between the provinces with the highest number of prescriptions and the province with the lowest number of prescriptions. ACEI Angiotensin converting enzyme inhibitor; Anticoag Anticoagulants; ARB Angiotensin receptor blocker; Beta Beta-blocker; CA Calcium antagonist; Diur Diuretic; Nitro Nitroglycerin; NL Newfoundland and Labrador; PEI Prince Edward Island; SLNTG sub-lingual nitroglycerin

### TABLE 2
Average cost of cardiovascular drug prescriptions per 100,000 population* per year by province, from 1996 to 2001

<table>
<thead>
<tr>
<th>Province</th>
<th>Anticoag (CND$)</th>
<th>NITRO (CND$)</th>
<th>SLNTG (CND$)</th>
<th>BETA (CND$)</th>
<th>CA (CND$)</th>
<th>ACEI (CND$)</th>
<th>ARB (CND$)</th>
<th>DIUR (CND$)</th>
<th>STATIN (CND$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NL/PEI</td>
<td>159,696</td>
<td>311,954</td>
<td>47,534</td>
<td>1,031,533</td>
<td>1,668,410</td>
<td>2,643,652</td>
<td>182,020</td>
<td>586,177</td>
<td>1,577,853</td>
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<td>Nova Scotia</td>
<td>173,548</td>
<td>345,004</td>
<td>59,895</td>
<td>1,279,546</td>
<td>2,119,290</td>
<td>2,226,540</td>
<td>431,599</td>
<td>568,162</td>
<td>2,250,880</td>
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<tr>
<td>New Brunswick</td>
<td>182,242</td>
<td>355,433</td>
<td>52,109</td>
<td>1,045,867</td>
<td>1,965,677</td>
<td>2,009,004</td>
<td>175,788</td>
<td>480,003</td>
<td>2,155,446</td>
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<tr>
<td>Quebec</td>
<td>170,822</td>
<td>253,028</td>
<td>58,985</td>
<td>964,085</td>
<td>2,035,399</td>
<td>1,623,565</td>
<td>564,635</td>
<td>602,273</td>
<td>2,766,204</td>
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<tr>
<td>Ontario</td>
<td>144,378</td>
<td>148,894</td>
<td>55,535</td>
<td>731,362</td>
<td>1,860,122</td>
<td>1,947,976</td>
<td>298,523</td>
<td>366,163</td>
<td>2,370,654</td>
</tr>
<tr>
<td>Manitoba</td>
<td>143,991</td>
<td>161,532</td>
<td>34,397</td>
<td>563,985</td>
<td>1,236,566</td>
<td>1,594,448</td>
<td>369,782</td>
<td>354,906</td>
<td>1,509,287</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>231,646</td>
<td>164,383</td>
<td>38,967</td>
<td>605,067</td>
<td>1,375,899</td>
<td>1,841,794</td>
<td>408,783</td>
<td>617,306</td>
<td>1,171,891</td>
</tr>
<tr>
<td>Alberta</td>
<td>166,105</td>
<td>127,402</td>
<td>29,965</td>
<td>491,803</td>
<td>1,141,664</td>
<td>1,477,346</td>
<td>403,766</td>
<td>349,208</td>
<td>1,420,730</td>
</tr>
<tr>
<td>British Columbia</td>
<td>164,322</td>
<td>146,519</td>
<td>36,172</td>
<td>567,827</td>
<td>1,108,289</td>
<td>1,459,680</td>
<td>216,296</td>
<td>250,858</td>
<td>1,529,174</td>
</tr>
</tbody>
</table>

Data from IMS Health Canada. *Population data from 2001 Statistics Canada Census (19). ACEI Angiotensin converting enzyme inhibitor; Anticoag Anticoagulants; ARB Angiotensin receptor blocker; Beta Beta-blocker; CA Calcium antagonist; Diur Diuretic; Nitro Nitroglycerin; NL Newfoundland and Labrador; PEI Prince Edward Island; SLNTG sub-lingual nitroglycerin

![Figure 4](image4.jpg) Change in angiotensin receptor blocker prescriptions in Canada, from 1996 to 2001. Data from IMS Health Canada. Note: Data for eprosartan is not shown; it entered the Canadian pharmaceutical market in January 2001

![Figure 5](image5.jpg) Change in angiotensin converting enzyme inhibitor prescriptions in Canada, from 1996 to 2001. Data from IMS Health Canada. Note: Data from benazepril, cilazapril, perindopril and trandolapril are not shown due to low rate of use
Figure 6) Change in statin prescriptions in Canada, from 1996 to 2001. Data from IMS Health Canada

Figure 7 illustrates the absolute changes in beta-blocker utilization over time, with atenolol and metoprolol tartrate showing, by far, the largest market share and the largest continual increases in utilization rates. The newer beta-blockers, those prescribed mainly for use in heart failure (carvedilol and bisoprolol fumarate), have the largest relative increases in use over time but comprise very little of the overall market share.

Figure 8 illustrates the changes in utilization patterns of calcium antagonists. Amlodipine mesylate utilization was substantially increased during the study period and there were slight decreases in the utilization of nifedipine and diltiazem hydrochloride.

DISCUSSION

The present study shows that utilization and expenditures of cardiovascular drugs in Canada have steadily increased over the six-year period. The major increases in utilization and expenditures have been with the newer drug classes: the ACEIs and the statins. However, the most frequently used cardiovascular drug class in Canada remains the diuretics. There has been no significant decrease in utilization of any cardiovascular drug class. Therefore, there is an absolute increase in the overall utilization of cardiovascular drugs in Canada. This increase translates into a more than doubling of the total expenditure for cardiovascular drugs in the country from 1996 to 2001 alone. Many of these medications improve outcomes and may temporarily decrease resource utilization in other sectors of the healthcare system, such as hospital admissions. Increases of these particular medications known to have these benefits may be seen as an advance in the healthcare of Canadians. However, this rapid increase in drug utilization, particularly of those drugs not known to improve outcomes, is probably not sustainable for drug plans and solutions need to be found to manage these drug utilization increases.

There are several plausible reasons for the increase in drug utilization over this time period. Many new clinical trials have provided evidence, supported in recent clinical practice guidelines, in support of the use of diuretics, statins, ACEIs, beta-blockers and calcium antagonists in cardiac patients (2-18). In addition, due to the ageing population, there may be more candidates for cardiovascular drug use as more of the population of Canada may develop, or be at risk for developing, heart disease (hypertension, dyslipidemia and diabetes) (19). Of note, although utilization of calcium antagonists is the fifth highest medication class, its expenditures are the third highest of the classes. Therefore, on a unit basis, calcium antagonists are relatively more expensive than the other new medication classes. Provincially, some similar patterns of both utilization and expenditure for the different drug classes exist; however, there are significant provincial variations in the top three cardiovascular medications used and their subsequent costs.

A large gradient in the magnitude of utilization and costs of cardiovascular drugs across the country was demonstrated. The ratio of the province with the highest use of the particular drug class to the province with the lowest use is as high as five for drugs such as ARBs, a class perhaps where evidence is less certain (Table 1). Ratios of utilization are lowest for classes such as anticoagulants and SLNTGs, drugs for which there is little
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Controversy about their use. However, there remains a large gradient between provinces in the magnitude of utilization, regardless of whether evidence-based cardiovascular drugs are being examined or not. The east-to-west gradient of drug utilization and costs may relate to the prevalence and burden of cardiovascular disease across the country. In previous Canadian Journal of Cardiology papers, it was shown that hospitalization rates, risk factors and cardiovascular death rates from cardiovascular disease also follow an east-west gradient, being the highest in Newfoundland and Labrador and lowest in British Columbia (20-22). The parallel effect in cardiovascular drug use may very well be appropriate given the varying burden of heart disease across the country.

It is possible that some of the provincial differences reflect variations in drug reimbursement policies. In general, there is little difference between provinces with respect to the patients and medications covered in drug reimbursement policies. However, some differences do exist. One notable exception is with ARBs. Ontario and British Columbia require special procedures for access to ARBs, whereas these agents are included in general benefits in Quebec. These policies are mirrored in the rates of ARB use adjusted per population, with the highest use in Quebec and the lowest use in British Columbia and Ontario. In addition, the Reference Drug Program in British Columbia for ACEIs, calcium antagonists and nitrates (ie, SLNTG and nitroglycerin) may relate to British Columbia having the lowest rates of use of each for these drug classes compared with the other provinces. Since British Columbia has the lowest drug use in all drug categories, these policies only partially explain the differences. Other reasons for these interprovincial variations warrant further investigation.

The absolute use of ARBs is relatively low compared with other classes of agents. However, the sharp incline in the rate of use of ARBs since their introduction in 1996 is quite dramatic. This significant change in the market share of the ARB class is of particular interest because the only major studies to be published during this period were the Losartan Heart Failure Survival Study (ELITE II) (2000) (23) and theValsartan Heart Failure Trial (Val-HeFT) (2001) (24), which demonstrated that ARBs were not superior in reducing mortality compared with ACEIs for the treatment of heart failure. While more recent evidence has been published about the renal protective effect of some ARBs, this was after the present study period (25). Clinical practice guidelines also did not emphasize the use of ARBs during this period, leaving this class as a second-line agent to ACEIs for heart failure and as a third-line agent for hypertension (13,15). Therefore, the substantial increase in the use of this class of medications demonstrated in the present study was not likely influenced by clinical trial evidence or guidelines, and most probably was secondary to marketing initiatives, and possibly, better tolerability of this class of medications compared with ACEIs for heart failure (23).

It is not surprising that ramipril had the largest increase in the market share in the ACEI class and is the ACEI with the greatest utilization, given the trial evidence in both post-AMI patients (Acute Infarction Ramipril Efficacy [AIRE], 1993) (26) and in general cardiovascular protection (HOPE, 2000) (8). However, there was a sharp increase in ramipril utilization starting from November 1999 when it was presented at the American Heart Association meeting in Atlanta (27). Details of the impact of the HOPE trial on ACEI prescribing in Ontario have been published elsewhere (28).

The present study found that atorvastatin is the statin with the largest market share and the greatest increase in drug utilization rates. Although it is the most potent statin for lowering total cholesterol, low-density lipoproteins and triglycerides, as described in the Comparative Study of HMG-CoA Reductase Inhibitor, Atorvastatin, Versus Equivalent Dose Strengths of Statins (CURVES) (1998) (29), it was not until the Myocardial Ischemia Reduction with Acute Cholesterol Lowering (MIRACL) trial was published in 2001 (30) that any clinical trial outcome data existed for atorvastatin. Yet, there was a striking increase in utilization apparent from its introduction to the market in April 1997. This increase in use and large market share for atorvastatin is in spite of the fact that simvastatin and pravastatin sodium have demonstrated mortality benefits from large clinical trials, and that pravastatin sodium is relatively less expensive than atorvastatin (2,3,31,32). The impact of the CURVES trial regarding lipid lowering potential, or the marketing efforts for this agent likely influenced its significant impact on utilization and market share within the statin medication class. Previous studies have illustrated the impact of the Scandinavian Simvastatin Survival Study (4S) on the utilization of statins in high-risk patients (33).

While clinical practice guidelines for hypertension and post-AMI continue to promote the use of beta-blockers, the major changes in beta-blocker evidence results from those trials conducted recently (1996 to 2001) in heart failure patients (MERIT, COPERNICUS, CIBIS-II and US carvedilol trials) (4-7). While it was found that the most commonly prescribed agents have remained atenolol and metoprolol tartrate, it is the newest agents, proven beneficial for heart failure, that had the largest relative increases in use. The increases in carvedilol use are apparent from November 1996 onward, and those for bisoprolol, from February 2001, both of which coincide with the publication of supportive clinical trial evidence for their use in heart failure.

Use of the calcium antagonist amlodipine besylate substantially increased over the study period. This is despite a paucity of clinical trial outcome data for this agent within the class or compared with other cardiovascular medication classes. Amlodipine besylate was studied for heart failure in the Prospective Randomized Amlodipine Survival Evaluation (PRAISE) 1 (published in 1996) (34) and PRAISE 2 (presented in 2000) (35) studies, and while results of PRAISE 1 appeared promising in a select group with nonischemic cardiomyopathy, the PRAISE 2 trial found no benefit. While long-acting calcium antagonists are now recommended as first-line agents for isolated systolic hypertension and no specific agent is recommended, the clinical trials on which this recommendation is based were not conducted with amlodipine besylate but were based on the Syst-Eur and Syst-China studies with nitrendipine and nifedipine (36,37). So concrete reasons for the substantial increase in the use of amlodipine besylate remain elusive, and the increase may simply be the result of strong marketing initiatives.

It is important to note that many medications, such as ACEIs for congestive heart failure and statins for coronary heart disease, are still underutilized despite the large increase in utilization found in the present study (33). Focusing on using prescribed feedback systems to increase the use of evidence-based medications over those without evidence of benefit must take precedence so that patient outcomes and population health are improved.
REFERENCES


