Toward Open Engagement on Health Policy

Innovative Approaches to Reducing Financial Barriers to Obstetric Care in Low-Income Countries

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Lack of access to quality care is the main obstacle to reducing maternal mortality in low-income countries. In many settings, women must pay out-of-pocket fees, resulting in delays, some of them fatal, and catastrophic expenditure that push households into poverty.

Various innovative approaches have targeted the poor or exempted specific services, such as cesarean deliveries. We analyzed 8 case studies to better understand current experiments in reducing financial barriers to maternal care.

Although service utilization increased in most of the settings, concerns remain about quality of care, equity between rich and poor patients and between urban and rural residents, and financial sustainability to support these new strategies. (*Am J Public Health.* 2010;100:1845–1852. doi:10.2105/AJPH.2009.179689)

LACK OF ACCESS TO QUALITY care is the main obstacle to reducing maternal mortality in low- and middle-income countries.[1] Two types of barriers are critical: physical and financial.[2–4] Poor countries often have few and widely spaced health facilities that are adequately equipped and staffed with competent, available, and committed personnel.[5] Many women prefer to deliver at home rather than embark on a long, expensive, and painful journey to underequipped health centers and poorly functioning district hospitals.[4]

When women or their families in these countries decide to seek health care, the next obstacle is out-of-pocket payment for the services. Access to a cesarean delivery is directly affected by household wealth. In a study of Demographic and Health Survey data for 42 developing countries, cesarean birth rates were extremely low among the very poor: less than 1% for the poorest quintile of the population in 20 countries and less than 1% for 80% of the population in 6 countries.[2] Childbirth can be costly for households in countries that do not provide universal health care. If mother or child suffers complications, costs can skyrocket.[6] There is increasing recognition that maternal costs, especially when complications occur, can plunge a household into poverty or force it to rely on risky coping strategies.[7,8]

A recent review by the World Health Organization found that the direct costs of maternal health care ranged between 1% and 5% of total annual household expenditures, rising to between 5% and 34% if the woman suffered a complication.[9] The Economic Commission for Africa has called for the elimination of user fees for basic health services as a "quick win" that can diminish health inequities related to poverty and gender discrimination.[10(p15)] In recent years, Nepal and several countries in sub-Saharan Africa have introduced policies that eliminate fees for maternal health care.[11]

Social health insurance subsidized by taxation at the national level is considered to be the best way to fund health care, but most countries in sub-Saharan Africa and South Asia do not have the means to organize it. Social health insurance presents challenges in rural areas because of low incomes, limited formal sector employment, and minimal health care infrastructure.[12] Countries are therefore pursuing more specific approaches through different pooling and targeting mechanisms. However, published evaluations of these attempts to reduce financial barriers to obstetric care are still scarce.

We aimed to contribute to a better understanding of current experiments in reducing financial barriers to maternal care by analyzing results from 8 case studies, which are published elsewhere.[13] The initiatives described in these studies varied broadly in mechanism (from fee exemption to cash assistance), structure (some local and others national), location (ranging across Africa, Asia, and Latin America), and population target (from all pregnant women to only those from poor households). This breadth allowed us to extract some preliminary lessons for policymakers about likely challenges in different contexts.

SCHEMES FOR REDUCING FINANCIAL BARRIERS

The 8 programs we focused on are shown in Table 1. We chose

TABLE 1—Programs to Reduce Financial Barriers to Maternal Care, 2008

Strategy	Scope	Country
User fee abolition for deliveries	National	Ghana[14]
User fee abolition for deliveries	National	Senegal[14]
Community health insurance for obstetric care	Half of the districts	Guinea[15]
Essential obstetric care insurance	Some urban and rural districts	Mauritania[16]
District-based obstetric cost sharing	Some districts	Burkina Faso[17]
Targeted vouchers and health equity funds for delivery care	Selected districts	Cambodia[18]
Incentive payments for delivery in health facilities, targeted at poor women	National	India[19]
Social health insurance covering mothers and children	National	Bolivia[20]

programs for which data on the process of implementation were available; some also had data on impact. These programs, although not an exhaustive review of all those in existence, were representative of recent approaches in low-income countries.

We asked teams of researchers involved in the evaluation of these schemes to answer a set of questions. These covered program design and management, service utilization, quality of care, equity, satisfaction of users and providers, and (when available) health outcomes, financial impact on facilities and households, and costs.

Our 8 case studies focused on the cost of care and on increasing risk pooling (sharing the cost of care over larger groups, so that the rich can subsidize the poor and those with fewer health needs can subsidize those with more). Most adopted 1 or more of the direct strategies to reduce financial barriers to care described in Table 2.

Fee Exemptions

In September 2003, the government of Ghana began exempting users from delivery fees in the 4 most deprived regions of the country (northern, upper east, upper west, and central), and in April 2005 it extended this policy to its remaining 6 regions. The exemption policy was financed through highly indebted poor country debt relief funds, which were channeled to the districts to reimburse both private and public facilities according to the number of deliveries performed each month. Ghana faced implementation difficulties mainly stemming from inadequate funding to scale up and sustain the policy.[14]

Senegal instituted free normal and cesarean deliveries at the start of 2005 in 5 regions, chosen because they were relatively more deprived than others. The package covered all women for normal deliveries at health posts and health centers and all cesarean deliveries at district and regional hospitals. The funding mechanism for normal deliveries took the form of kits with basic supplies, which were delivered via the national medical stores. These replaced user payments at the point of delivery, at least in theory. For the regional hospitals, US$110 at the time of evaluation was paid per cesarean delivery. The program failed to adequately reimburse lower-level facilities. It also lacked clear guidelines for implementation and failed to assist women with complicated deliveries (other than cesarean deliveries).[14]

These programs were broad but thin: entitlement was universal, with rapid scale-up from poorer regions to all regions of the country (except Dakar), but cost reductions were limited to service fees, and even these were only partially realized.

Cash Assistance

In Guinea, community health insurance (called Mutuelles de santé pour la prise en charge des Risques liés à la Grossesse et l'Accouchement [Community health insurance for safe motherhood], or MURIGA) was developed specifically to protect women and their families from excessive expenditures.[15] MURIGA covered the costs of maternity-related services only: women's obstetric care (antenatal care, delivery, obstetric complications) and transportation in the event of referral to a higher-level health facility. Despite financial and technical support from international agencies to MURIGA during the implementation phase, the median coverage among different prefectures at the time of evaluation was 10%. Poor management capacity by the community was one of the main constraints identified by the case study.

In Mauritania, a flat-fee prepayment scheme started in the capital in 2002 with the technical and financial support of the French government's aid program. This prepayment (around US$22) was promoted to pregnant women at their first antenatal consultation and covered all costs until the end of the pregnancy. The state paid salaries to the health personnel involved in the obstetric care, and the prepayment covered consumables and fees. The receipts generated by the contributions also provided maternity health staff members with bonuses to compensate for the loss of revenues from patients (30% of bonuses were distributed in accordance with merit-based criteria), but the staff complained to evaluators that it was not enough. This system was also heavily reliant on external technical assistance. One expatriate was working full-time on follow-up and helping to open new sites within the country.[16]

The Burkina Faso cost-sharing system was a district-driven initiative. It provided all care for the mother and her newborn (transport, intervention, and postdelivery care) for emergency or life-threatening cases. The direct costs were shared between 4 parties:

TABLE 2—Strategies to Reduce Financial Barriers to Maternal Care, 2008

Country	Strategy	Funding	Targeting	Types of Costs	Purchasing	Payment system
			Health system mechanisms			
Burkina Faso, Ghana, Senegal,	Fee exemption or reduction	Public finance or donors	Service based; possible geographic factors and self-selection	Official fees for services and goods	Public, private, and private not-for-profit health facilities	Subsidies on inputs or retrospective payment per case to facilities
Cambodia	Waivers (health equity fund)	Public finance or donors	Individual or household	Official fees for services and goods	Public, private, and private not-for-profit health facilities	Payments per case or per capita to facilities
Mauritania	Reduction of financial barriers via informal payments	User fees, with possible subsidy component	All services within specific facilities or facility types	Official fees for services and goods	Public, private, and private not-for-profit health facilities	Internal to facility budget; substitution of official for unofficial payments
			Household mechanisms			
India	Conditional cash transfers	Public finance or donors	Individual or household	Any component, including fees, transport, food, opportunity costs	Usually third-party organization based in community, at facility, or independent; generally not for profit	Payment to client, subject to specified attendance at facilities
Cambodia	Vouchers	Public finance or donors, with possible copayments	Mainly individual or household, possible geographic factors	Official fees for services and goods	Usually third-party organization based in community, at facility, or independent; generally not for profit	Payment per case to facilities in exchange for redeemed vouchers
Guinea, Mauritania, Bolivia	Prepayment, community health insurance, social heath insurance	Public finance or donors, with possible copayments	Mainly individual or household, possible geographic factors	Official fees for services and goods	Usually third-party organization based in community, at facility, or independent; generally not for profit	Subsidy payment to insurance fund per target client enrolled

Source. Adapted from Witter et al.[21]

the households, the management committees of health centers, the local authorities, and the Ministry of Health. One of the major challenges was providing emergency obstetric care at all times and guaranteeing the package of services promised for the fee throughout the year. The operating theater experienced some problems (shortages of oxygen and anesthesia products and breakdowns in sterilization equipment), leading to the suspension of activities and the transfer of women to the university teaching hospital. Another difficulty was the impact on staff revenues. No compensation was offered for the drop in their income after the introduction of improved practices.[17]

Programs Targeted to the Poorest Women

In Cambodia, a voucher system and a health equity fund were implemented with the specific aim of protecting the poorest women. These were identified by local health workers and staff of the voucher management agency through home visits in the participating villages. Each pregnant woman was interviewed. The number of voucher and health equity fund beneficiaries represented a large share (32.5%) of total reported facility deliveries and increased sharply over time. But the process evaluation questioned the effectiveness of this individual targeting: because of logistic and time constraints, the voucher management agency was able to perform only 61% of the expected home visits.[18]

In India, the government introduced a national conditional cash assistance program, Janani Suruksha Yojana (Maternal Protection Program), in 2005 to promote institutional deliveries. Women with a below–poverty line card who attended 3 antenatal clinics and who delivered in a health facility were to receive money soon after delivery, from the facility staff, to take care of their direct and indirect costs. Process evaluation in 4 states found problems in ensuring efficient and transparent cash

transfers. In some states, women received half of the normal amount for a delivery; in others, poor women received their cash after 6 months or a year because of a paucity of funds at the district level.[19]

Social Health Insurance

A Bolivian public health insurance scheme has existed for the past 15 years and has undergone several expansions and improvements. Three successive schemes have been developed since 1996, offering a variety of packages of free care and promoting access for priority groups such as mothers and children. The most recent was the Seguro Universal Materno Infantil (Universal Mother and Child Insurance Scheme), which began in 2002 and covered approximately 500 health problems related to the perinatal period and to children from birth to age 5 years. Its services were extended in 2006 to incorporate 27 additional sexual and reproductive health service packages, including family planning and cervical cancer screening, protecting women up to 60 years of age.

Although the program was called social health insurance, it was funded not by membership but by national and local revenues and to that extent was similar to a national exemption policy. The management capacity of municipal and health services personnel was a recurrent problem: reimbursement mechanisms were somewhat bureaucratic and slow, which affected service delivery, especially among tertiary-level hospitals.[20]

PROGRESS AND CHALLENGES

All schemes reported increased uptake of services, although few had robust evidence of the extent of the increase (Table 3). Only Guinea showed poor progress, with only a 5% increase in the assisted delivery rate from 2000 to 2006 (from 17% to 22%) in the areas covered by the program.

Because none of the programs were implemented with an experimental design, causality between a program and increased service utilization could not be shown. Increases could be attributable to other programs or a general improvement in obstetric care access and supply. In Guinea, increases in the cesarean birth rate followed the same trend in areas covered by MURIGA (from 0.75% of deliveries to 1.85%) and elsewhere in the country (from 0.4% to 1.63%).

One surprising finding was the low uptake of some of the benefits packages, even where these were substantial and did not require copayments by households. In the Cambodia voucher scheme, fewer than half of the eligible women used their vouchers for delivery care. This merits further investigation and highlights the

TABLE 3—Maternal Care Cost and Utilization Changes After Interventions to Remove Financial Barriers

Country	Maternal Care Finance Scheme	Cost of Intervention	Impact on Utilization
Bolivia	Social health insurance	Not reported	Supervised deliveries rose 17% and cesarean deliveries rose 0.5% nationally from 1994 to 2003, partly because of program, but cesarean rate did not increase in rural areas
Burkina Faso	Cost sharing	Estimated $165/cesarean delivery	Supervised deliveries rose 20.3% and cesarean deliveries rose 1.2% between 2003 and 2007 in the Secteur 30 health district
Cambodia	Vouchers	$5/voucher recipient, $18/supported delivery	Public health facility deliveries (paid for by vouchers or personal funds) rose 12.3% from 2006 to 2007
Ghana	Fee exemption	$22/delivery (all types), $0.16 per capita (nationally), $62/additional delivery (all types)	Supervised delivery rates rose 12% from 2003 to 2005 in the central region and 5% from 2004 to 2005 in the Volta region
Guinea	MURIGA community health insurance	Not reported	Supervised deliveries rose 5% and cesarean deliveries rose 1.1% from 2000 to 2006 in both intervention and nonintervention areas
India	Cash transfer	Not reported	Facility deliveries rose 15%–27% (depending on area) from 2004 to 2006
Mauritania	Flat-fee prepayment scheme	Set-up costs of $1.3–$4/reproductive-age woman, premium of $22/pregnancy	Facility deliveries rose 33.8% from 2000 to 2007
Senegal	Fee exemption	$2.2/normal delivery, $154/cesarean delivery, $0.10 per capita nationally, $21/additional normal delivery, $467/additional cesarean delivery	In a sample of facilities in 5 exempted regions, supervised deliveries rose 4% and cesarean deliveries rose 1.4% from 2004 to 2006

Notes. All dollar amounts are reported in US dollars.
Source. Adapted from Witter et al.[22]

importance of nonfinancial barriers, such as concerns over quality of care and geographical and cultural issues.

Only a few studies (in Ghana, Mauritania, and Burkina Faso) systematically examined the effects of programs on quality of care. In Ghana, quality of care was found to be poor both before and after the intervention. Comparison of quality of care by type of facility indicated a generally higher quality of care in government-owned than in privately owned facilities in the central and Volta regions.[14] In Mauritania, quality of intrapartum care decreased after the introduction of the flat-fee prepayment scheme. Although the situation improved between 2005 and 2007, it did not reach the quality standards existing at the introduction of the program.[16]

Few studies gathered independent data on household costs. In Ghana, a household survey found a significant decrease in mean delivery fees for cesarean and normal deliveries after the intervention. In Ghana, the total average cost of childbirth decreased by 22% (from US $195 to $153) for cesarean delivery and by 19% (from US $42 to $34) for normal delivery, which is an improvement but not close to full coverage.[23]

Equity

Several approaches to targeting of benefits were used in the programs we studied. One group of schemes designated a benefit package that was theoretically free for the entire population regardless of their socioeconomic status (in Senegal, Ghana, and Bolivia); in these cases, the only targeting was an early roll out to poorer regions of the country. Some programs had voluntary enrollment and required a financial contribution from the patient (in Burkina Faso, Mauritania, and Guinea). These 3 schemes did not create a special system for the poor, although in some cases they used the national official system (individual identification at the health facility level by the social services) to exempt poor women. However, only Burkina Faso disclosed the number of poor women exempted.

Other programs focused exclusively on the poor (in Cambodia and India). In Cambodia, home visits and individual questionnaires were administrated, and in India, the possession of a below-poverty-line card was the criterion of inclusion in the scheme. The assumed equity advantages of individual over geographical targeting were not supported by the Cambodia case study, which observed problems in maintaining systems for identifying the poor in villages throughout the country, where only 61% of the expected home visits to identify poor pregnant women were conducted.

Equity between rich and poor households and between urban and rural residents was a problem in the majority of the programs. In Bolivia, for example, a significant and sustained increase in access was achieved, but indicators for rural areas still lagged far behind those of urban areas. Antenatal coverage for urban women was almost double that of women in rural areas, and cesarean birth rates were almost 4 times as high (23% vs 6.1%, according to the 2003 Demographic and Health Survey.[24] In Ghana, the reduction in out-of-pocket expenses was proportionally greater in the top quintile (22%) than in the bottom (13%).[14]

Health Outcomes

None of the case studies were designed to establish a link between the scheme and a decrease in maternal mortality: most of the data were collected on hospital births, and many women in these countries were still delivering at home.

No significant changes in fetal outcomes occurred in stillbirth rates in Ghana after the implementation of its intervention in the 2 regions in which the case study reviewed a month of records.[14] A small, nonsignificant reduction in fetal deaths occurring during labor or delivery (3.3% in 2004 to 3.1% in 2005; $P>.05$) was noted in Senegal in the study districts.[14]

In Burkina Faso, early perinatal mortality (<24 hours) after cesarean delivery dropped from 3.6% in 2005 to 2% in 2007 ($P<.05$) for all types of cesarean deliveries and from 4% to 2.2% ($P<.05$) for emergency cesarean deliveries.[17]

Monitoring and Evaluation

Most of the studies (with the exception of those in Guinea and Cambodia) noted dissatisfaction among health workers about rising workloads and diminished income supplements. Only Mauritania's program incorporated financial incentives for the staff, redistributing 33% of the receipts to the staff as bonuses. However, the workers complained that these bonuses were lower than were previous receipts from informal payments. To ensure the sustainability of the program and to minimize adverse effects, this constituency should be won over in reforms to user payments. This is likely to involve a variety of measures, including consultation over changes, improvements to pay and working conditions, and ensuring adequate staffing and controls over working hours.

We noted a need for clear implementation plans and guidelines for some of the initiatives. Problems in implementation can distort a plan's objectives (e.g., in India, officials in some areas decided to reimburse home deliveries, undermining the goal of encouraging hospital births). This issue has been documented in similar programs elsewhere.[25]

Our case studies also highlighted the importance of establishing clear monitoring and evaluation frameworks for new programs. Because funding for many of these programs is tenuous, robust evidence of results is needed to justify further external investment.

Financial Issues and Sustainability

Information on the costs of the intervention was missing from many of the studies, but where it was available, the estimates were fairly similar (e.g., US $18–$21 for normal deliveries and US $154–$165 for cesarean births; Table 3). These costs masked differences in benefit packages, however. Most schemes focused on direct service costs to users for care and drugs, but others (e.g., the Cambodian voucher system) also covered transportation costs.

Seven of the 8 programs studied were in their first 2 years of operation (or data had been collected

Lessons From Case Studies of Programs to Reduce Financial Barriers to Obstetric Care 2008

1. **Program design**
   - A thorough situation analysis of the main barriers to increasing skilled delivery should inform the program structure
   - Programs directly addressing financial barriers are most appropriate where there is
     - ○ High maternal mortality
     - ○ Relatively low skilled attendance rate at delivery
     - ○ Low cesarean rates (<5% of all deliveries)
     - ○ Physical access to health care facilities
     - ○ Minimum level of trained personnel in facilities
     - ○ Acceptable quality of care
     - ○ High out-of-pocket payments by households for delivery care
   - Programs should
     - ○ Include life-saving interventions and alleviate economic hardship to families
     - ○ Be extended to major service providers (public and private)
     - ○ Foresee additional investments to address key supply-side constraints (such as staff shortages) and to cope with increased utilization in the medium term
     - ○ Reinforce the referral process, so that uncomplicated deliveries are handled at lower-level facilities and emergencies can be sent to referral hospitals
2. **Program development process**
   - All key stakeholders should be involved in development
   - Leaders should be identified
   - Costs should carefully and realistically estimated and matched with likely funding sources
   - Clear policy guidelines should be developed and communicated to all key stakeholders
   - Programs should be subject to periodic review and revision with major stakeholders
3. **Program dissemination**
   - Core messages should be as simple as possible
   - Communities and health workers should be targeted
   - Descriptions of benefits and eligibility criteria should be prominently displayed in health facilities
4. **Resource allocation**
   - Funds should be allocated by area according to a population-based formula, adjusted for service utilization rates and case mix
   - Other public funding sources should be maintained so that the program provides additional resources
   - Funding should be regular and predictable
5. **Payment systems**

   The payment mechanism should
   - ○ Ensure that average production costs are reimbursed (but not excessively reimbursed) for each provider type
   - ○ Be structured in advance, on the basis of predicted caseload, and adjusted periodically, after evaluation
   - ○ Be frequent if payments are made retroactively, to avoid cash flow problems

   Verification measures should incorporate
   - ○ Record keeping that facilitates independent verification of cases managed
   - ○ Monitoring of indicators of cost escalation, including cesarean delivery rates
   - ○ Monitoring of impact on health facilities, with checks to avoid shifting of costs onto other services or into informal payments
   - Compensatory measures should be instituted if health workers were dependent for part or all of their income on user fees
6. **Management, monitoring, and evaluation**
   - Clear lines of responsibility should be established for managing and monitoring the implementation process

- Timely monitoring should detect and respond to problems and flag successes to generate continued financial support
- Periodic community-based surveys should assess benefits to different socioeconomic and geographical groups
- Periodic evaluations should compare baseline indicators of utilization, quality of care, health outcomes, and household costs with program results
- Country experiences should be documented and shared, with information not only on costs and outcomes but also on process

Source. Adapted from Witter et al. [22]

during this period); therefore, their effects on fixed costs, such as staff, equipment, and maintenance, were not yet evident. Over time, as activity levels increase, governments must expect to increase allocations for these needs.

Funding sources for the programs varied greatly: some relied entirely on national government funding (in Ghana, Senegal, and India), donors (in Cambodia), or users (in Mauritania); others were able to tap several sources (3 levels of government in Bolivia; a mix of users, local government, and national government in Burkina Faso). Mauritania and Guinea received considerable assistance with set-up costs from donors. We noted some correlation between funding source and scale: programs funded by the government were much more likely to be national. These government-funded policies were also most affected by funding delays, unpredictability, and inadequacy.

Some of the programs lasted only a short time and were soon superseded, fully or partially, by new initiatives (e.g., Ghana shifted from exemptions to national health insurance, and Burkina Faso moved from localized cost sharing to a national subsidy policy). Such changes can be positive if they represent scaling up of policies and benefit from lessons learned in previous experiences. Only 1 case study evaluated a program with a substantial history—Bolivia, whose social health insurance had functioned for more than a decade. This program demonstrated that national indicators can be improved with sustained national commitment, but it also had problems with cost control, and its achievements were limited by programs that targeted financial barriers alone, without addressing wider health system, geographical, and cultural barriers.

Conclusions

Our case studies offer some practical lessons on the implementation of programs aimed at reducing financial barriers to obstetric care. These are summarized in the box on the previous page.

Closing the gap in skilled attendance at childbirth and in maternal health, between and within countries, is drawing renewed interest around the world. Many approaches have been tested in recent years in different contexts. In addition to interventions that directly address financial barriers for households, policymakers and stakeholders are also addressing complementary areas, such as incentives for health workers to increase staff retention in rural areas and aid mechanisms that enable and reward higher performance by the health system as a whole. These approaches can all contribute, if designed in an integrated way, to meeting the millennium development goals.

Ascertaining the right package for a given context is complex. The balance of supply- and demand-side constraints will vary, and program design must take into account resource availability, cultural expectations of roles and responsibilities, and how the health service is financed and organized.

No single strategy is best for all contexts, but some important lessons for implementation have emerged from our case studies. The experience of countries that have seen sustained improvements in maternal health, such as Malaysia and Sri Lanka,[26] show that the key ingredients for the long term are local commitment, perseverance and adaptability over time, a holistic approach that addresses demand- and supply-side barriers, and a focus on universal coverage as the ultimate, if not immediate, goal. ■

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Contributors

F. Richard coordinated the conception and design of the study and the analysis and interpretation of data and wrote the first draft of the article. S. Witter conducted the analysis and interpretation of data, wrote sections of the article, and reviewed the article. V. De Brouwere contributed to the analysis and interpretation of data and reviewed the article. All authors approved the final version of the article.

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Human Participant Protection

No protocol approval was needed for this study because only secondary data were used.

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Urban Sprawl, Smart Growth, and Deliberative Democracy

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Urban sprawl is an increasingly common feature of the built environment in the United States and other industrialized nations. Although there is considerable evidence that urban sprawl has adverse affects on public health and the environment, policy frameworks designed to combat sprawl—such as smart growth—have proven to be controversial, making implementation difficult.

Smart growth has generated considerable controversy because stakeholders affected by urban planning policies have conflicting interests and divergent moral and political viewpoints. In some of these situations, deliberative democracy—an approach to resolving controversial public-policy questions that emphasizes open, deliberative debate among the affected parties as an alternative to voting—would be a fair and effective way to resolve urban-planning issues. (*Am J Public Health.* 2010;100: 1852–1856. doi:10.2105/AJPH.2009.182501)

IN THE LAST TWO DECADES, public health researchers have demonstrated how the built environment—homes, roads, neighborhoods, workplaces, and