

Appendix VII

INTERNATIONAL VIGNETTES

CT scanners have been installed and used in other countries at lower rates than in the United States. Although medical systems and policies in these countries are different from those in the United States, the primary factor limiting use of CT scanners appears to be financial.

BRITAIN

The British National Health Service plans medical services within an annual budget approved by the British Parliament. Because the budget is fixed, there is considerable competition for funds among various activities within the Health Service. In addition, Britain's financial problems have heightened pressures on the Health Service. Therefore, new technologies are examined with some care before widespread diffusion occurs, especially if the technology is as expensive as a CT scanner.

The British Department of Health and Social Security (DHSS) supported the development of the prototype EM I head scanner that was installed in 1971. Because initial clinical tests were promising, two more first-production head scanners were purchased with DHSS Research and Development funds (494). Evaluations continued to be promising, so three more scanners were purchased. In 1976, the Department was informed of the evaluations conducted with common protocols, and a national policy was adopted to locate one head scanner in each Regional Health Authority area. Consequently, each major neurological/neurosurgical unit serving a million people or more will have a head scanner. In October 1976, 18 head scanners were operational in Britain (England, Wales, and Scotland), with another 14 on order, to serve a population of about 58 million. By mid-1977, about 30 brain scanners were operational.

In June 1975, the first body scanner was installed for evaluation purposes at a Medical Research Council center (494). Promising initial results led to the purchase of two more units, with five more on order in October 1976. According to a DHSS report, "The whole body scanner has not yet been established so definitively. Nevertheless its promise in the diagnosis and monitoring of therapy of malignant disease along with the signposts of its potential value in the investigation of other lesions merits support for more widespread evaluation in a number of centres of excellence" (494). However, subsequent diffusion of body scanners was not so rational. By April 1977, 11 EMI whole body scanners were installed or on order in the United Kingdom, and only three of those were official health service acquisitions, The other eight were donated by philanthropists or charities, or purchased with endowment funds. *

* This information was furnished by Barbar Stocking, Nuffield provincial Hospitals Trust, London.

As indicated, the head scanner has undergone rather extensive evaluation. Use of head scanners in Britain and the United States appears to be quite similar. Evaluations indicate that installing an EMI scanner into an existing neurological/neurosurgical unit leads to increased costs. DHSS recognizes that the benefit to patients is not easily calculated, but assumes that as a more effective diagnostic tool, the CT head scanner “must represent a significant advance in an area of medicine which is associated with a high rate of death, disability, and long-term morbidity” (494).

Planning for body scanning has proceeded differently. Full evaluations have not been done, and scanners have been purchased with private funds. Thus, the goals of proper evaluation and geographic access to body scanners have been problematic in Britain.

CANADA

Under the national health insurance program in Canada, each province establishes minimum benefits and standards and receives about 50 percent of its funding out of Federal tax revenues. During the past 2 years, rising costs of medical care have considerably restricted the funds available for new technology. The Federal Government has recently negotiated a new basis for its participation in provincial programs, which probably will continue the financial restrictions.

In February 1976, eight CT scanners were operational in Canada, seven of which were head scanners (399). Two more head scanners and five more body scanners were on order. The Canadian Ministry of Health reports that all of these units were installed as of December 1976, and that no others have been ordered because of financial restrictions. Thus, nine head scanners and six body scanners, all located in hospitals, were serving the Canadian population of 23 million, that is, one scanner per 1.5 million population,

The Ministry of Health of the province of Ontario, with a population of about 8 million, evaluated the CT scanner in February 1976, noting that Ontario had four operational scanners and three more on order (401). A Task Force on the Placement of Instruments for Computerized Axial Tomography of the Ontario Ministry of Health analyzed patterns of use of existing machines (401). Its recommendations included the following:

- (1) All CT scanners acquired should have combined head and body scanning capability;
- (2) The number of CT scanners should be increased to 1 per **500,000 population**;
- (3) CT scanners should be installed only within University Hospitals or University Affiliated Hospitals.

Reported uses and rate of use of CT scanners in Ontario are quite similar to those in the United States. Toronto General Hospital, in 1975, calculated its cost per procedure to be approximately \$86 (Canadian), including **\$20 (Canadian)** for depreciation over a 5-year period (399). In November 1976, a representative of Toronto General Hospital indicated that the cost had risen to about \$95 (Canadian) per scan.

Other Canadian hospitals are depreciating their CT equipment over a 10-year period. In Ontario, funds for CT scanning are provided within the budget for a department of radiology, and there is usually no financial incentive for the hospital or the radiologists to perform scans.

In December 1976, three CT scanners were operational in the Province of Quebec, which has a population of about 6 million. Three more scanners were on order. A document prepared for the Provincial government stated that existing scanners had been installed to evaluate their use and impact (401). The document suggested that widespread diffusion in Quebec should depend upon demonstrated diagnostic advantages leading to a measurable reduction in mortality and morbidity or contribution to a proportional reduction in the cost of other diagnostic techniques.

SWEDEN

All of Sweden's 8.2 million citizens are insured for medical benefits, including physician care, hospitalization, and partial reimbursement for prescription drugs and dental care. The organization of medical care is highly decentralized, with hospital care almost entirely provided by county and municipal hospitals. The Central Government makes relatively little financial contribution to either capital funding or daily operation of these hospitals.

In July 1976, Sweden had two operational CT scanners, and three more were on order, to be operational before January 1977 (280). One hospital with a CT head scanner, Karolinska Institute in Stockholm, reported a decline in number of pneumoencephalograms, from 900 to about 200 during 1968-1974 (280). However, because the CT scanner was not installed until 1973, its specific impact was not clear. Karolinska Institute also reported a modest decline in number of cerebral angiograms since 1972, but the impact of the head scanner was uncertain. The other hospital, Emea General Hospital, has had its head scanner only since 1975, but reported a considerable reduction in both pneumoencephalograms and cerebral angiograms (280).

Sweden performed a total of 2,400 pneumoencephalograms and 11,700 cerebral angiograms in 1975 at some 80 radiology departments (280). The total number of pneumoencephalograms has been dramatically reduced in Sweden, but most of the reduction preceded installation of any CT scanner (see table 23).

Swedish planners examined the use of the two operational scanners and concluded that improved diagnoses and potential financial savings justify a modest expansion in the use of CT scanners (280). They noted that, in addition to the cost of the replaced diagnostic procedures, the indirect costs of neurodiagnostic procedures are large. Patients must remain in bed for about 3 days after a pneumoencephalogram, and they must be hospitalized for about a week for a complete neuroradiological examination. Therefore, the planners argued that CT scanning of outpatients is cost-effective.

**Table 23.—Numbers of Cerebral Angiographic and
Pneumoencephalographic Examinations in Various Swedish
Hospital Categories**

| | Pneumoencephalographic Examinations | | | | Cerebral Angiographic Examinations | | | |
|------------------------------|-------------------------------------|--------------|--------------|--------------|------------------------------------|---------------|---------------|---------------|
| | 1972 | 1973 | 1974 | 1975 | 1972 | 1973 | 1974 | 1975 |
| Regional hospitals | — | 1,900 | 1,800 | 1,700 | — | 6,600 | 6,700 | 6,900 |
| County hospitals | — | 1,000 | 700 | 550 | — | 3,500 | 3,400 | 3,300 |
| Local hospitals | — | 400 | 250 | 150 | — | 1,500 | 1,500 | 1,500 |
| Total | 3,850 | 3,300 | 2,750 | 2,400 | 11,700 | 11,600 | 11,600 | 11,700 |

Source: 280.