Lessons from the Eight Countries

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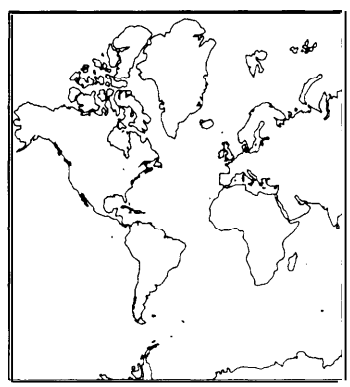
The preceding chapters have described the policies and mechanisms used to manage health care technology in eight industrialized countries: Australia, Canada, France, Germany, the Netherlands, Sweden, the United Kingdom, and the United States. These countries share a similar level of industrial development and confront similar challenges in meeting increasing demands for health care from aging populations (table 10-1). All currently are rethinking and restructuring their systems for health care delivery, and technology has come in for particular scrutiny in these efforts.

HEALTH SYSTEMS OF THE EIGHT COUNTRIES

Although the health systems of the eight countries have many similarities, they also differ considerably from each other. The ratio of physicians to population ranges from 1.4 to 3.1 per 1,000, and the average number of physician visits per person per year ranges from 2.8 to 11.5. The number of hospital beds ranges from 4.7 to 12.4 per 1,000 population, and the annual number of hospital days per person ranges from 1.2 to 3.7 (tables 10-2 and 10-3). The health care sector in each of these countries employs from 4.6 to 9.9 percent of the workforce (table 10-4).



The eight health care systems and their regulatory frameworks can be conceptualized in terms of the links they establish between four key constituencies: payers for health services, practitioners and providers, patients, and tax-paying citizens (table 10-5). These links (which differ in each system) establish a framework for managing health care systems, and in turn, for managing health care technology.

TABLE 10-1: Elderly Populations in Eight Countries, 1991

Country	Over 65 (%)	Over 75 (%)	Over 80 (Ye)
Australia	11.4	4,5	2.3
Canada	11,6	4.7	2.4
France	14.1	7.0	3.8
Germany	15.4	7.2	3.8
Netherlands	12,9	5.3	3.0
Sweden	17.7	8.1	4.4
United Kingdom	15.8	7.0	3.7
United States	12,7	5.2	2.9
OECD average	13.4		

SOURCE Organasation for Economic Cooperation and Development, OECD Health Data a Software Package for the International Comparison of Health Care Systems (Paris, France Organisationo for Economic Cooperation and Development, 1993).

Perhaps the most striking difference among the health care systems surveyed here concerns financing and the links between payers and patients. In the United States "payers" is most definitely plural; there are more than 1,500 for-profit and not-for-profit insurers as well as substantial government expenditures on care for the elderly, the indigent, and military veterans. At the other extreme, in Canada and Sweden, there is essentially only one payer or at least one payment scale.

Several European nations have systems of linked multiple payers in which both employment-based insurance plans and government-managed plans coordinate coverage and payments. These arrangements rely on significant collaboration among the various payers such that they are able to exert something similar to the market power of a single payer.

In all health care systems, patients receiving care often incur out-of-pocket expenses, particularly for prescription pharmaceuticals and assistive devices. In the United States these expenses may include the costs of acute care for people without insurance. In the United Kingdom a parallel "private" health system, together with privately provided insurance, exists as an alternative to the universal National Health Service for those willing to pay. In France co-payments are made by most citizens, and ambulatory medical care expenses are reimbursed to the patient and not paid directly to practitioners.

Nevertheless, with the exception of the 30 to 40 million uninsured people in the United States, virtually every citizen of these eight countries is freed from contemplation of the costs of care at the point of delivery. Thus, people go to physicians or other health care providers, providers recommend treatments or investigations, and neither patient nor provider is much concerned with (or, in some cases, even aware of) the cost implications of these decisions.

Divorcing payment for services from their provision, which in some countries has advanced important social equity goals, also has facilitated the diffusion of health care technologies. This facilitation, along with concomitant efforts to regulate technology adoption and use, point to the dominant theme of this volume: namely, that *technology management* within a health care system is a function of the structure of that system *and* its surrounding cultural milieu. In France the health care system exists as an extension of the state bureaucratic apparatus. In Germany corporate influence is as strong in the health care system as it is in other aspects of German society. In the United Kingdom the health care system has changed from a benevolent government service to a pastiche of market-driven components. Despite these differences, the management of technology in all of these countries requires consideration of two distinct but related processes: adoption and utilization.

TECHNOLOGY ADOPTION

Health care technologies are goods. Markets exist for these goods, and suppliers in these markets seek competitive advantages to increase market share and profitability. The proprietary nature of much medical technology, together with the high costs of innovation, have created world markets for many technologies—particularly pharmaceuticals and imaging and surgical instrumentation.

Despite patent protection and multinational conglomeration in production, demand for tech-

TABLE 10-2: Number of Physicians, Hospital Beds, and Health Personnel Per Bed in Eight Countries, 1990

Country	Physicians (per 1,000 population)	Beds (per 1,000 population)	Health care personnel per bed
Australia		9.8[a]	3,9a
Canada	2,2	6.6a	2.4[b]
France	2,7	9.4	1,1
Germany	3.1	10.4	1.3a
Netherlands	2.5	11,5	2.1
Sweden	2 9	12,4	1.9a
United Kingdom	1 4	6.4	2.6[c]
United States	2,3	4,7	3,4
OECD average	2,4	9.0	2.0

[a]1989
[b]1988
[c]1 *987*

SOURCE Organisatrion for Economic Cooperation and Development, OECD Health Data a Software Package for the International Comparison of Health Care Systems (Paris, France Organsation for Economic Cooperation and Development, 1993)

nological advances has been sufficient to sustain a very rapid pace of introduction of new products. Furthermore, rapid communication and the globalization of markets has meant that the range of technologies available in a given country is likely to be similar to that in another country, at least within the developed world. The six technologies considered in this volume are available in all eight countries, although the accessibility of each technology differs-quite markedly in some cases.

In this situation incentives for adoption include the benefits accruing to patients (decreased mortality or morbidity, increased quality-of-life), to providers (market advantage to a given physician or facility, more efficient provision of services), and to societies (economic development and economic nationalism focused on goods perceived to be high-tech). The relative importance of these incentives depends on the technology. Although the diffusion of computed tomography (CT) and magnetic resonance imaging (MRI) has been shaped by economic development issues in France and the Netherlands, the spread of laparoscopic cholecystectomy has been driven largely by patient and practitioner preferences.

Attempts to regulate technology are made at national or regional levels, or both. These include relatively ineffective certificate-of-need programs in Australia and the United States; the moderately effective Article 18 mechanism in the Netherlands; more effective systems of designated national centers for particular technologies in Australia; global budgets in Canada, Sweden, and the United Kingdom; and French “health maps” for planning. In countries with some form of central or system-level budgeting and expenditure management, incentives for adoption can be managed within a policy framework designed to optimize spending on technologies. In the Canadian and Swedish health care systems, particular attention is paid to siting of resource-intensive technologies, and the absence of alternative sources of capital funding acts tore inforce regulatory powers wielded at a systemwide level.

In such countries increasing energy is being invested in evaluation and assessment as part of the management process. Government-funded health systems in Canada and Europe are increasingly attempting to investigate the return on their expenditures in terms of improved health outcomes and, in some cases, in cost savings. In this climate various technology assessment schemes have evolved to marshal information relevant to spending decisions. To date, the greatest success in technology

TABLE 10-3: Numbers of Physicians Visits, Bed-days, and Average Length of Hospital Stay in Eight Countries

Country	Visits/person/year	Bed-days/person/year	Average length of stay
Australia	8.8	2.9	12,9
Canada	6.9	**2.0**	13.9
France	7,2	**2.9**	12.3
Germany	11.5	**3.3**	16.5
Netherlands	5.5	**3.7**	34.1
Sweden	2.8	**3.5**	18,0
United Kingdom	5.7	**2.0**	14,5
United States	5.5	**1.2**	9.1
OECD average	6.2	2.7	15,7

SOURCE Organastion for Economic Cooperation and Development, OECD Health Data a Software Package for the International Comparison of Health Care Systems (Paris, France Organisation for Economic Cooperation and Development, 1993)

management in countries with single-payer or linked multiple-payer financing has involved the shaping of policy decisions on the adoption and diffusion of resource-intensive technologies. Less costly technologies and those requiring minimal infrastructure investment have generally diffused unimpeded by macro-level management. With some exceptions, the power of financing has only begun to be used to manage technology.

In the United States, in contrast, such macro-level management is generally lacking or ineffective. Attention has been paid much more to the operational level of administration and clinical practice, through attempts to control utilization.

TECHNOLOGY UTILIZATION

Rates of procedures, the means used to deliver a specific service (such as neonatal intensive care units), and the mechanisms for regulating use vary widely. The evidence supports the theoretical expectation that fee-for-service reimbursement of providers creates incentives for technology use. For example, in France, MRI equipment diffused more rapidly in private hospitals than in public ones, apparently buoyed by opportunities for fee-for-service reimbursement in the private sector. Similar experience in several countries has fostered attempts to shift the basis of reimbursement from fee-for-service remuneration of practitioners and facilities to various forms of cavitation, global budgets, and salaries for practitioners.

Additional incentives for use emerge from the opportunity for accelerated capital cost recovery by owners of private establishments offering technological services, particularly medical imaging and laboratory services. Investment returns and subsequent incentives for use have been further enhanced by the incoherence of pricing for services such as medical imaging, particularly in the United States. Health systems in which technology use is subsumed within the budget of health facilities should theoretically encourage efficiency and specialization in service delivery as technology holders seek to reduce their average costs. In an entrepreneurial fee-for-service setting the constant rate of payment by insurers for each imaging study or laboratory test makes doing as many as possible more and more economically rewarding, as the marginal cost of each use diminishes.

Further incentives for technology use arise from the interplay of public expectations and health care systems. Among patients and practitioners, notions of rationalizing or optimizing resource use have only recently become admissible—and even then only minimally in most settings. The historical conception of practitioner responsibility as requiring an unbounded

TABLE 10-4: Percentage of Workforce Employed in Health Care Sector in Eight Countries (recent years)

Country	Percent
Australia	NA
Canada	NA
France	NA
Germany (1989)	5.6
Netherlands (1990)	6.3
Sweden (1990)	9.9
United Kingdom (1990)	4,6
United States (1989)	6.3

NA - not available

SOURCE Organisation for Economic Cooperation and Development OECD Health Data a Software Package for the International Comparison of Health Care Systems (Paris, France Organisation for Economic Cooperation and Development 1993)

commitment of resources to each and every patient has hampered the management of technology use and, with the rise of nonpractitioner health administrators, has signaled a shift in the practitioner's role from that of a steward of health care resources to that of an employee of a health care system or enterprise.

This is particularly marked in the United States, where many physicians are either employees of managed care enterprises or treated as subcontractors to such enterprises. Contract terms are increasingly set by the enterprise-a fundamental change from historical patterns of fee-for-servicc reimbursement at local prevailing rates. In the United Kingdom the rise of a private system may be seen as a response to perceived failures in managing health care as a public responsibility and a nonmarket service.

In the United States insurers have invested heavily in systems to review technology utilization. In the absence of a framework for national or regional management of the system, attention has shifted to the operational level, that of administration and clinical practice. Technology assessment in the United States is often taken to mean the various guidelines and procedures put in place to regulate the use of technology by providers. Many of these guidelines focus on reimbursement, such as insurers' declining to cover experimental therapies (i.e., those with little or equivocal evidence of efficacy).

Although guidelines are an important element of technology assessment in any health care system, the United States has not been able to support the effects of these efforts with national or regional policymaking. In this environment incentives for the use of certain technologies seem likely to overwhelm the mechanisms for use management, leading to overuse in some cases and underuse in other cases. In the long run, effective technology management requires attention to both system and practice levels.

PUBLIC REACTIONS AND PRESSURES

The public has played a vital role in the adoption and diffusion of' new technologies. In all of the eight countries surveyed here, the public may complain about the costs of health care, but when individuals are sick, they are unlikely to inquire as to whether the technology used in their care is being used optimally. In addition to the trust vested in practitioners, the level of knowledge required to evaluate technology use often lies beyond even the practitioners who use the technology regularly. That laypersons rely on their health care practitioners for guidance in such matters is not surprising.

Concern arises because the practitioner-patient relationship, in addition to being heavily weighted in favor of the practitioner knowledge, creates an opportunity for the practitioner not only to recommend the amount of a good (i.e.. medical care) to be supplied but often also to set the price at which it will be supplied. All of this occurs with little role for payers for these services.

Still, the public also plays an important role as a social arbiter, modulating forces favoring technology use. This takes several forms. but in all countries surveyed here, health care services and their provision and financing have been major domestic policy issues. The pressure for change comes both from policy makers and directly from the public. The public has expressed some dissatisfaction with its health care system in all the coun-

TABLE 10-5: Health Care Systems in Eight Countries

	Canada	Un ed S a es
Health care system	Public financing by federal & provincial governments, provincial administration, universal access & portability, legal prohibition of parallel private-sector activity	Multiple payers (1 ,500 insurers); Medicaid/care public financing, corporate roles and interests, administratively cumbersome and increasing reform pressure
Regulation a) drugs	FDA model, provincial formularies for publicly funded programs, price regulation through Patent Medicines Review Board	FDA; large domestic industry; applicants support costs of regulatory requirements in exchange for faster processing
b) equipment	Device registration, suggestions for enhanced system exist; siting restrictions established by payers (provincial governments)	Law establishes classes 1, 11, and Ill with exemptions for devices "substantially equivalent;" certificate-of-need programs in some States
c) physicians	Provincially-based self regulation, incentives for nonurban practice, some licensing restrictions; generally fee-for-service practice	Entrepreneurial, fee-for-service practice with increasing amount of "managed care;" concern over imbalance in number of specialists v. generalists
Research & development	Small industrial role, generally arms of multinational firms, government spending low compared to other OECD nations; provincial sources exist for health services research	Large industry with extensive R&D; also, high level of government funding (NIH, AHCPR)
Technology assessment	CCOHTA, provincial bodies in BC and Quebec, attention to TA in Saskatchewan and Alberta	Diverse groups but little coordination; OTA, OHTA, AHCPR, professional organizations, industry. state-level activities
	France	**Sweden**
Health care system	Mix of employer-managed sick funds & social security financing, individuals reimbursed for 80'%. of costs (remainder privately insured); system of public and private hospitals	County-level administration of local and shared regional facilities; publicly-managed insurance with annual deductible; current climate of reform to increase choice and decrease bureaucracy via internal markets
Regulation a) drugs	FDA model; cost-efficiency aspects considered by Commission de la Transparence; Agence du Medicament issues approval for marketing after examining evidence of safety and effectiveness	FDA model, state monopoly on sales with patient paying small co-payment
b) equipment	Process of needs definition and government authorization for siting and operation	Little regulation; current move to establish device system like that for drugs and harmonize with EC policies
c) physicians	Fee-for-service, public and private MDs, current plans to limit medical student enrollment	Physician resource plans exist, MD freedom to adopt new technology is relatively controlled
Research & development	INSERM plays prominent role	MRC; also, industrial policy to groom national champions in the drug Industry
Technology dassessment	CEDIT, ANDEM, consensus conferences, CREME mandated by law but evidence of impact not yet available	SPRI, SBU (good track record, particularly with big-ticket items), consensus conferences with social orientation

TABLE 10-5 (cont'd.): Health Care Systems in Eight Countries

	The Netherlands	Germany
Health care system	Multiple payers, sick funds, global budgeting, changes to Internal markets	1,120 employer-based sick funds, office/hospital separation with remuneration to physician associations
Regulation a) drugs	FDA model, national formulary linked to payment for drugs	FDA model; 140,000 drugs available but most not evaluated as approval applies only to new drugs
b) equipment	Minimal regulation, Article 18 for siting of big-ticket technologies	No apparent restrictions or regulation, powerful export-oriented device Industry
c) physicians	General Incomes policy; payment by capitation and fee-for-service	Regional association with bargaining power; fee-for-service remuneration
Research & development	Investigational fund, TNO, industrial development	Significant Industrial role, government support
Technology assessment	Many actors, coordination mechanisms weak; includes Health Council, CBo	Some QA activities
	Australia	**United Kingdom**
Health care system	Multiple payers with mix of private and public insurers, shared state-federal jurisdiction	NHS funds health care through regional and district health authorites, recent purchaser-provider reforms, private-sector insurance and practice also exist
Regulation a) drugs	FDA model	FDA model
b) equipment	Little regulation, some attempt at certificate-of-need program, national centers for highly specialized services	Minimal regulation; some technical commentary prepared by Department of Health in some cases
c) physicians	Fee-for-service although "national" fee schedule appears to cover most physicians	Cavitation payments to GPs, fund-holding GPs purchase care form trusts and other health services
Research & development	MRC, Iittle Industry role	Noted role of MRC in clinical trials and substantial UK-based pharmaceutical industry in R&D
Technology assessment	NHTAP, AHTAP, AIH & NCHPE all involved in technology assessment; impact strongest in gate-keeper roles, influence growing, Increased role for public possible	Growing interest particularly with need for outcomes information as part of NHS reforms, bodies whose work may contribute to TA Medical Research Council, Audit Commission, Kings Fund, Cochrane Collaboration

SOURCE R Battista & M Hedge 1994

tries analyzed in this report. Satisfaction is at its lowest in the United States, where in the early 1990s, 29 percent of those polled felt that the health care system needed to be rebuilt completely and 60 percent felt that fundamental changes were needed. At the other extreme, the Canadian population seems the most content with its current system; 56 percent of those polled saying that only minor changes were needed (5) (see table 10-6).

TABLE 10-6: Public Views of Health Care Systems in Eight Countries, 1990

Country	Percentage of respondents		
	Minor changes needed	Fundamental changes needed	Completely rebuild system
Australia	34	43	17
Canada	56	38	5
France	41	42	10
Germany (West)	41	35	13
Netherlands	47	46	5
Sweden	32	58	6
United Kingdom	27	52	17
United States	10	60	29

SOURCE R Blendon, R Leitman, 1 Morrison, K Donelan, "Satisfaction with Health Systems in Ten Nations, " *Health A/fare,* pp 185-192, summer 1990

Important differences exist in public roles among the countries surveyed here. In publicly financed systems, the citizen as taxpayer is unlikely to accommodate the limitless demands of the citizen as patient. The Netherlands and several Canadian provinces have established public commissions on health care in whose deliberations financing has figured prominently. In France changes in health care financing in 1990 created a contributory tax whose existence has provided the French parliament with an inroad to the national discourse on health costs and services.

In linked multiple-payer systems, governments often play a similar role, acting as the facilitators of collaborative price-setting while also acting as payers for services delivered to some segments of the population. The quasi-governmental role of sick funds and other population-based insurance arrangements may shield governments in these systems from the extent of criticism and scrutiny that those in Canada and the United Kingdom have received over their provision of health care services.

In the United States public attitudes have created a climate for health care reform. Concern has focused less on high overall expenditures or the quality of health care available than on inadequate financial protection against the costs of illness. The 1992 presidential election brought with it the promise of significant change. It remains too early to evaluate the successor even feasibility of such massive reform; however, that the public is calling for change is recognized by virtually all participants in the debate.

There is an additional avenue through which the public affects technology use in health care systems: mass media. Technology advocates, payers, and practitioners and facilities all use media outlets with a view to shaping social discourse on health care. For example, media coverage of "waiting lists" for access to specific technologies has been a powerful factor in accelerating decisionmaking with regard to CABG in Canada, the Netherlands, and Sweden. In both France and the Netherlands, mass media coverage of laparoscopic surgical techniques is credited with increasing patient demand for these technologies.

Technologies (particularly pharmaceuticals) are advertised to patients and providers. Several countries have guidelines for advertising, but not one prohibits it. Particularly in the United States, facilities and practitioners attempt to increase business by advertising the availability of specific technologies.

All of these facets of public participation combine in ways that appear to resist generalization even within a single country. Whatever form it takes and through whatever channels, public participation is an important factor affecting health care management in all eight countries.

HEALTH CARE TECHNOLOGY ASSESSMENT

Some form of technology evaluation or assessment is occurring in each of the countries in this report. The specific details and impacts of those efforts are, however, highly variable.

Health care technology assessment is a relatively new field in the United States as well as elsewhere. Its beginnings may be traced to the establishment of a health program in the Congressional Office of Technology Assessment (OTA) in 1975. The first report to describe assessments of specific technologies was published by the U.S. National Research Council in 1975 (9). Subsequent OTA reports described methods of technology assessment and illustrated how they might be applied to a variety of technologies (12, 13,14,15).

The United States does not have a dedicated national (executive branch) agency for health care technology assessment, although various entities carry out and encourage assessment activities. Without a national focus, activities have grownup in many, probably hundreds, of different public and private organizations. In some other countries, however, both national and regional programs have been established. The first was the Australian National Health Technology Advisory Panel (NHTAP), established in 1982. Countries that have established or designated national programs to become involved in health care technology include Sweden (1987), France (1990), the United Kingdom (1990), and Canada (1990). Regional or provincial programs also have been established, as in Quebec (1988).

Although programs have been established in a number of countries, investments in technology assessment are small compared to investments in health care and health-related research. The Institute of Medicine (7) estimated that U.S.1.3 billion-O.3 percent of the money spent on health care—was related to health care technology assessment in the United States in 1984, which included U.S.$1. 1 billion for clinical trials, mostly of pharmaceuticals. Spending direct to technology assessment was less than $50 million, about 0.5 percent of health R&D funds.

Health care technology assessment has developed primarily to aid policymaking in the countries described. In some countries fixed and prospective budgets have led to limitations on rises in health care expenditures that have begun to force choices between competing alternatives. One of the main emphases of the programs in such countries as the United Kingdom. France, and Sweden is to aid such choices.

It is important not to overstate the influence of technology assessment, however. Only a small minority of existing technologies have been formally assessed. The emphasis of most agencies until the present has been on newer, capital-intensive technologies that are more often the subject of explicit policymaking. There is, however, increasing attention to the established, "small-ticket" technologies that probably contribute much more to health care budgets and may also include many ineffective tools and practices.

Furthermore, adoption and use of health care technology is influenced by many factors, including the perception and experience of health and disease, cultural responses to technology, the nature of the medical profession, industrial information and promotion, and financial and regulatory systems. Policies can strongly affect some technologies, but many others are not affected directly by such policies. Physicians and hospitals retain considerable autonomy despite formal national or regional policies. Most decisions concerning diffusion are made in the purchasing departments of hospitals and in the clinics and practices of physicians.

Several key themes deserve attention. First, *technology assessment's potential is realized only with effective links to technology management.* Health care systems with a limited policy structure for technology management, such as those of Germany and the United States, do little in the way of implementing technology assessment findings, (despite much activity in the United States). In contrast, systems with centralized public management and collectivized financing tend to have greater demonstrable links between technology assessment and technology manage-

ment, particularly at the national or regional policy level.

Second, *the level at which technology assessment activities occur in a health care system will dictate their scope and impact.* In the single-payer systems of Canada, Sweden, and the U.K. National Health Service, the "client" for technology assessment information is easily identifiable and reasonably receptive to such information. In the multiple-payer system of the United States, insurers have embarked on forms of technology assessment with a view to regulating the practice of those who provide care to their insured clients. Although these activities are not focused on the adoption or financing of technology, they have a significant impact on technology use by providers. No health care system has yet established a technology assessment program spanning these two domains.

Finally, there is much about the use of health care technologies that is unknown or uncertain. In this environment, identifying lacunae in knowledge, whether about effectiveness or economics, should be an important part of technology assessment activities. Following that, collaboration is a logical response, for the information generated about health care technologies stands to benefit patients, providers, and payers in many countries.

THE CASE STUDIES

The authors of the eight chapters in this volume each examined six areas or technologies to explore policies in health care and their results (table 10-7). The six technologies are:

1. treatment of coronary artery disease;
2. medical imaging;
3. laparoscopic surgery;
4. treatment of end-stage renal disease (including the use of EPO);
5. neonatal intensive care (including the use of ECMO); and
6. screening for breast cancer.

All the technologies examined here share the combination of at least some accepted effectiveness and relatively high cost. In some circumstances societies have had to decide how much of these services they are willing to purchase and to whom limited supplies will be offered. Each country has also had to struggle to find information to answer questions on benefits and costs. The cases shed light not only on policy mechanisms but also on the development and use of technology assessment in these decisions. Our best judgment of the relative impact of technology assessment in each country on the adoption and diffusion of the technologies examined is shown in Figure 10-1.

Treatments for Coronary Artery Disease

Coronary artery bypass grafting (CABG) was introduced in the early 1970s and diffused rapidly in the United States (which now has the highest CABG rate) but less rapidly in other countries (3) (table 10-8). The use of CABG in patients who are unlikely to benefit (and, conversely, patients who are likely to benefit by not having it) may be substantial. PTCA was introduced as an alternative to CABG in the late 1970s and was touted as a cheaper and less-invasive alternative to CABG. It also diffused rapidly, but the promise of substitution for CABG has been largely unfulfilled (table 10-9): in no country has PTCA diffusion been accompanied by slowing rates of CABG.

Policies on these procedures have generally been weak or nonexistent. Although randomized clinical trials of CABG were organized fairly early in its diffusion (especially in the United States), the results of these trials have not been used systematically in making policy or influencing clinical practice. In the United States diffusion has not been slowed by any discernible factor.

In Europe and Canada decisionmaking seems to have been guided primarily by a desire to limit resources for such care, linked to skepticism about the procedure's effectiveness early in its diffusion. Early diffusion was limited in a number of European countries because of limitations in the number of procedures that could be done and the slow pace of increasing capacity. In Sweden only four hospitals were equipped with the facilities necessary to perform the procedure; facilities were also limited in other countries, including the United Kingdom, the Netherlands, France, and Germany.

FIGURE 10–1: Relative Impact of Technology Assessment on Technology Adoption and Diffusion (Case Study Technologies)

Impact of TA	CABG/PTCA	CT/MRI	LC	ESRD	NICU	Breast cancer I
Highest	Sweden	Sweden	Sweden	Sweden	Canada	U.K
				Canada		Sweden
	Canada	U.K.	Australia		Netherlands	Canada
		Canada	Netherlands			Netherlands
	U.K		France		UK.	
	France	Netherlands	U K	France	France	
	Netherlands	France	Canada	Netherlands	Sweden	U.S.
	Australia	Australia	US.	Australia		Australia
			Germany	U.K.		France
	U.S	U.S		US.	US.	
Lowest	Germany	Germany		Germany	Germany	Germany

KEY Breast cancer = screening programs for breast cancer, CABG = coronary artery bypass grafting, CT/MRI - computerized tomography and magnetic resonance imaging, ESRD = treatments for end-stage renal disease, LC = laparoscopic cholecystectomy techniques, NICU = neonatal intensive care units & EMCO, PTCA = percutaneous transluminal coronary angioplasty
NOTE Joined cells suggest that there is little to distinguish the countries in the list

SOURCE R Battista and M Hedge, 1994

No assessments other than informal evaluations or expert judgments guided decisions on how many facilities to have, how many surgeons to train, or how many operations to perform.

Early in its life cycle the public did not demand the procedure (3). With time, however, public and political pressures developed. In Sweden and Canada the existence of waiting lists for CABG created political pressure to accelerate diffusion. In the Netherlands the government tried to maintain a restrictive policy but eventually had to expand greatly the available facilities in light of public pressure (including the patients' association occupying the Parliament building). PTCA also seems to have diffused without a great deal of policy attention: it was only after the mid- 1980s that public agencies began to publish assessments of these technologies. The assessments had little impact.

Newer treatments are now emerging, such as those using lasers. Despite the large investments that would be required for such technologies, little evaluation or information on diffusion is available. In light of the massive burden of coronary artery disease in all the countries surveyed here, conditions appear ripe for rapid diffusion of new technologies aimed at treating this disease. If the experience with CABG and PTCA is repeated, this diffusion may well proceed largely unchecked by research findings or assessment activity.

Medical Imaging

Evaluation of medical imaging is difficult. Traditionally, diagnostic technologies such as CT scanners have been assessed on the basis of their technical capability and their diagnostic accuracy. Beginning in the 1970s, however, more and more authors recognized that the result sought from diagnosis was improved patient health. Studies were mounted to examine the impact of information from imaging on therapeutic decisions, but only rarely on the effects on health outcome. The state-of-the-art of studying diagnostic technologies continues to lag behind the recognition that health outcome should be the standard for its eval -

TABLE 10-7: The Case Studies in the Eight Countries

	Canada	United States
CABG & PTCA	In Quebec, CETS work led to decision to put catheterization labs only where surgery existed; some planning attempts but few data (e.g., 1,000 procedures/500,000 people/yr); permitsfor service establishment; no PTCA evaluation	Wide diffusion, wide geographic variation and expansion of indications to include treatment of elderly persons
CT/MRI	CT. policy limited reaction very political decisionmaking MRI: tight economic times, increasing evaluation culture and links to information have slowed diffusion	CT: many machines, some experience with certificate-of-need programs MRI: like CT, for both, self-referral may act to increase diffusion
Laparoscopic Cholecystectomy	Rapid diffusion via public pressure, commonly surgeons, no specific regulation	Rapid diffusion, public pressure and professional repositioning for general surgeons
End-stage Renal Disease	Patient-level approach, rapid move to home dialysis, transplants limited by organ availability	Universally accessible; incentives for dialysis as payment for drugs post-transplant limited to three years, more than half of all patients treated with EPO
NICU	Regionalized care; ECMO in Quebec has TA using outcome data explicitly for future policy on ECMO	Rapid diffusion, championed by users
Breast Cancer Screening	Politically charged, major Canadian research (NBSS); screening is neither high-technology nor a TA-resisting practice, so TA's role focuses on choices for efficient program delivery	Range of recommendations; insured services in 32 states; apparent tension among guideline developers (ACS, NCI)
	France	**Sweden**
CABG & PTCA	Ministry of Health authorization required, rapid increase in PTCA, no identifiable role for TA	Moderate diffusion pace but increasing public concern in mid-80s over waiting lists prompted national evaluation and calls for increased CABG & PTCA, "watt-and-see" slows diffusion and affords an opportunity for TA involvement
CT/MRI	Both require government authorization and have diffused rapidly carrying France from a position of few machines to many per population, when compared to other European countries	CT slowish diffusion, planned evaluation was actually used in managing diffusion MRI much the same as CT experience with big impact for NEMT report
Laparoscopic Cholecystectomy	Started in France, no authorization required	Financial incentives for less invasive, stay-shortening technologies have encouraged diffusion
End-stage Renal Disease	Ministry of Health authorization required, health needs are defined but apparently not linked to actual practice	Regionalized services, high prevalence of ESRD and of transplanted patients
NICU	No TA role, ECMO seems low priority in light of AREC, a made-m-France technology	Regionalized despite lack of official pressure/policies to do so, 2 ECMO centers exist and are felt to satisfy demand
Breast Cancer Screening	Insurance programs pay for mammography for women 50-69 years of age, CNAMTS is now funding pilot screening projects	Introduced in 1964, now virtually national coverage of screening program with county-to-county variation in eligibility; >50% of eligibles are believed to be screened

	The Netherlands	Germany
'CABG & PTCA	Highest rates in Europe, despite inclusion under Article 18, initail Intention to use Information in policymaking never actually happened	Rapid diffusion, planning for catheterization lab needs at state level, CABG guidelines developed by surgeons for QA
CT/MRI	CT little impact of TA, covered by Article 18 from 1984-1989 MRI better timing, more impact of TA, still rapid diffusion	CT diffused rapidly, funded initially by federal Ministry of Research & Technology, certificate-of-need attempts ineffective but documentation requirements produced temporary slowing of growth MRI slower than CT, possibly limited by financing changes limiting resources from government for establishment and from sick funds for reimbursement
Laparoscoplc Cholecystectomy	Fairly rapid diffusion, little assessment	Originated in Germany and France, no particular regulatory or licensing requirements but consumer demand and competition with nonsurgeons drive rapid diffusion
End-stage Renal Disease	Health Council role in decisionmaking for payment, transplantation limited by organ supply use of predictive modeling for forecasting	Low transplant rate, possibly due to absence of law governing organ donation and retrieval 'non-profit" non-hospital dialysis has grown in Importance
NICU	Small units now consolidating	Regionalized care established by obstetricians, ECMO diffusion slow but due to no particular factor
Breast Cancer Screening	Early hospital-based screening led to 1987 recommendation to establish biennial screening for women aged 50-70, Sick Funds Council funds program administered through regional cancer centers, CBO developed guidelines for screening	Eligibility for screening reported to be women > 20 years of age, mammography Included as part of broad cancer screening programs, paid for by sick funds, currently project in place to generate data for recommendation on mammography's place in screening programs
	Australia	**United Kingdom**
CABG & PTCA	No evaluation of CABG, 1991 rate of 669/mllllon people, NHTAP assessment of PTCA recommended developing guidelines, waiting lists exist but average wait is < 1 month	'Regional specialty until 1991 reforms, 1986 target of 300 CABG/milion people established but not reinforced
CT/MRI	CT >1/100,000 population, CT diffused rapidly and current concern is Inappropriate use, MRI evaluated early in diffusion & NHTAP recommend a centralized planning of MRI services	Brain and body CT scanners evaluated by Department of Health (DH) and Introduction regulated by DH, MRI evaluated in DH/MRC project, diffusion slowed by NHS requiring providers to pass capital costs on to purchasers through charges for services
Laparoscopic Cholecystectomy	Assessments undertaken but diffusion still rapid, laparoscopic cholecystectomy's Introduction associated with **26%** increase in rates of gallbladder surgery, other laparoscopic techniques have diffused less rapidly	Lack of central policy combined with private sector adoption, relatively rapid diffusion
End-stage Renal Disease	AHTAC guidelines developed for transplantation minimum number (30/yr) and orgaization of dialysis services, rate of growth of home dialysis slower than rate of growth of persons with ESRD	ESRD therapies centralized in bigger centers, emphasis on home dialysis and CAPD, Increasing role for private sector contractors to provide dialysis in Wales not yet seen elsewhere
NICU	Regionalized care, 2 centers provide ECMO, growing concern about costs of care (institutional and social) for very -low- birthweight infants	Regionalized care, growing concern about long-term morbidity among NICU-treated children
Breast Cancer Screening	Small-scale Screening begun during 1980s led to national program targeted at women 50 & over, NHTAP & AHMAC heavily involved in process leading to national program	National screening program in place current concerns include ensuring adequate coverage of population and maintaing skills Of program workers

SOURCE R Battista & M Hedge, 1994

TABLE 10-8: CABG Procedures in Eight Countries, 1985-1991
Number/(rate per million population)

Country	1985		1988		1990		1991	
Australia	7,100	(470)	9,566	(579)	10,775	(630)	12,649	(731)
Canada	9,690	(380)	11,400	(425)			18,360	(680)
France	5,900	(1 10)	13,200	(240)	21,450	(390)	22,250	(410)
Germany (all)					26,137	(335)		
West Germany	12,600	(190)	22,000	(360)			30,500	(500)
East Germany	3,800	(62)						
Netherlands	6,800	(478)	8,280	(563)	9,470	(635)		
Sweden	1,970	(236)	3,518	(416)	4,329	(51 1)	5,693	(670)
United Kingdom	10,840	(195)			16,233	(282)	22,882	(405)
United States	201,000	(855)	253,000	(1 ,017)	262,000	(1 ,056)	265,000	(1,055)

SOURCE *Biomedical Business International* Newsletter 14(2):10, 1991, European Society of Cardiology, "European Survey on Open Heart Surgery 1990, ''Annals of the European Academy of Sciences and Arts, vOI 2, Salzburg, Austria, 1991: U S Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics, unpublished 1979-1992 data from the National Hospital Discharge Survey provided by E Wood, Hospital Care Statistics Branch, Hyattsvlle, MD, 1994

uation. This means that comparing different methods of diagnosis, including those within the field of diagnostic imaging, has not often been done vigorously.

Diffusion of CT scanners was quite rapid in relation to other technologies that have been studied (1) (table 10- 10). In the United States this occurred despite certificate-of-need programs. Several factors promoted this rapid diffusion, including high profitability and enthusiastic physician acceptance. Beginning in 1978, MRI devices diffused into U.S. health care. Health planning also was unable to regulate diffusion of MRI scanners for reasons that included weaknesses of the planning program and difficulties in obtaining objective information on MRI's value.

CT and MRI scanners entail similarly high infrastructure costs. In all countries but the United States their diffusion has been shaped by the willingness of the public purse to fund them.

The diffusion of CT scanners illustrates clearly the effects of public policies. In France, for example, diffusion of CT scanners was delayed until the French industry produced scanners. When French-made scanners were available, the policy was to encourage their purchase.

Several countries, including Australia, the Netherlands, France, and Canada, developed guidelines for the number of CT scanners per population, restricting the numbers or rates. In general, formal assessment played little role in the development of such guidelines, which subsequently were revised rather rapidly (followed by the equally rapid diffusion of CT scanners). Whether this is a failure of regulation or indicative of responsive public policy is difficult to say.

One country in which an early assessment clearly had an influence on diffusion was Sweden, where an assessment gave guidance to hospitals as to whether it might be economically advantageous for them to purchase a CT scanner. Initial diffusion was slower than in other countries despite well-developed expertise in neurology. The Canadian province of Quebec also was able to slow diffusion of CT scanners, but the resulting lack of access to CT scanning led to pressures to relax the controls.

A number of countries used the case of the CT scanner to learn what might be done in linking assessment and decisionmaking. When MRI was introduced, it was assessed earlier and more sys-

TABLE 10-9: PTCA Procedures in Eight Countries, 1985-1991
Number/(rate per million population)

Country	1985		1989		1990		1991	
Australia	1,244	(79)	4,219	(251)	**4,904**	(288)	5,726	**(330)**
Canada			10,730	(405)	**12,230**	(453)	12,420	**(460)**
France	3,480	(60)	18,000	(324)	**22,863**	(460)	23,125	**(410)**
Germany					**35,881**	(490)		
West Germany	4,490	(77)	18,800	(308)	**30,956**	(505)	34,328	**(560)**
East Germany					**4,925**	(294)		
Netherlands	2,556	(185)	6,828	(458)	**8,205**	(550)	8,899	**(593)**
Sweden	165	(20)	858	(103)	**1,098**	(129)	1,834	**(21 5)**
United Kingdom	1,640	(29)	7,148	(126)	**8,460**	(148)	9,775	**(1 70)**
United States	90,000	(380)	239,000	(1 ,018)	**260,000**	(1 ,048)	298,000	**(1 ,187)**

SOURCE European Society of Cardiology, "European Survey on Open Heart Surgery 1990, " Annals of the European Academy of Sciences and Arts, vol 2, Salzburg, Austria, 1991, The Swedish Council on Technology Assessment in Health Care, Goodman, C , The Role of PTCA in Coronary Revascularlzation Evidence, Assessment, and Policy, Sept , 1992, U S Department of Health and Human Services, public Health Service, National Heart, Lung, and Blood Institute, The Bypass Angioplasty Revascularizatlon Investigation (BARI) A Brief Description Bethesda, MD, 1990, U S Department of Health and Human Services, Public Health Service, National Institutes of Health, *NIH Dataf300k* 1993 (NIH Publication No 93-1261) (Bethesda, MD, 1993)

thematically. In addition its slower diffusion was in part due to worldwide economic problems. Whether assessment was an important cause of its slower diffusion would be difficult to say, but certainly plans for MRI diffusion were more effective (table 10-1 1). In the Netherlands, for example, assessments were organized with the underlying idea of affecting policy through phased changes. In Sweden a report done by SPRI influenced MRI diffusion.

Laparoscopic Surgery

All eight health care systems surveyed in this volume have been rapid adopters of laparoscopic surgical techniques. In all except Sweden, this has occurred in the absence of any particular policy incentives. In Sweden explicit policy incentives for adoption of stay-reducing technologies have acted in concert with forces present in other countries. In all countries public interest and pressures have stimulated diffusion of laparoscopic cholecystectomy, but other laparoscopic procedures have not diffused so rapidly.

The speed of diffusion has made it impossible to perform good evaluations. Policy mechanisms did not control the diffusion in the United States, where payment was readily available for conventional cholecystectomy (although the Medicare program did establish a lower payment than that for conventional cholecystectomy). Industry strongly promoted the innovation. In Canada, too, policy mechanisms did not control Iaparoscopic cholecystectomy. In Europe, although laparoscopic cholecystectomy diffused relatively rapidly, diffusion of other laparoscopic procedures seems to have been constrained by limited budgets and lack of fees for these procedures (2).

At the level of the hospital, laparoscopic equipment is relatively low-tech, requiring little change in infrastructure or service arrangements. New technologies substituting for existing ones with minimal capital outlay diffuse with a stealth and speed not seen with imaging or any of the other technologies surveyed in this volume, all of which require substantial infrastructure investments.

TABLE 10-10: CT Scanners in Eight Countries, 1986-1992
Number/(rate per million population)

Coun ry	986		988		990		992	
Australia	165	(10,6)	185	(10.9)	235	(137)	292	(17.1)
Canada					190	(7.0)	200	(7.5)
France	264	(4.8)	350	**(6.2)**	409	(7,2)		
West Germany	423	(7,0)	595	(97)	750	(122)		
East Germany							31	(1 .8)
Netherlands	45	(3.2)	83	(5.7)	**109**	(73)		
Sweden	45	(5.4)	75	(9 o)	**90**	(10.5)	102	(12.0)
United Kingdom	149	(2,7)	204	(3.6)	**250**	(4.3)		
United States	3,000	(12.7)	4,991	(20.4)	**6,715**	(26.8)		

SOURCE M Bos, 1994

All health systems share an interest in reducing hospital length of stay, but any advantage arising from laparoscopic surgery in this regard may be squandered if the bed-days freed are simply filled with persons undergoing other elective surgeries.

The rapid growth in laparosopic cholecystectomy use in several countries is consistent with a growth greater than the rate of natural increase of the open procedure it replaces. Expanding the number of persons deemed candidates for operation (particularly for an often-elective procedure such as cholecystectomy), in the absence of guidelines defining indications, may well increase overall expenditures on surgery.

Little assessment of any of the laparoscopic procedures has been done (2). As this case shows, despite the growth in technology assessment activities, such activities still may be unsuccessful in identifying technological innovations early enough to influence their diffusion. Without clear measures of benefit of expansions in surgery, evaluating the overall impact of these and other minimally invasive, stay-reducing technologies will be an ongoing challenge for all health care systems.

Treatments for End-Stage Renal Disease (ESRD)

Treatment of ESRD is different from other areas of health care technology because its efficacy and appropriate use is not at issue; patients with ESRD will die without treatment. All eight countries in this report furnish essentially full financial coverage of the cost of treatment for all or most of the people with the disease.

Because of the high cost of treatment (particularly renal dialysis) questions concerning this procedure have generally centered on how to provide it more efficiently. All countries have made some attempt to limit the number of services provided, but then have met irresistible pressures to expand the provision of treatment to all who can benefit from it.

ESRD treatment is a field in which a great deal of assessment has been performed, with a major focus on the high aggregate costs of conventional dialysis. This has led nearly all countries to advocate alternatives, including renal transplant, peritoneal dialysis, and home dialysis. If successful, a transplant eliminates the need for continuing dialysis; however, the number of transplants is limited by the availability of kidneys. Home dialysis, emphasized by some countries (such as Canada and the United Kingdom), is a method of providing more services at lower average costs.

In the United States outpatient hemodialysis is the dominant treatment under the Medicare ESRD program. which covers nearly all Americans with ESRD. Home dialysis is used by only 2 percent of program enrollees. The American system of treat-

TABLE 10-11: MRI Scanners in Eight Countries, 1986-1992
Number/(rate per million population)

Country	1986		1988		1990		1991		1992	
Australia	3	(0.2)	7	(0.4)	11	(0.6)	20	(1,2)	25	(1 .5)
Canada	5	(0.2)	9	(0.3)	20	(0.7)	22	(0.8)	28	(10)
France	29	(0.5)	36	(0.6)	70	(1.2)	95	(1 .7)	107	(19)
West Germany	41	(0.6)	91	(1.5)	143	(2.3)	200	(3.2)		
East Germany									1	(.05)
Netherlands	2	(0.1)	5	(0.3)	14	(0.9)	20	(1.3)	27	(1 .8)
Sweden	2	(0.2)	6	(0.7)	12	(1 .5)	17	(2.2)	22	(2.6)
United Kingdom	14	(0.2)	25	(0.4)	55	(0.9)	65	(1.1)	80	(1 .4)
United States	110	(0.4)	1,600	(6.6)	2,076	(8.4)	2,560	(10.1)	2,940	(11.3)

SOURCE M BOS, 1994

ment is dominated by profit-making dialysis centers, and incentives to move toward less expensive forms of dialysis are lacking. Policy changes within the ESRD program are almost continuous and are intended to avoid introducing incentives for overuse.

EPO was introduced in 1989. This drug reduces morbidity and improves the quality of life for some people on dialysis, but at a substantial cost. Because services for ESRD are managed at the system level in all eight countries, responses to EPO may provide some insight into how health care systems are managing the transition from the sole goal of prolonging life to a more complex improvement in quality of life with minimal morbidity. In Canada and France initial limitations in access to EPO led to public demonstrations, particularly by nephrologists caring for persons on dialysis, and to subsequent expansion of access. In other countries, despite its high cost, EPO has been incorporated into ESRD programs without assessment or serious public discussion. The percentage of ESRD patients receiving EPO in 1990 ranged from 60 percent in the United States and Sweden to about 20 percent in the United Kingdom (8).

Neonatal Intensive Care

Neonatal intensive care services are provided in all eight countries through organized systems of care, although the levels of services are not directly comparable. The United States is striking for its high level of such services combined with a high infant mortality rate compared with other industrialized countries.

Few figures are available concerning the diffusion of neonatal intensive care. One reason for this is the difficulty of defining such care. Techniques of intensive care are now widely used in newborn health care. The components of neonatal care vary both from center to center within a country and from country to country. As an example, extracorporeal membrane oxygenation (ECMO) is hardly used in France but is used in many centers in the United States.

ECMO diffused rapidly in the United States without consensus on effectiveness. By the end of 1989, more than 64 neonatal intensive care units had treated a total of 3,595 babies. Its rapid diffusion is probably related to the chance it may offer to save the life of a newborn, together with its revenue-generating potential in the United States and some other countries.

Assessment has generally played little role in developments in neonatal intensive care. One exception is Canada, which has a regionalized system for neonatal intensive care. An assessment of ECMO has been organized using outcome data to help decide future policy. In the Netherlands and the United Kingdom prospective randomized

studieso of ECMO are intended to guide future policy decisions.

Screening for Breast Cancer

Breast cancer screening is available in all eight countries, but there are vast differences among screening activities. Preventive measures are often not covered automatically by insurance, especially when they require special investments. In the case of screening for breast cancer special mammography equipment is required as well as specially trained staff. Special centers for this purpose maybe established. These factors may explain its slow diffusion. The differences from country to country, however, suggest that political circumstances may beat least as important for implementation as evidence of efficacy.

In the United States mammography screening has been recommended since 1977, based on a large randomized clinical trial done in New York City. Gradually, state laws have mandated insurance coverage for mammography screening, and the Medicare program has covered it since 1991. The capacity for screening in the United States is more than adequate to screen the entire target population, but the actual percentage of women over the age of 50 who have been screened falls far short of the goal of universal screening.

A number of assessments of mammography have been done in the countries covered in this report (including randomized trials in Canada, the United Kingdom, and Sweden, and formal cost-effectiveness analyses organized in Sweden, the Netherlands, and the United States). These assessments appear to have affected policy. All assessments have encouraged a public sector program for breast cancer screening. Single-payer control provides a political target for advocates of mammography and appears to have contributed to the development of coordinated programs in Canada, the Netherlands, and Sweden.

The absence of coordination among program advocates and payers remains an issue in all countries. As a result, screening programs have tended not to be focused on risk categories (e.g., age, family history) for which the greatest benefit has been demonstrated. The relative success of programs in Canada, Sweden, and the Netherlands demonstrate the difficulty of providing, managing, and evaluating preventive services in the absence of some form of central policy and coordinating mechanism for such preventive services.

CONCLUSIONS

In contrast to the situation in 1980, all of the countries examined in this report now have stated policy goals of assessing the benefits of health care technologies. Formal programs for health care technology assessment vary but are operational in all the countries studied. Although still small, these programs are beginning to change the nature of health care policymaking.

Countries with national systems of health care have attempted to develop policies to manage new and existing technologies in concert with global or prospective budgeting. One element of these policies is technology assessment and its linkage to policy decisions. Technology assessment's impact varies, but it is becoming an important factor in decisions about technology acquisition. Table 10-12 presents our best judgment of the overall impact of technology assessment on policymaking in the eight countries studied.

The United States has not developed a policy structure that makes the management of health care technology possible at the national level. Efforts in the United States are aimed at directly affecting medical practice (with varying success). The national and regional issues have not been addressed effectively.

One lesson emerging from this report is that although national and regional policymaking is essential to control health care expenditures, such policies are not sufficient for managing technology. To ensure the efficacy and cost-effectiveness of technology adoption and use, actions at the operational level of clinical medicine also seem to be necessary. Such actions are only beginning in most of the countries studied, other than the United States.

Health system reforms appear to be accelerating around the globe. All countries face increasing

TABLE 10-12: Overall Impact of Technology Assessment on Policymaking in Eight Countries

Significaton impact	Sweden
Moderate impact	Canada The Netherlands
Modest impact	Australia U.K.
Minimal impact	Us. France
No impact	Germany
(Nascent Technology Assessment)	

SOURCE R Battista and M Hedge, 1994

demands from an aging population for increasing costly services (even if the percentage of GNP spent on health care does not rise greatly). In addition, all are grappling with inappropriate use of technology, and consumer dissatisfaction (16). Some countries, such as Sweden, are making changes to enhance consumer choice of physicians and hospitals. Others, such as the United Kingdom, are making profound organizational changes to affect incentives in their health care systems. Some countries are planning further changes in financing mechanisms to control specialists' incomes and to change incentives in specialist payments. Quality of care is of growing concern: several countries are actively attempting to limit payments for "unnecessary" care, and the public and policy makers are beginning to question the benefits of certain clinical procedures.

These trends point to a future for technology assessment and, perhaps, to better management of health care technology. There is a growing recognition of the need for more timely and accurate information on the benefits, risks, and costs of health care technologies. To the extent that they deal with specific technologies, all policies, whether regulatory or financial, can be developed intelligently only if there is good access to such information. Physicians, institutions, and patients also need information to make their decisions. The informational needs are enormous and remain largely unmet.

Although the effects of technology assessment have so far been relatively limited in some countries, others can point to real successes. The most striking differences between the situation in 1980 and today in 1994 include:

- the substantial increase in governmental support for health care technology assessment,
- the marked increase in the number of institutions and people involved in technology assessment, and
- the strengthening of the international network in this field.

A final word about internationalism in this field: the 1980 OTA report ended with a recognition of the importance of an international perspective in health care technology assessment. The current report also demonstrates the common problems and similar solutions that countries are finding. In 1994 we can describe actual progress that has been made in this area, beginning with the establishment of the International Society for Technology Assessment in Health Care (ISTAHC) in 1985, which has furnished a forum for individuals from many countries to share concerns, results of analysis, and possible problem-solving approaches. In 1993 the International Network of Agencies for Health Technology Assessment (INAHTA), initially involving about 13 public agencies in 10 countries, was formed for the purpose of exchanging information, avoiding duplication, and perhaps actually working together on assessment. In 1994 the EUR-ASSESS program, intended to coordinate technology assessment activities among the members of the European Union, was funded by the European Commission. These networks are still relatively young, but their very formation indicates that the need for an international perspective has been recognized.

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