PATTERNS OF USE

5.

PATTERNS OF USE

Ideally, patients are scanned when it can be reasonably expected that useful information about their condition will be found. Indications for use of a diagnostic technology such as CT scanning include consideration of the potential benefits, the population who will benefit, the medical problem affected, and appropriate conditions of use. However, insufficient studies have been conducted to determine the proper indications for use of CT scanners.

CT head scanners are usually used to diagnose mass lesions, cerebrovascular disease, and diseases with enlargement of the ventricles of the brain. Head scans also are commonly used for patients with symptoms such as headache and for victims of head trauma. Depending on the institution, studies have shown that results of 34 to 90 percent of all head scans are negative.

CT body scanners are used primarily for head scanning, although scanning for suspected abdominal problems is becoming more common. Patterns of use for body scanners are not yet as well established as those for head scanning because body scanners are at an earlier stage of development and often are not eligible for third-party payment. The complexity of medical diagnosis, the vast array of potential uses in the body from the neck down, and the capability of present CT scanners have also hindered the development of patterns of use of body scanning.

CT scanners are used for both inpatients and outpatients. Thus, they have the potential to avert hospital admissions and reduce the length of stay in hospitals. No data, however, show that this potential is being realized. Depending on the institution, from 20 to 90 percent of scans are performed on inpatients. The waiting period for a scan is generally longer for outpatients than for inpatients. Some inpatients may be scanned more quickly to expedite definitive treatment or discharge from the hospital. Other patients may be hospitalized to gain earlier access to CT scanners.

Current Federal policy does not link formally developed information on efficacy with the development of appropriate standards of use for CT scanners. The Professional Standards Review Organizations (PSROs) do review medical services for appropriateness, but no standards have been developed for CT scanners. The lack of information on appropriate indications of use hampers any effort to develop such standards.

EXPERIENCE WITH CT SCANNING

Patterns of Use

Head Scanning

The use of CT head scanners has varied considerably from institution to institution (47, 84, 108, 167, 205, 219, 249, 264, 265, 388, 405, 540). Many diseases and medical conditions can be diagnosed by CT scanning (table 12). The most common diagnoses have been mass lesions (mostly tumors, but some cysts as well), cerebrovascular disease (including stroke, hemorrhage, and aneurysm), and diseases with enlargements of the ventricular space of the brain (hydrocephalus and cerebral atrophy). Institutions reported that from 7 to **30** percent of patients scanned had brain tumors, **6** to **29** percent atrophy or hydrocephalus, **8** to 17 percent infarction (stroke), and 2 to 11 percent hemorrhage or aneurysm. The remaining CT examinations were either normal or revealed other neurological disorders. Reporting institutions found that from 11 to 44 percent of scans were normal (table 13). A recent study of nine hospitals reported that 53 percent of head scans and 36 percent of body scans were normal (149).

One study of several institutions found that about **50** percent of head scans were normal, with some institutions running as high as **80 to 90** percent normal. Two institutions surveyed had data on the percent of normal scans over time. One reported an increase of normal scans from **25** percent to 40 percent and the other from 34 percent to 46 percent (265). A high percentage of normal findings might indicate that CT scanning is being used more frequently as a primary diagnostic or screening tool than earlier. CT scanning is also used increasingly to plan therapy or to monitor changes in a patient's condition. For example, patients receiving radiation therapy for brain tumor are often monitored to observe the effects of therapy (90,407).

Body Scanning

As noted above, body scanners are often used primarily for scanning the head. In 1977, about **60** percent of examinations on body scanners were head scans **(158).** However, institutions that have both head and body scanners use their body scanners primarily to examine parts of the body other than the head. Mayo Clinic, for example, reported 76 percent of the examinations by its body scanners were body scans (465), and the Mallinckrodt Institute in St. Louis reported 95-percent (474) body scans on its body scanner. In institutions with both a head and body scanner, **65** percent of examinations on body scanners were body scans in a 1977 survey **(158).**

Most scans of the body relate to suspected abdominal problems, such as pancreatic tumors, abscesses, or jaundice (149). Scans are used less often for the thorax or extremities (table 12). However, these patterns of use are in flux. They can be expected to change rather dramatically as more becomes known about the usefulness of body scanning. For example, a study reported use of CT scanning as an adjunct of draining abdominal abscesses by needle, thereby avoiding surgery **(215).** According to a 1977 survey, 29 percent of scans on body scanners were of the abdomen, 6 percent of the pelvis, 5 percent of the chest, and 1 percent of the extremities (158).

Table 12.—Some Diseases That Can Be Diagnosed by CT Scanning[a]

HEAD SCANNING (Refs. 15,18,21,23,39,50,99, 124,125,162,211 ,223,224,229, 267,268,291 ,343,386,405,406, 410,41 1,459,472,478,537,539, 540)	BODY SCANNING (Refs. 6,7,8,9,38,95,157,209, 21 7,218,222,306,316,31 7,366, 452,461 ,465,474,477,493,526)
Mass lesions	**Tumors or cysts in:**
acoustic neuroma	adrenal
astrocytoma	bladder
epidermoid tumors	bone
glioblastoma	kidney
meningioma	larynx
metastatic neoplasms	liver
oligodendroglioma	lung
pituitary adenoma	lymph nodes
teratoma	mediastinum
cysts	pancreas
	parathyroid
Atrophy	pelvis
Cerebral abscess	pharynx
Hydrocephalus	retroperitoneum
Porencephaly	thyroid
Trauma	ureter
Tuberous sclerosis	
Multiple sclerosis	**Aortic aneurysm**
	Obstructive jaundice
Cerebrovascular disease	**Syringomyelia**
aneurysm	**Abdominal abscess**
arteriovenous malformation	
infarction (stroke)	**Traumatic damage to organs**
intracerebral hemorrhage	
subarachnoid hemorrhage	
Diseases of the eye	
tumors of eye and optic nerve	
exophthalmos	
Congenital abnormalities	

[a]This table lists only some of the diseases for which CT scanning has been applied and includes only selected references; it is not comprehensive.

Contrast Enhancement

The use of contrast enhancement varies from institution to institution (44, 45, 47, 48, 118, 119, 159, 264, 265, 303, 382), but has generally been increasing over the past few years **(45, 382).** Overall, more than 50 percent of patients are scanned after the injection of contrast material (29, 159). Initially, contrast enhancement was used less frequently for body scanning than for head scanning (149). But by 1977, a survey showed that 68 percent of head scans on body scanners were enhanced, while

Table 13.—Major Diagnostic Uses of Head Scanning

Tumor	Atrophy or Hydrocephalus[a]	Infarction	Hemorrhage or Aneurysm	Other Neurological Disorders	Normal	(Reference)
18	29	17	3	1	32	(82)
25	22	8	3	5	37	(47)
19	20	13	8	29	11	(388)
7	25	11	2	11	44	(108)
30	6	8	11	18	27	(405)
12	20	—13—		12	43	(264)

Each horizontal line shows the types of diagnoses made on the basis of CT scanning at one institution or group of Institutions. Numbers indicate the *percentage* of patients scanned who fell into a particular diagnostic category.

[a] Diseases which entail enlargements of the ventricular space

65 percent of abdominal scans were enhanced and 60 percent of scans of the pelvis were enhanced. Scans of the chest and extremities were enhanced less frequently (158).

Research Use

A few scanners are used solely for research; the National Institutes of Health has several CT scanners for use in the medical care of patients who are research subjects. Other scanners are scheduled for some research time, usually 5 to 10 percent of the total time available. Some uses combine service with research studies of accuracy or efficacy.

Although clinical researchers have concentrated so far on evaluating diagnostic usefulness, CT scanning is also a potentially valuable tool for biomedical research. Investigators have used CT scanning to study the anatomy and physiology of the normal brain (213, 220, 309, 414) and to seek correlations between brain anatomy and behavioral (170, 171,252,372, 441), biochemical (122, 453), or neurological (254, 442, 468) abnormalities. Experimental uses of body scanning are also increasing (145, 313, 461), such as evaluating damage to the heart **(200).**

Indications for Use of CT Scanning

The critical question of the appropriate indications for use of CT scanners has not been effectively addressed. Ideally, patients are scanned when it can be reasonably expected that useful information about their condition will be found. Indications for use must be specified through consideration of the benefits from CT scanning, the population who will benefit, the medical problem affected, and appropriate conditions of use.

Development of indications for use depends on information about efficacy. If arriving at a diagnosis is the goal, CT scanning may be used to diagnose all the conditions listed in table 12. If improved patient outcome were the goal, however, the indications for use would be different.

However the goal is defined, little is known about appropriate indications for use of CT scanners. Few institutions have reported indications used for head scanning. In two large neurological referral centers, CT head scans were ordered for patients because of suspected mass lesions in **30** percent of scans, vascular abnormalities (such as stroke) in 10 percent, trauma in **5** percent, suspected optic lesions in 5 percent, suspected hydrocephalus or shunts in 5 percent, and symptoms such as headache, confusion, seizure, or dementia in **23 to 30** percent. Indications for other patients were not given **(265).** A survey of nine hospitals in **1977** found the following indications for performing head scans (149):

Headaches	17.1 percent
Motor disturbances	14.2 percent
Tumors	9.5 percent
Cerebral vascular accident (stroke)	5.5 percent
Mental symptoms	5.4 percent
Trauma	4.2 percent
Other	44.1 percent
Total	100.0 percent

The same survey reported that suspected abnormalities of the pancreas, liver, abdomen, kidney, and pelvis, plus a variety of carcinomas, accounted for more than 64 percent of CT body scans (149).

Alderson and his coworkers reviewed the experience of one institution. They found that of 490 patients scanned, 195 had an abnormal neurological examination (38 of whom were diagnosed as having strokes), and 295 patients had a normal neurological examination. Of those with normal neurological examinations, 67 had headache only, 54 had seizures, 60 had mental deterioration, and the remaining 114 had miscellaneous complaints (4).

A CT head scan is commonly given to patients whose only symptom is headache. Two studies have examined the results of such scans. Alderson and his coworkers found that of **67** otherwise normal patients with headache, only 3 had abnormal scans, and that these were of little clinical importance (4). Carrera and his coworkers reviewed the experience of 53 patients whose chief complaint was headache but who had no other neurological findings. They found no abnormal CT examinations **(92).**

Another common use is for patients with head trauma. French and Dublin reported on 1,000 consecutive patients who were scanned for head injuries. Twenty-seven percent of the patients were alert and had normal neurological examinations; only 13 percent of those with normal neurological examinations had abnormal scans, and none of them required surgery (173).

Alderson analyzed the results of 295 patients with complaints but no focal findings* on neurological examination; 205 scans (0o percent) were normal. If "brain softening" is excluded, only 15 (5 percent) had an abnormality. A symptom that often indicated abnormalities was the acute onset of seizures. In 28 such patients, 4 had lesions, 2 of them tumors (4).

*Focal findings are those indicating an abnormality in a specific part of the brain.

Similar experience has not yet been reported for body scanning, so it will not be further discussed in this section.

Potential Levels of Use for CT Scanners

The five levels of efficacy suggested by Fineberg et al. (167) (chapter 3) indicate the impacts that different policies might have on the use of CT scanners. The maximum number of "appropriate" scans may vary greatly depending on the definition of efficacy. If efficacy is defined as the therapeutic impact of a diagnostic technology, data on such effects of CT scanning are currently too limited for full evaluation. One could identify possible therapies for a particular diagnosis and change in use of such therapies due to CT scanning. For example, the major available therapy for intracranial lesions is neurosurgery. In 1975, 89,000 intracranial procedures were performed in the United States (511). This figure represents a possible level of use based on the fourth level of the Fineberg definition of efficacy, therapeutic impact. Surgery canceled as a result of demonstrated spread of cancer could also be considered. Other diagnoses of potentially treatable conditions could be added to this figure.

If diagnostic reliability alone were used as the criterion on which to determine need, then the potential number of scans would be much greater. For example, in 1974, there were approximately 600,000 hospitalizations for stroke in the United States (513). Each person with a stroke serious enough to require hospitalization could be scanned one or more times. But it is unclear what this information would add to the patient's well-being, because generally, strokes can be well diagnosed clinically, and little effective therapy can be performed (314). One important use is to ensure that the stroke is not hemorrhagic if anti-coagulation is planned or contemplated.

Many patients present symptoms such as headache that could indicate a serious neurological disorder. J. Lloyd Johnson Associates estimated the number of scans required to diagnose intracranial disease *and* to examine patients with symptoms possibly indicating such a disease (table 14). Patients with serious disease would certainly be a minority of the total number of cases with symptoms (524). For example, about 12 million people with headaches visit physicians' offices each year (512)—J. Lloyd Johnson Associates estimates that 750,000 of these patients appear to be serious enough to be scanned (265). (Since the major concern in such headache is primary brain cancer, this figure may be compared to the yearly incidence of such cancer, which is about 6,000. See table 14.)

Using this reasoning, Johnson Associates estimated a level of use of about 4 million head scans annually (265). This estimate is partially based on the common medical assertion that it is valuable to scan worried patients likely to be normal to reassure them that no lesion is present; and it is valuable to scan patients likely to have untreatable disease to give them realistic prognoses, Scanning the brain of patients with lung cancer, breast cancer, and so forth could not only give such information, but might also obviate painful and expensive therapy if the cancer were found to have spread to the brain (a common condition in its final stages). Because of this philosophy and of the lack of data on using CT scanning to plan therapy, indications for appropriate use of scanning are difficult to define.

Similar rough estimates could be made for body scanning, but data on the efficacy of body scanning are even more limited than for head scanning. J. Lloyd Johnson

Table 14.—Estimated Types of Patients Diagnosed or Referred Annually Who Are Potential Cases for CT Head Scanning

	Number of Cases	Totals
Diseases of the Central Nervous System		
Subarachnoid Hemorrhage	15,000	
Cerebral Hemorrhage	555,000	
Cerebral Embolism	220,000	
Stroke	80,000	
Intracranial Abscess	6,000	
Head Injuries	250,000	
Unspecified Neurological Signs	700,000	
Other Diseases of the Brain	324,000	2,150,000
Malignant Neoplasms of the		
Brain	6,000	
Lung	80,000	
Breast	290,000	
Prostate	150,000	526,000
Functional and Other Symptoms		
Headache	750,000	
Convulsions	400,000	
Vertigo	100,000	1,250,000
Total		3,926,000

Source: Adapted from table B.1, reference 265.

Associates used assumptions similar to those for head scanning and projected a national level of use of about 2.7 million body scans annually (265).*

Thus, planning on the basis of expected patterns of use requires explicit consideration of the efficacy of a technology. The goal of using a diagnostic technology such as the CT scanner must be defined. Different goals yield very different levels of use. Depending on the goal, existing knowledge would justify either a very small or a large number of scanners. In fact, using the J. Lloyd Johnson Associates estimates, more than 2,200 CT scanners would be called for,' a number that could cost more than $1 billion to purchase the machines, and $l billion to $2 billion per year in payments for scans.

Institutional Setting of CT Scanning

Most CT scanners in hospitals are operated by the department of radiology, although they may be owned by that department, by the radiologists, or by the hospital One reason for operation by the radiology department is that the Joint Commission on Accreditation of Hospitals (JCAH) required that an authenticated report by a radiologist be included in every interpretation of a radiological procedure, including CT scanning. In 1976, however, this requirement was changed to allow

*6.7 million examinations divided by 3,000 scans per scanner.

any qualified physician to interpret special diagnostic procedures, including CT scans. Neither policy has applied to nonhospital scanners, some of which are under the control of neurologists and/or neurosurgeons. *

Regardless of the kind of institution or specialist owning or operating a CT scanner, a patient cannot be scanned except by a physician's order. In hospitals, clinical physicians refer patients to the department of radiology for a CT scan. A 1975 survey reported the source of referrals for head scans as follows (80):

Neurology	37%
Neurosurgery	26%
Other hospital staff	14%
Outside physicians	28%

Similar results were reported in a 1977 survey of nine hospitals (149):

Surgery	27%
Internal medicine	25%
Neurology	24%
Family/General practice	14%
Other	15%

This later survey reported on sources of referrals for body scans (149).

Internal medicine	391%0
Surgery	19%
Family/General practice	15%
Other	27%

Inpatient-Outpatient Use of CT Scanning

CT scanning can be performed on inpatients or outpatients, depending on the patient's condition and the physician's desire. Unlike arteriograms and pneumoencephalograms, the procedure does not require admission to a hospital. Although CT scanning can avert hospital admissions and reduce lengths of stay, available information indicates that that potential has not been fully realized.

Most institutions perform scans on both inpatients and outpatients. The fraction of those scanned who are inpatients varies from 20 to 90 percent (264) Massachusetts General Hospital performs 90 percent of its scans on inpatients, but Mayo Clinic conducts 80 percent of its scans on outpatients (582). In a 1975 survey of 10 institutions, Buenger and Huckman (82) found an average of 46-percent inpatient scans, with a wide range. The American Hospital Association **(29)** surveyed 41 hospitals in 1976 and found 51-percent inpatient scans, with a range from 23 to 90 percent. A recent survey of nine hospitals reported that 52 percent of head scans and 60 percent of body scans were performed on inpatients (149)

Outpatients have confronted much longer waiting periods for scans: an average of **11.5** days compared to **1.6** days for inpatients **(159).** A survey in 1976 reported

*Partly because they cannot profit from self-referral, radiologists consider CT scanners most appropriate in their custody. Neurologists and neurosurgeons believe that they should reinvolved in the control of head scanning because they have more training and experience in interpreting brain anatomy than radiologists.

that delays for inpatients had increased in 21 percent of the institutions and had decreased in 9 percent. Delays for outpatients had increased in 35 percent and had decreased in 6 percent. Waiting periods tended to decrease after installation of a new machine in the same region (159). By 1977, a survey of body scanners found a scheduling delay of **0.9** days for inpatients and **3.4** days for outpatients **(158).**

Self-Referral for CT Scanning

Self-referral occurs when a physician both refers a patient for a test or procedure and receives payment for performing the test. At least **89** percent of all CT scanners are in hospitals or in radiological offices where one physician orders, and another performs scans. Thus, self-referral is associated with 11 percent of existing scanners, at most. *

FEDERAL POLICIES CONCERNING USE

The Professional Standards Review Organizations (PSRO) program is one of the principal expressions of Federal policy concerning the use of medical services, including CT scanning. The PSRO program, established in 1972 by P.L. 92-603, is administered by the Health Standards and Quality Bureau (HSQB, formerly the Bureau of Quality Assurance) of the Health Care Financing Administration. The purposes of the program are to help improve the quality and control the costs of medical services reimbursed through Federal payment programs. The program operates by setting standards and criteria for the desired level and quality of medical services and by evaluating against these standards the services actually provided. This process is designed to ensure that payment will be made only when services are medically necessary (235).

The PSRO program is based on the concept that medical professionals are the most appropriate individuals to evaluate the quality of medical services and that effective peer review at the local level is the soundest method for ensuring the appropriate use of medical care resources and facilities. The PSRO program is made up of separate and independent organizations covering **203** geographic areas. Each PSRO must be substantially representative of all practicing physicians in an area. The PSRO program is new and is not yet fully implemented. Of the 203 PSRO areas in March 1977, only 120 PSRO agencies had been funded; 100 were in "conditional status; 20 were in "planning' 'status. By September 30, 1977, 120 were in "conditional" status and 60 in "planning" status.

PSROs usually review only services reimbursed through Federal payment programs, Medicare and Medicaid,** whose coverage policies and eligibility

*As noted in chapter **4**, **20** percent of all scanners are located in private offices of all kinds, including at least 8 percent that are clearly radiological practices.

● *Although the law mandates review of publicly funded services only, some PSROs have begun to review privately funded services also. PSROs also have authority over other health programs authorized by the Social Security Act, including Maternal and Child Health programs. Because of the small size of such programs, they will not be referred to further.

requirements are set nationally, and PSROs must function within those limits. A service may be ruled ineligible for coverage either nationally or locally, with national decisions taking precedence. As will be described in chapter 6, CT body scanning is not yet a covered service under the Medicare program. Therefore, PSROs neither are permitted to find body scanning to be "medically necessary," nor would develop standards for its use. Questions about coverage can be answered locally or referred to the national level for resolution. If a PSRO disagrees with coverage policies or eligibility requirements, it may ask for reconsideration of such policy. Although no such question has yet come to the national level, this mechanism does have promise as a method of obtaining reactions from the local level and from medical practitioners to the national Medicare program.

Each State with three or more PSROs has a statewide Professional Standards Review Council. Among other duties, these Councils have the responsibility to disseminate information and data among the PSROs within the State. At the national level, a National Professional Standards Review Council is established by law. This Council has several functions, including one to "provide for the development and distribution, among Statewide Professional Standards Review Councils and Professional Standards Review Organizations of information and data which will assist such review councils and organizations in carrying out their duties and functions." Such information is specified as including regional norms and standards. Local PSROs are not required to accept model standards issued by the National Council. However, the National Council has authority to disapprove local standards that deviate from model standards if the Council determines that the differences are not medically justified. The National PSRO Council has provided general guidance and sample criteria sets developed by several organizations, including the American Medical Association, under contract with the Department of Health, Education, and Welfare (HEW). The purpose of these contracts has been mainly to develop criteria on medical necessity for hospitalization for different disease categories. HSQB hopes that both technical assistance and norms and standards will have an important educational effect, as well as affecting practice directly through reimbursement policy.

Each PSRO is initially limited to reviewing hospital inpatient services. After a PSRO has demonstrated its effectiveness, the Secretary of HEW may grant permission for it to review outpatient services also, although none have yet begun to carry out such reviews. PSROs review the medical care provided by utilization review of medical care for individuals and by medical care evaluation (MCE) studies. Utilization review can be either admission review, to determine the necessity for admission, or concurrent stay review, to determine the length of time a patient should be hospitalized. * In most instances, hospital committees are delegated by PSROs to perform these reviews, but PSROs must monitor the review process. Medical Care Evaluation studies are retrospective reviews of the medical care that was provided to certain groups of patients (e. g, by diagnosis), of the use of specific medical technologies, or of any category of medical or administrative services provided.** As

*Under proposed regulations, concurrent review may be applied prior to major diagnostic or therapeutic procedures if medically unnecessary or inappropriate utilization of a procedure is documented (242). This provision could apply to CT scanning in the future.

**Through the use of medical information systems, the quality of medical care can be monitored during the process of medical care rather than afterward. For a discussion of this subject, see OTA report, *Policy Implications of Medical Information Systems.*

specified in the statute, PSROs review services to determine whether:

(A) such services and items are or were medically necessary;
(B) the quality of such services meets professionally recognized standards of health care; and
(C) in case such services and items are proposed to be provided in a hospital or other health care facility on an inpatient basis, such services and items could, consistent with the provision of appropriate medical care, be effectively provided on an outpatient basis or more economically in an inpatient health care facility of a different type.

The law requires that PSROs use norms, criteria, and standards in evaluating medical services. This approach allows nonphysicians to perform many of the reviews and also enhances the objectivity of the review process. Standards are developed by a consensus of physicians, based on typical patterns of practice in the area and on such regional or national information as may be available and considered applicable by the PSRO. No PSROs had developed standards for CT scanning by September 1977.

In its early stages, the PSRO program has concentrated on determining the need for hospitalization. Now PSROs are beginning to move beyond the question of necessity for hospitalization to review of surgical procedures and review of ancillary services, including such radiological services as CT scanning. HSQB which administers the PSRO program, hopes to provide sample criteria in these areas.

PSRO decisions on medical care utilization and quality can be enforced in several ways. Reimbursement for services provided can be withheld by Medicare and Medicaid (Medicaid regulations are established in each State and vary somewhat). For serious and repeated violations of PSRO standards, a physician's right to be reimbursed through Medicare and Medicaid can be suspended or revoked.

SHORTCOMINGS OF UTILIZATION POLICIES

Potential uses of CT scanning are virtually unlimited. The entire body of every patient could be scanned to provide physicians and patients the most complete and accurate anatomical information possible. Further, each patient could then be scanned periodically to monitor the effect of treatment and rate of recovery. CT scanning could even be used routinely as a screening tool. Such uses would require a large number of scanners operating at full capacity and would result in a substantial increase in national medical expenditures. Such extensive use would obviously represent an extreme approach. Optimal use of CT scanners would probably be at some level below this extreme. A principle issue, then, is how to ensure appropriate use. How can limits on use be established without sacrificing quality of care?

Historically, individual physicians have made decisions about appropriate use of a technology for each patient. Such decisions were based on clinical experience, advice from colleagues, information obtained from medical journals and manufacturers, judgment, and experience. As more physicians used a technology, usual and customary patterns of use developed. No formal process has existed for developing scientific information about the efficacy of medical technologies or for using that information as the basis for decisions about appropriate use.

The PSRO legislation established a framework by which appropriate use of medical technologies could be evaluated by physicians acting in organized groups rather than as individuals. Their decisions, however, are still based largely on traditional sources of information, so that customary practice patterns, whether appropriate or not, become accepted as standard. For CT scanners, as well as other medical technologies, little is known about the four factors defining efficacy: benefits received and probability of benefit, population benefiting, medical problem affected, and appropriate conditions of use. Evaluating the overall efficacy of diagnostic technologies such as CT scanning does pose special problems. Nevertheless, the lack of scientifically derived information on indications for use hampers the development of appropriate standards. Provided with such information, PSROs could become a mechanism for evaluating medical care. In its absence, PSROs are developing local standards for medical services based primarily on prevailing patterns of medical practice.

The Health Standards and Quality Bureau (HSQB) does not have the authority to impose national standards for use. It does have the authority, but not the mandate, to collect the results of studies concerning efficacy and safety and to provide them to PSROs as model or recommended norms, criteria, and standards. Experience with the PSRO program seems to indicate that local PSROs have generally been willing to adopt, with minor modification, the model standards and criteria developed nationally. Although limited information on efficacy and safety of CT scanners exists, HSQB has furnished none to PSROs.