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# Generic Drug Cost Containment in Medicaid: Lessons from Five State MAC Programs

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*In Medicaid, generic drug cost containment revolves around two programs: the Federal upper limit (FUL) program and State maximum allowable cost (MAC) programs. This article analyzes MAC programs in five States and finds considerable variation between these programs and the FUL program in both size and pricing aggressiveness. We conclude that expansion of existing MAC programs and creation of new ones could contribute to cost containment efforts nationwide. Options for States seeking to optimize their efforts include focusing on pricing for drugs with high sales volumes, ensuring that MAC lists include prices for all forms and dosages of listed drug entities, and collaborating with other States or the Federal Government on MAC list operations.*

## INTRODUCTION

The current State budgetary environment has fueled a search for innovative ways to control Medicaid spending on prescription drugs. While brand-name drugs have received the most attention from policymakers, generic drugs also deserve consideration, as they account for between 15 and 20 percent of Medicaid drug spending

(McNeil and Harper, 2002; Wimpee, Zuchlewski, and Kerber, 2002; Hawkins, 2002; Gruel, 2002; Bridges, 2002; and Commonwealth of Massachusetts, 2002). Generic drug cost containment in Medicaid revolves around the FUL program, in which CMS establishes maximum prices at which Medicaid will reimburse for certain generic drug forms, and State MAC programs, through which individual State Medicaid Programs create their own lists of maximum reimbursement prices for generic drugs. As a general rule, State MAC lists include more drugs and establish more aggressive (i.e., lower) reimbursement prices than the FUL list. States with established MAC programs have reported annual pharmacy budget savings of up to 4 percent (Wimpee, Zuchlewski, and Kerber, 2002); therefore, it is worth considering whether expansion or enhancement of State MAC programs could contribute to cost containment efforts nationwide.

Our objective in this article is to characterize these State MAC lists with respect to the number of drugs included and the aggressiveness of pricing for these drugs, comparing these lists both with each other and the FUL, in order to derive lessons in support of further policy development in this area.

## BACKGROUND

MAC lists are State-level programs designed to ensure that Medicaid acts as a prudent purchaser of generic and

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multi-source brand drugs.<sup>1</sup> States with MAC programs typically publish lists of selected generic and multi-source brand drugs along with the maximum price at which Medicaid will reimburse for those drugs. In general, pharmacies will receive payment no higher than the MAC price when billing Medicaid for drugs on a State's MAC list. According to the National Pharmaceutical Council (2002), 30 States had MAC lists in 2001; since then, a number of States have created new MAC lists, but others, such as New York, are still functioning without MAC programs (Merola, 2003).

State MAC programs are similar to the FUL program, which establishes national ceiling prices for certain generic drugs under Medicaid. Established in 1987, the FUL program stipulates that CMS assign upper-limit prices for certain multi-source drugs and requires that aggregate Medicaid expenditures for those drugs not exceed the calculated reimbursement amount using FUL prices.<sup>2</sup>

An important difference between the FUL program and State MAC programs is that State MAC lists typically contain more drugs and assign lower prices than the FUL list. Federal regulations state that CMS may only assign FUL prices for drugs if the FDA has evaluated at least three formulations of the drug as therapeutically equivalent and at least three suppliers list the drug for sale in national drug price compendia (*Code of Federal Regulations*, 2002). State Medicaid Programs, on the other hand, have greater latitude and employ less stringent criteria in determining which drugs are eligible for inclusion

on their MAC lists. State MAC programs also have greater flexibility in setting drug prices than does the FUL program, which according to Federal regulations must set prices at 150 percent of the published price for the least costly therapeutic equivalent drug (*Code of Federal Regulations*, 2002).

## METHODS

### Definition of Terms

We use two terms to characterize the number of drugs on a State MAC list. *Breadth* is defined as the number of different drug entities represented on a MAC list, where each drug entity represents a different molecular compound (e.g., atenolol is a drug entity). Different strengths, forms, or package sizes of the same molecular compound do not represent different drug entities and therefore do not enter into the assessment of MAC list breadth. By contrast, *depth* is defined as the representation of different strengths, forms, and package sizes on a MAC list, and is equivalent to the number of different generic code numbers (GCNs) per drug entity included on the list. A GCN is a standard number assigned by First DataBank (a drug pricing service) to each strength, formulation, and route of administration of a drug entity; atenolol 25 mg tablets, oral, for example, has its own unique GCN. One drug entity may have multiple GCNs, depending on the product's available strengths (e.g., 50 mg, 100 mg, etc.), forms (e.g., tablet, capsule, liquid, etc.), and routes of administration (e.g., oral, transdermal, injectable, etc.).

### Selection of MAC Programs

This study was designed to include a range of different sized MAC programs based on the number of drugs included on

<sup>1</sup> A multi-source brand drug is an off-patent drug that is still marketed under its brand name, despite the availability of generic substitutes. Examples include Zantac®, Prozac®, and Ritalin®.

<sup>2</sup> States may set certain MAC prices higher than the corresponding FUL prices, as long as total Medicaid expenditures for all drugs with FUL prices does not exceed the total calculated reimbursement amount using FUL prices (*Code of Federal Regulations*, 2002).

their lists (i.e., breadth). First, we conducted informal telephone interviews with Medicaid officials from around the Nation to produce a list of small-to-medium and medium-to-large MAC programs. Then we selected from each list States with which we had pre-existing research relationships from an ongoing CMS-sponsored study (The Health Strategies Consultancy, 2001). Georgia and Washington were chosen to represent the small-to-medium programs, and Texas, Arkansas, and Maryland were chosen to represent the medium-to-large programs.

## Data Collection

Data for this study were collected from August to December 2002 using telephone interviews, information posted on State and Federal Web sites, and written correspondence with State officials responsible for administering the MAC programs in their respective States. We obtained MAC lists, containing maximum Medicaid reimbursement prices listed by GCN, for Georgia (<http://www.communityhealth.state.ga.us>); Washington (<http://fortress.wa.gov/dshs/maa/pharmacy>); Texas (<http://www.hhsc.state.tx.us/HCF/vdp/productenroll.html>); and Arkansas (<http://www.medicaid.state.ar.us/>). We obtained the FUL drug list from CMS (2004).

Medicaid officials in Maryland were unable to supply a MAC list with prices listed by GCN, because Maryland uses a slightly more complex medication classification scheme that subdivides drug entities by unit dose. For this reason, Maryland was excluded from the quantitative comparison of MAC list size and pricing aggressiveness.

In addition to furnishing MAC price lists, Medicaid officials in all five States participated in interviews following a standard protocol inquiring about (1) generic drug utilization in the case study State, (2)

general State policies toward generic drugs, (3) MAC program history, (4) political context, (5) process for selecting products, (6) methodology for determining prices, (7) procedures for MAC list updates, (8) process for notifying providers of changes, (9) assessment of program effectiveness, and (10) use of third-party vendors for assistance in administering the program. In most cases, telephone interviews were followed-up with additional requests for information.

## Data Analysis

### Drug Lists and Pricing Information

Drug lists and pricing information from Georgia, Washington, Texas, and Arkansas's MAC programs and the FUL program were aggregated into a master spreadsheet. (As previously noted, Maryland was excluded from the quantitative analysis because their drug classification scheme could not be matched with that of the other State MAC lists and the FUL list.) In order to ensure accurate measurements of list size, each list was reviewed to ensure that there were no duplicate entries (i.e., that each individual GCN was listed only once on each list); in addition, all outdated references to drugs no longer marketed were removed. All prices for oral medications were listed as per-unit prices for all package sizes within a GCN. (The FUL list and all State MAC lists, except for Texas, use per-unit prices at the 100-count package size for all package sizes within a GCN. For Texas, which lists MAC prices down to the package size level, calculated per-unit prices were averaged across all applicable package sizes in order to obtain a standard per-unit price for all package sizes within a GCN.) Package size prices were retained for topical drugs (e.g., creams, ointments) and some liquid forms (e.g., eye drops,

**Table 1**  
**FUL and MAC List Per Unit Prices for 20 Representative Generic Drugs, by Study State: 2001**

Drug Entity, Strength, and Form	Total National Sales, 2001 (Millions) <sup>1</sup>	MAC Programs				
		FUL List	Georgia	Arkansas	Washington	Texas
Acyclovir 200 mg Capsules	\$224.1	\$0.3525	\$0.3530	\$0.3525	\$0.3382	\$0.2424
Albuterol 0.083 Percent Nebulizer Solution, 3 mL	368.9	0.1450	0.1572	0.1093	0.1990	0.0925
Albuterol 90 mg Inhaler Refills	702.7	—	—	—	0.4394	0.2932
Alprazolam 0.25 mg Tablets	598.9	0.0480	0.0560	0.0480	0.0383	0.0312
Amitriptyline HCl 10 mg Tablets	173.1	0.0466	0.0315	0.0466	0.0466	0.0242
Amoxicillin 250 mg Capsules	366.8	0.0636	0.0636	0.0636	0.0735	0.0494
Atenolol 25 mg Tablets	551.8	0.0461	0.0460	0.0614	0.0825	0.0386
Cephalexin 250 mg Capsules	442.4	0.1500	0.1700	0.2513	0.1103	0.0795
Clonazepam 0.5 mg Tablets	367.2	0.2455	0.2760	0.2455	0.1800	0.2013
Enalapril maleate 2.5 mg Tablets	432.5	—	0.6347	0.0625	—	0.0699
Fluoxetine 10 mg Capsules	730.6	—	—	0.1556	0.0953	0.4426
Glyburide 1.25 mg Tablets	333.7	—	0.1466	0.0671	0.1312	—
Hydrochlorothiazide 25 mg / Triamterene 37.5 mg Capsules	324.0	0.3177	0.3014	0.3177	0.3075	0.2284
Ibuprofen 400 mg Tablets	257.0	0.0493	0.0640	0.0493	0.0338	0.0287
Isosorbide Mononitrate 10 mg Tablets	331.6	0.6110	0.6110	0.6111	0.6110	0.4562
Lorazepam 0.5 mg Tablets	536.5	0.4350	0.4350	0.4350	0.0982	0.1081
Naproxen 250 mg Tablets	323.0	0.1325	0.1035	0.1044	0.1075	0.0780
Ranitidine HCl 150 mg Tablets	707.8	0.3411	0.2294	0.3411	0.0800	0.0417
Verapamil HCl 120 mg ER Capsules	335.3	0.8250	0.8250	0.8250	0.8250	0.6440
Warfarin 1 mg Tablets	240.2	—	0.4361	0.4362	—	0.4959

<sup>1</sup> These data represent total nationwide sales (not just Medicaid) for all available forms and strengths of the listed drug entity. For comparison, total nationwide generic sales in 2001 were approximately \$27 billion.

NOTES: FUL is Federal upper limit. MAC is maximum allowable cost.

SOURCE: (Scott-Levin, 2002.)

antibiotics, injectables) where separate prices were available. Table 1 shows prices obtained for 20 representative generic drugs used in our analyses; the drugs listed accounted for approximately 31 percent of total nationwide generic drug sales in 2001.

### Sales Volumes

Sales figures for individual generic drugs within each State Medicaid Program were unavailable. In order to perform volume weightings roughly comparable to generic sales volumes within State Medicaid Programs, we obtained sales figures for the top 200 generic drugs by overall national sales (not just Medicaid) in 2001, as compiled by Scott-Levin (2002). According to their data, these accounted for 90 percent of total national generic drug sales in 2001 (approximately \$27 billion).

### FUL and Non-FUL Drugs

The drugs contained in the master spread-sheet were divided into two groups: (1) FUL—the set of drugs (listed by GCN) for which prices are established by CMS, and (2) non-FUL—the set of drugs (listed by GCN) for which no FUL price is set by CMS. For example, clonazepam 0.5 mg tablets was categorized as a FUL drug, while fluoxetine 10 mg capsules, because it has no FUL price, was categorized as a non-FUL drug (Table 1).

If a certain drug entity contained some GCNs with FUL prices and some GCNs without FUL prices, the GCNs with FUL prices were placed in the FUL list and the GCNs without FUL prices were placed in the non-FUL list. For example, amoxicillin 250 mg capsules and amoxicillin 500 mg capsules both have FUL prices and were therefore designated as FUL drugs;

however, amoxicillin 875 mg tablets does not have a FUL price and was therefore designated as a non-FUL drug.

## Data Analyses

Separate data analyses were performed for the FUL and non-FUL drug groupings. Data analyses for the FUL drugs were designed to examine the importance of FUL drugs within the larger universe of generic drugs and the extent to which FUL drugs on State MAC lists are priced lower than on the FUL list itself. The following analyses were performed:

- A calculation of the percentage of total national generic drug sales accounted for by FUL drugs. This calculation was obtained by summing the total 2001 national sales for all FUL drugs (Scott-Levin, 2002) and then dividing by the total national 2001 sales for all generic drugs. The resultant figure estimates the rough percentage of total generic Medicaid sales accounted for by drugs with FUL prices, with the acknowledged limitation that the distribution of generic drug sales in Medicaid would differ somewhat from the distribution of total generic drug sales in all markets nationwide.
- A comparison of the average per-unit price for a FUL drug, weighted by sales volume, from the Texas, Arkansas, Georgia, and Washington MAC lists, and the FUL list. This analysis was performed in several steps. First, each MAC list and the FUL list was reprocessed to represent prices by drug entity rather than by GCN; this was done by calculating non-weighted averages of all of the GCN-specific prices for each drug entity on each list. (This first step was necessary because Scott-Levin [2002] provides sales estimates by drug entity, not by GCN.) Second, prices by drug entity

were multiplied by the 2001 national sales for that drug entity for all drug entities on all five lists. Third, these last figures were added together and divided by the total 2001 national sales for all FUL drugs. The result was a volume-weighted average drug price for each drug list.

Data analyses for the non-FUL drugs were designed to examine the extent to which State MAC lists include drugs other than those with established FUL prices, and the variability between State MAC lists with regard to breadth, depth, and pricing aggressiveness for non-FUL drugs. The following analyses were performed:

- A count of the total number (i.e., breadth) of non-FUL drug entities represented on the Texas, Arkansas, Georgia, and Washington MAC lists.
- A comparison of the four MAC lists on the average number of GCNs listed per non-FUL drug entity (i.e., depth). To ensure a meaningful comparison, this analysis included only those non-FUL drug entities for which at least one GCN appeared on all four State MAC lists.
- A comparison of the four MAC lists on the average price for a non-FUL drug. To ensure a meaningful comparison, this analysis included only those non-FUL GCNs for which prices were listed on all four States MAC lists. Because sales volumes were not available for all of these drugs, this calculation was a non-weighted average.

## RESULTS

### FUL Drugs

*Percentage of generic drug sales.* Sales of drug entities with FUL prices accounted for approximately \$17.7 million, or 65 percent of total nationwide generic drugs sales of \$27.2 million in 2001.

*Volume-weighted average per-unit prices.* The Texas MAC list had the lowest weighted-average price for FUL drugs at \$0.26 per unit, followed by Arkansas at \$0.28. Washington had a weighted-average price of \$0.35 per unit, while Georgia's MAC and FUL lists both had weighted-average prices of \$0.37 per unit.

### **Non-FUL Drugs**

*Breadth of drugs represented on MAC lists.* The Arkansas MAC list contained the highest number of non-FUL drug entities at 95, followed by Texas at 91. Georgia's MAC list contained 82 non-FUL drug entities, while Washington's contained 67.

*Depth of drugs represented on MAC lists.* The Arkansas MAC list had the most depth, containing prices for an average of 4.02 GCNs per drug entity. Texas's MAC list contained prices for 3.84 GCNs, followed by Washington's for 2.98, and Georgia's for 2.72. To ensure a meaningful comparison, these figures included only those non-FUL drug entities for which at least one GCN appeared on all four State MAC lists (a total of 43 drug entities).

*Average per-unit prices.* The Arkansas MAC list had the lowest average price for non-FUL drugs at \$0.26 per unit, followed by Texas at \$0.27. Washington's list had an average price of \$0.31 per unit, while Georgia's had an average price of \$0.32 per unit. To ensure a meaningful comparison, these figures included only those non-FUL GCNs for which prices were listed on all four State MAC lists (a total of 70 GCNs). Because sales volumes were not available for all of these drugs, per-unit prices were calculated as non-weighted averages.

## **DISCUSSION**

MAC and FUL programs contribute to State Medicaid pharmacy program savings in two ways. First, they exert a mix effect by encouraging pharmacies to dispense generic rather than brand-name products. (For drugs on MAC or FUL lists, pharmacies have an obvious incentive to dispense generic products, because MAC and FUL reimbursements are based on generic rather than brand-name drug prices.) Second, they exert a price effect by directly limiting Medicaid reimbursements for listed generic drug products.

Programs exert these effects in proportion to the size (i.e., breadth and depth) and the pricing aggressiveness of their drug lists. Because State MAC programs generally have more latitude than the FUL program in placing drugs on their lists and in setting prices for those drugs, MAC programs are typically larger and more price aggressive than the FUL program. Our study was designed to quantify the degree to which State MAC lists are larger than the FUL list, the degree to which they are more price aggressive, and the variability among State MAC lists regarding size and pricing for non-FUL drugs, i.e., drugs that do not have established FUL prices.

Our analyses for FUL drugs yielded three important observations. First, they account for approximately 65 percent of total nationwide generic drug sales. This finding indicates that FUL drugs are important, and that small variations in pricing for this set of drugs should drive significant savings when aggregated across the Medicaid Program. Second, some State MAC programs do indeed list FUL drugs at a considerable discount to FUL prices.

The leader among our sample was the Texas MAC program, with a sales volume-weighted average price of \$0.26 per unit, or 30 percent less than the FUL list average price of \$0.37 per unit. Third, there is considerable variability in price aggressiveness among MAC programs: Arkansas was nearly as price aggressive as Texas, while Washington was barely more price aggressive than the FUL list and Georgia's MAC had equivalent pricing to the FUL list for FUL drugs.

For non-FUL drugs, our analysis also yielded important findings. First, there was considerable variability among the MAC programs in the number (i.e., breadth) of additional non-FUL drug entities included on their lists, from 67 additional drug entities for Washington to 95 additional for Arkansas. Second, there was variability among the MAC programs in the number of GCNs per drug entity for which prices were listed (i.e., depth), from 2.72 for Georgia to 4.02 for Arkansas. Third, there was considerable variability in pricing for a standard list of non-FUL drugs, with Arkansas's MAC list the most aggressive at an average price of \$0.26 per unit and Georgia's the least aggressive at an average price of \$0.32 per unit.

In summary, the State MAC lists we studied were all larger than the FUL list, but they varied considerably amongst themselves with regard to their price aggressiveness for FUL drugs and their breadth, depth, and price aggressiveness for non-FUL drugs. These observations lead to a number of questions. First, do increasing MAC list breadth, depth, and pricing aggressiveness translate into budget savings for State Medicaid Programs? Second, what explains the variability among MAC lists in breadth, depth, and pricing aggressiveness? Third, what lessons can be derived in support of further policy development in this area?

All State officials we interviewed stated that their MAC programs do result in pharmacy budget savings for their Medicaid Programs. For example, Washington projects annual MAC attributable savings of \$7.5 million out of a total Medicaid pharmacy budget of \$367 million (Wimpee, Zuchlewski, and Kerber, 2002; Childs, 2002), and Arkansas estimates savings of \$8.8 million out of \$206 million (Bridges, 2002). Unfortunately, however, we were unable to obtain savings estimates using common metrics that could be compared meaningfully across all four States. A proper comparison of budget savings attributable to MAC lists would require a detailed accounting of all of the costs involved with development and maintenance, as well as a parallel run of claims data over at least a 1-year period for all States under consideration, with comparison of all claims reimbursed at MAC prices with the same claims had they been reimbursed at non-MAC prices. Such analyses were beyond the scope of this article, but it is hoped that our research will lay the groundwork for an investigation of this type in the future.

Our discussions with Medicaid officials revealed two important contributing factors regarding the variability among MAC lists in breadth, depth, and pricing aggressiveness: (1) MAC list creation and administration is tedious and resource-intensive, and (2) State MAC programs have difficulty obtaining reliable pricing data for the drugs on their lists. Our study offers several lessons for policy development along both of these fronts.

With regard to the tedious nature of MAC list maintenance, our study results suggest three possible approaches for optimizing resources (Table 2). First, States might focus on the generic drugs with the highest sales volumes. Because FUL drugs account for approximately 65 percent of sales, States with resource limitations

**Table 2**

**Possible Ways for States to Optimize Resources in MAC List Development and Maintenance**

- Focus on generic drugs with high sales volumes
- Ensure that MAC lists contain prices for all strengths and forms (i.e., generic code numbers) of a given drug entity
- Collaborate with other States and/or CMS

NOTE: MAC is maximum allowable cost.

SOURCES: Abramson, R.G., Missmar, R., Li, S.P., Mendelson, D.N., The Health Strategies Consultancy LLC, and Harrington, C.A., Nova Southeastern University College of Pharmacy, 2004.

might benefit by focusing on more aggressive pricing for these drugs, rather than adding lower volume non-FUL drugs to their lists. When adding non-FUL drugs, States should focus on the highest volume drugs. Further research, including detailed cost-benefit accounting of MAC list operations, may shed light on whether MAC lists yield diminishing marginal returns as they expand (due to higher maintenance costs), or whether increasing savings continue to accrue as lists become broader.

Second, States might ensure that MAC lists contain prices for as many available forms and dosages of a listed product as possible. Our data demonstrated surprising variability in depth for non-FUL drugs, indicating that MAC lists often do not include some of the available strengths and forms (i.e., GCNs) of listed drug entities. If a prescribed dosage form is not on the MAC list, it will be reimbursed at the (generally much higher) non-MAC price. Therefore, States might be able to achieve additional cost savings by reviewing their MAC lists to ensure they have as complete an accounting as possible of the available GCNs for each drug entity. Expanding MAC lists by adding GCNs for existing drug entities (i.e., increasing depth without increasing breadth) may be less resource intensive than adding new drug entities (i.e., increasing breadth).

Third, States might consider collaborating with other States on one or more elements of MAC list operations. Our discussions with Medicaid officials uncovered scant evidence of such collaboration to date, although Texas officials indicated

that several States have considered defaulting to their MAC list. Potential barriers to collaboration include (1) regional variation in the supply and demand of individual drug products, (2) different degrees of wholesaler and pharmacy leverage in individual States, (3) the need for collaborating programs to agree on a wide variety of procedures for obtaining pricing information and establishing MAC prices, and (4) the possibility of losing special relationships with local pharmacies. Resource demands also raise the question of whether the Federal Government might expand the FUL program or create an optional national MAC list to ease the burden on States. However, some States believe that they are able to update their MAC lists faster than the Federal Government can update the FUL; this is attributed to special relationships with local pharmacies that provide current information on product availability and prices.

With regard to the second important factor contributing to variability among MAC lists—difficulty obtaining reliable drug pricing data—state officials report being largely dependent on informal relationships with wholesalers and pharmacies, and note that third parties demonstrate considerable variability in their willingness to cooperate with the Medicaid Program. Some wholesalers and pharmacies release pricing information willingly, while others refuse to divulge proprietary data that might be used to erode their margins on generic drugs. (Because of price caps from insurers on brand-name products, generic drug sales now constitute a principal

**Table 3**  
**Strategies for Obtaining Drug Pricing Information**

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- Make reimbursement concessions to pharmacies in exchange for pricing information
  - Seek price information from alternative sources, e.g., State-run hospitals or clinics
  - Implement formal policies requiring wholesale price disclosure
  - Explore pharmacy reimbursement schemes that reduce pharmacy dependence on profits from generic drug sales
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SOURCES: Abramson, R.G., Missmar, R., Li, S.P., Mendelson, D.N., The Health Strategies Consultancy LLC, and Harrington, C.A., Nova Southeastern University College of Pharmacy, 2004.

source of operating revenue for most retail pharmacies.) State Officials also report that prices from First DataBank are self-reported and often lag significantly behind the market.

Emerging strategies for obtaining crucial price information (Table 3) include making reimbursement concessions to pharmacies in exchange for pricing information, seeking pricing information from alternative sources (including State-run hospitals or clinics), and implementing formal policies requiring price disclosure. Pharmacies might also be more willing to share pricing information with State Medicaid Programs under alternate reimbursement schemes that would reduce their dependency on profits from generic drug sales. Pharmacists are now actively calling for reimbursement based on services provided rather than on prescriptions dispensed, i.e., direct payment for helping physicians optimize drug choice and dosing and for helping recipients optimize drug regimen adherence. Besides reducing pharmacists' economic dependency on the spread between wholesaler purchase price and retail sale price, thus removing a source of antagonism between pharmacists and State Medicaid officials that currently impedes information sharing, such a reimbursement paradigm would reduce pharmacists' financial incentive to dispense more drugs. One would expect this realignment of economic incentives to help contain costs by reducing drug utilization.

A final consideration surrounding the proliferation and development of MAC programs is the question of whether aggres-

sive price limitations on generic drugs may have a perverse effect of discouraging the substitution of generic for brand-name products in States lacking mandatory generic substitution policies. Evaluation of this hypothesis was beyond the scope of our analysis, and would ideally be conducted within a broader policy study looking at both brand-name and generic dispensing rates.

In conclusion, our study showed that there is variability in MAC program breadth, depth, and pricing aggressiveness. All of the MAC programs studied were broader than the FUL list, but they varied considerably amongst themselves with regard to price aggressiveness for FUL drugs and to breadth, depth, and price aggressiveness for non-FUL drugs. Expansion of existing MAC programs and creation of new programs in States that do not currently have them could contribute to cost containment efforts nationwide. Options for States seeking to optimize their efforts include (1) focusing on the most important generic drug cost drivers, (2) ensuring they have prices for multiple forms and dosages of listed drug entities, and (3) perhaps collaborating with other States or the Federal Government on MAC list operations.

Potential avenues for further research include investigating whether there are diminishing marginal returns to a State Medicaid Program as it expands the number of drugs on its MAC list, as well as examination of the effects of MAC lists on beneficiary quality of care and on stakeholders, especially pharmacies.

## REFERENCES

Bridges, S.: Arkansas Medicaid, Personal communication. Little Rock, Arkansas. October 31, 2002.

Centers for Medicare & Medicaid Services: *Federal Upper Limits on Drugs*. Internet address: <http://cms.hhs.gov/medicaid/drugs/drug10.asp>. (Accessed 2004.)

Childs, S.: Washington Medical Assistance Administration, Telephone interview. Olympia, Washington. July 28, 2002.

*Code of Federal Regulations: Access to Services*. Title 42-Public Health, Volume 3, Part 42 CFR 447.333. Office of the Federal Register, National Archives and Records Administration. U.S. Government Printing Office, Washington, DC. October 1, 2002.

*Code of Federal Regulations: Access to Services*. Title 42-Public Health, Volume 3, Part 42 CFR 447.332 (a). Office of the Federal Register, National Archives and Records Administration. U.S. Government Printing Office, Washington, DC. October 1, 2002.

*Code of Federal Regulations: Access to Services*. Title 42-Public Health, Volume 3, Part CFR 447.332 (b). Office of the Federal Register, National Archives and Records Administration. U.S. Government Printing Office, Washington, DC. October 1, 2002.

Commonwealth of Massachusetts, Executive Office of Health and Human Services, Division of Health Care Finance and Policy: *Report to the General Court: Reimbursement for Prescribed Drugs, October 3, 2002*. Internet address: [http://www.ltcpa.org/public/pdf/Pharmacy\\_Report\\_Oct3.pdf](http://www.ltcpa.org/public/pdf/Pharmacy_Report_Oct3.pdf). (Accessed 2004.)

Gruel, J.: Maryland Medicaid, Telephone interview. Baltimore, Maryland. August 21, 2002.

Hawkins, E.: Georgia Medicaid, Telephone interview. Atlanta, Georgia. August 15, 2002.

The Health Strategies Consultancy LLC, and American Management Systems, Inc.: *An Overview of Prescription Drug Cost Containment Approaches Used in Medicaid Programs and the Commercial Market*. Lessons Learned from State Medicaid and Pharmacy Assistance Programs. CMS Task Order Number: GS-23F-9785H. November 2001.

McNeil, M., and Harper, L.: Texas Medicaid, Telephone interview. Austin, Texas. July 19, 2002.

Merola, T.: New York Medicaid, Telephone interview. Albany, New York. June 2, 2003.

National Pharmaceutical Council: *Pharmaceutical Benefits Under State Medical Assistance Programs, 2001*. 2002.

Scott-Levin: Top 200 Generic Drugs by Retail Sales in 2001. *Drug Topics News Magazine*. February 18, 2002.

Wimpee, A., Zuchlewski, T., and Kerber, R.: Washington Medicaid, Telephone interview. Olympia, Washington. July 31, 2002.

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