

USAGE OF ENDOSCOPY IN AUSTRALIA

a report by the

NATIONAL

HEALTH

TECHNOLOGY

ADVISORY

PANEL

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USAGE OF ENDOSCOPY IN AUSTRALIA

REPORT BY THE
NATIONAL HEALTH TECHNOLOGY ADVISORY PANEL

Any comments or information relevant to the subject matter of this report would be welcome. Correspondence should be directed to:

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EXECUTIVE SUMMARY

- . This paper provides information on trends in the usage of endoscopy in Australia, and raises issues in relation to this technology. It is intended to serve as a basis for further discussion.

TRENDS IN THE INCIDENCE OF ENDOSCOPIC PROCEDURES

- . Commonwealth Department of Health statistics for endoscopy services for which medical benefits have been paid have been examined for the years 1980/81 - 1985/86 inclusive.
- . Endoscopic procedures increased by 77% (from 235 161 to 415 340 per annum) during the period.
- . Endoscopic procedures represented 0.34% of the total number of procedures recorded in 1985/86. Benefits paid totalled \$58.5 M representing 2.2% of the total benefits paid for all services listed in the Medicare Benefits Schedule.
- . Gastrointestinal endoscopy had the largest growth, of 107% (from 113 692 to 235 571 procedures) and represented 57% of all endoscopy procedures in 1985/86.
- . There was a particularly rapid growth in the use of flexible endoscopes and in endoscopic therapeutic applications.

PROVIDERS OF ENDOSCOPIC SERVICES

- . The importance of training and certification of competency in the use of endoscopes has been highlighted by professional medical bodies and individuals.
- . The great majority of endoscopic procedures are performed by specialists. However, a significant proportion of the procedures in the lower gastrointestinal tract are being performed by general practitioners (13% in 1985/86).

IMPACT OF ENDOSCOPY ON ALTERNATIVE PROCEDURES

- . Growth in the use of endoscopy has not been matched by a fall in the number of barium studies, which still far exceed the number of equivalent gastrointestinal endoscopic examinations. However, the rate of increase for barium studies has slowed.

FUTURE TRENDS

Factors which could affect future trends in endoscopy usage include:

- Removal of the requirement for a diagnostic test before each prescription of the H-2 receptor antagonists cimetidine and ranitidine could tend to slow growth;
- Trends towards office endoscopy and endoscopy on GP referral, could tend to increase numbers of services.

Given the high incidence of bowel cancer, and the potential for prevention of this disease, the role of endoscopy in investigations of the lower gastrointestinal tract is likely to increase further.

MATTERS REQUIRING FURTHER CONSIDERATION

The relative roles of endoscopy and barium radiography in examinations of the gastrointestinal tract are in need of further clarification. Endoscopy is more expensive than barium radiography but there is growing evidence that the equivalent endoscopic investigations are more accurate.

Further evaluation of the benefits and cost effectiveness of endoscopy, particularly in gastroenterology, would be desirable.

The Panel suggests that the Royal Australasian College of Physicians, the Gastroenterological Society of Australia, the Royal Australasian College of Surgeons and the Royal Australasian College of Radiologists might consider cooperating in the development of guidelines on the most effective patterns of usage of endoscopy and barium radiography in gastrointestinal examinations.

Any guidelines developed should be made available to general practitioners, as well as to specialists, to assist them in decisions on referring patients for endoscopy.

INTRODUCTION

In recent years there has been a large increase in the use of endoscopy in Australia, raising questions on the adequacy of training for endoscopists, and the cost effectiveness of endoscopic procedures. This paper has been prepared as a basis for further discussion of these issues. It provides an overview of the level of and trends in usage of endoscopy in Australia. It also gives information on the providers of endoscopic services, training issues and, where possible, the effect of the growth of these procedures on alternative techniques.

Preparation of this discussion paper was prompted in part by previous communication between the NHTAP and the Gastroenterological Society of Australia. The Society had particular concerns relating to certification of persons who used gastrointestinal endoscopes.

TYPES OF ENDOSCOPE

An endoscope is a tubular device through which light can be transmitted, permitting the visual examination of the interior of an organ. It may be inserted into the organ through a natural opening in the body, or through surgical openings in the skin.

Endoscopic procedures have been used in medicine since 1887, when Nitze invented the cystoscope for bladder examinations. Early endoscopic tools were limited by their rigidity and thickness, but technological advances in the optical sciences in the late 1950s have greatly extended the scope of endoscopy. In a major breakthrough, the development of flexible endoscopes was made possible by the advent of fibre optics, which enabled the transmission of light along curved paths. Another advance was the development of a greatly improved lens system for rigid endoscopes (1).

A modern rigid endoscope basically comprises an eye-piece attached to a shaft containing a system of solid glass rod lenses separated by small air spaces. Fibre-optic bundles are used to transmit light from a lamp along the shaft to illumine the organ being examined. The whole optical system is enclosed in an outer sheath which may contain ancillary channels for the passage of air, water or tools such as biopsy forceps or cytology brushes. The endoscope may be designed to provide views in any direction - forward, forward oblique, lateral or retrospective.

The costs of rigid endoscopes, excluding light sources and accessories, are in the region of \$A 2,500 to \$A 4,000.

In the flexible endoscope, a coherent fibre-optic bundle in a flexible shaft transmits the image of the object being viewed from a lens at the tip of the shaft to a focussing lens at the head of the device. The properties of the fibre-optic bundle allow the shaft to be bent and the manoeuvrable tip to be angled, without degradation of the image. Tip movement is controlled by pull wires under the outer sheath which are operated by wheels on the head. Like the rigid endoscope, the flexible endoscope has fibre-optic bundles for light transmission, and may have ancillary channels in the outer sheath. Accessories may include a side arm with a second eye-piece, and a camera.

The costs of flexible endoscopes, excluding light sources and accessories, are in the region of \$A 10,000 - \$A 25,000.

According to information provided to the Panel, the value of endoscopic instruments imported in 1984/85 was in the region of \$M5.0, distributed about equally between rigid and flexible endoscopes. It was expected that this value would increase by 10-12% during 1985/86.

TRENDS IN THE INCIDENCE OF ENDOSCOPIC PROCEDURES

With the aim of quantifying trends in the usage of endoscopy in Australia, the Panel collected statistics from the Commonwealth Department of Health for the period 1980/81 to 1985/86, and from State and Territory Health Authorities.

The Commonwealth Department of Health statistics relate to endoscopy services for which medical benefits have been paid. These data are thought to cover about 70% of all services rendered in Australia. The principal omissions are services provided in public hospitals free of charge. Other omissions include services rendered for insurance or employment purposes, those covered by third party or worker's compensation provisions, and those provided to repatriation beneficiaries or defence personnel. Endoscopic procedures which could not be separated from non-endoscopic procedures in the medical benefits data were not included in the collection.

Table 1 gives the incidence of the identified endoscopic procedures for which medical benefits have been paid, under the headings in which they appear in the Medicare Benefits Schedule (MBS). The data are graphically presented in Figure 1.

The data show an increase of 77% in the use of endoscopy over the period 1980/81 - 1985/86. Over the same period, the increase in the Australian population was 5%. Some 415,340 procedures were recorded in 1985/86, 0.34% of all recorded medical services. Benefits totalling \$58.5 M were paid for identified endoscopic services that year, representing 2.2% of total benefits paid for all procedures.

TABLE 1

ENDOSCOPIC PROCEDURES FOR WHICH A MEDICAL BENEFIT WAS PAID
DURING THE PERIOD 1980/81 - 1985/86 INCLUSIVE

	<u>1980/81</u>	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u>	<u>1984/85</u>	<u>1985/86</u>
<u>GENERAL SURGICAL</u>						
Gastrointestinal Endoscopy (Items 3846-62, 4354-67, 4383-94)	113,692	141,140	155,496	177,047	189,380	235,571
Laparoscopy * (Items 4191-94)	67	76	74	52	20,236	41,716
<u>UROLOGICAL</u>						
(Items 5845-53, 5864-88, 6005-10 6027, 6047-61)	50,512	58,570	58,601	59,793	58,282	60,893
<u>ENT **</u>						
(Items 5464-86, 5348 5357, 5520-40 5605-11, 5619)	14,095	16,064	15,843	16,283	15,605	17,662
<u>OBSTETRICS AND GYNAECOLOGY</u>						
(Items 278-84 6415 6451, 6483, 6604-7)	50,100	62,012	67,877	74,327	60,509	50,969
<u>ORTHOPAEDIC</u>						
(Items 8080, 8084)	6,645	9,356	8,822	8,730	7,907	8,479
<u>THORACIC</u>						
(Item 6974)	50	74	63	71	46	50
<u>TOTAL</u>	235,161	287,292	306,776	336,303	351,965	415,340

Source: Commonwealth Department of Health

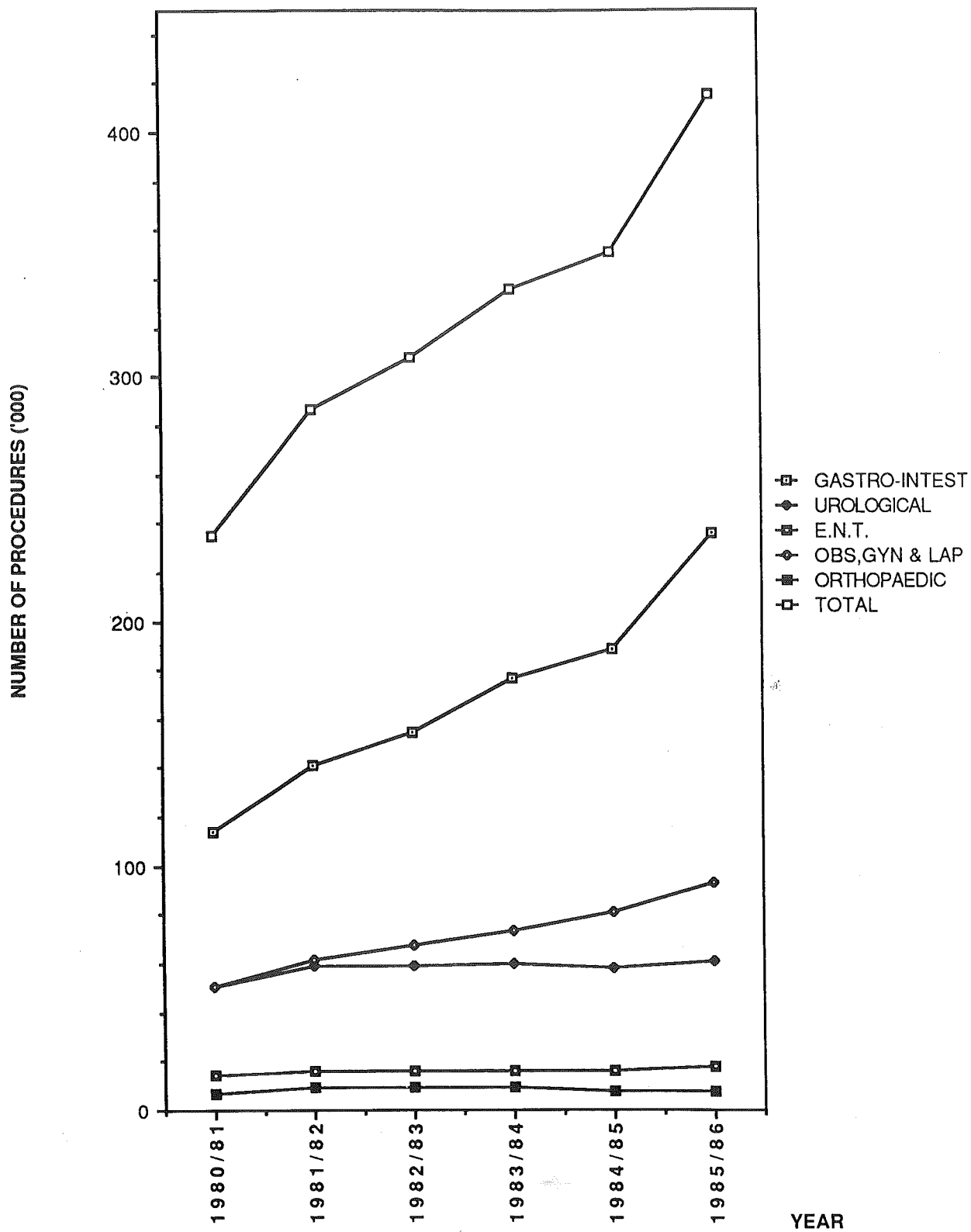
(NOTE: The figures in brackets are the code numbers for the relevant endoscopic procedures contained in the various editions of the Medicare Benefits Schedule Book).

* The apparent increase in laparoscopic procedures after 1983/84 is an artefact related to the transfer of items from the Gynaecological Division of the Schedule.

** Includes bronchoscopy

FIGURE 1: ENDOSCOPIC PROCEDURES

FOR WHICH A MEDICAL BENEFIT WAS PAID



YEAR

The Panel considered whether the observed increases accurately reflected actual increases in usage of endoscopy in Australia, or whether they could in part be accounted for by variations in the proportion of Australian services covered by the medical benefits data. Doessel has pointed out (2) that data for the period 1975/76 to 1980/81 are non-comparable with those for 1981/82 to 1982/83, as a result of changes in Commonwealth medical benefits coverage. Another inconsistency occurs between 1982/83 and 1983/84, resulting from the introduction of Medicare on 1 February 1984, and between 1983/84 and 1984/85, the first full year of Medicare.

In an endeavour to obtain another indication of trends the endoscopic data were compared with the total number of services recorded in the medical benefits data, which increased by 50% over the period. The trend in endoscopic services as a percentage of total services is shown in Fig 2. Evidently over the period the number of endoscopic services for which medical benefits were paid increased more rapidly than the total of items in the Schedule. This was particularly apparent in 1985/86.

Overall, the data suggest that there has been a large increase in the usage of endoscopy in Australia in recent years, and that the rate of usage is accelerating. However, it has not been possible to quantify all Australian services. It should be noted that, unless otherwise indicated, numbers of services and percentage increases given in this report, refer to the identified services for which medical benefits have been paid, and not to absolute totals for Australia.

The most numerous endoscopic procedures recorded in 1985/86 were in the areas of gastroenterology (235571 services) urology (60893) and obstetrics and gynaecology (50969). In these major groups gastrointestinal endoscopy showed the largest increase for the period (107%).

The statistics provided by the State and Territory Health Authorities on endoscopic procedures were for in-patients in public hospital systems, and are summarised in Table 2. There are difficulties in deriving Australia-wide trends from these data because:

- . the yearly basis on which these statistics are collected differs between the States and Territories;
- . some States have only recently begun to collect such information;
- . the scope of collection is not uniform between States. For example, in Victoria public hospitals have been progressively phased in to the hospital morbidity collection;

the data provided by the Health Authorities do not include the increasing number of endoscopic procedures being performed on an outpatient basis;

the addition of public hospital inpatient data and Medicare data could result in double counting of some procedures.

It has been suggested to the Panel that individual gastroenterology units at major public hospitals generally had an increase of less than 20% in the number of upper gastrointestinal endoscopic examinations over this time period. The increase in the use of colonoscopy was believed to be greater than this (3).

TABLE 2
ENDOSCOPIC PROCEDURES IN PUBLIC HOSPITALS
BY STATE/TERRITORY

State/Territory	<u>Calendar Year</u>				
	1980	1981	1982	1983	1984
NSW (4)	35 922	40 313	-	48 828	41 542
VIC (5)(a)	-	-	-	24 477	-
QLD (6)	17 769	19 792	-	-	-
SA (7)	9 725	10 184	9 801	9 297	9 332
TAS (8)(b)	1 276	1 494	1 521	1 602	1 701
WA (9)	-	5 899	7 741	8 136	8 473
ACT (10)(c)	2 614	3 237	3 508	3 938	3 716
NT (11)	511	-	848	-	-

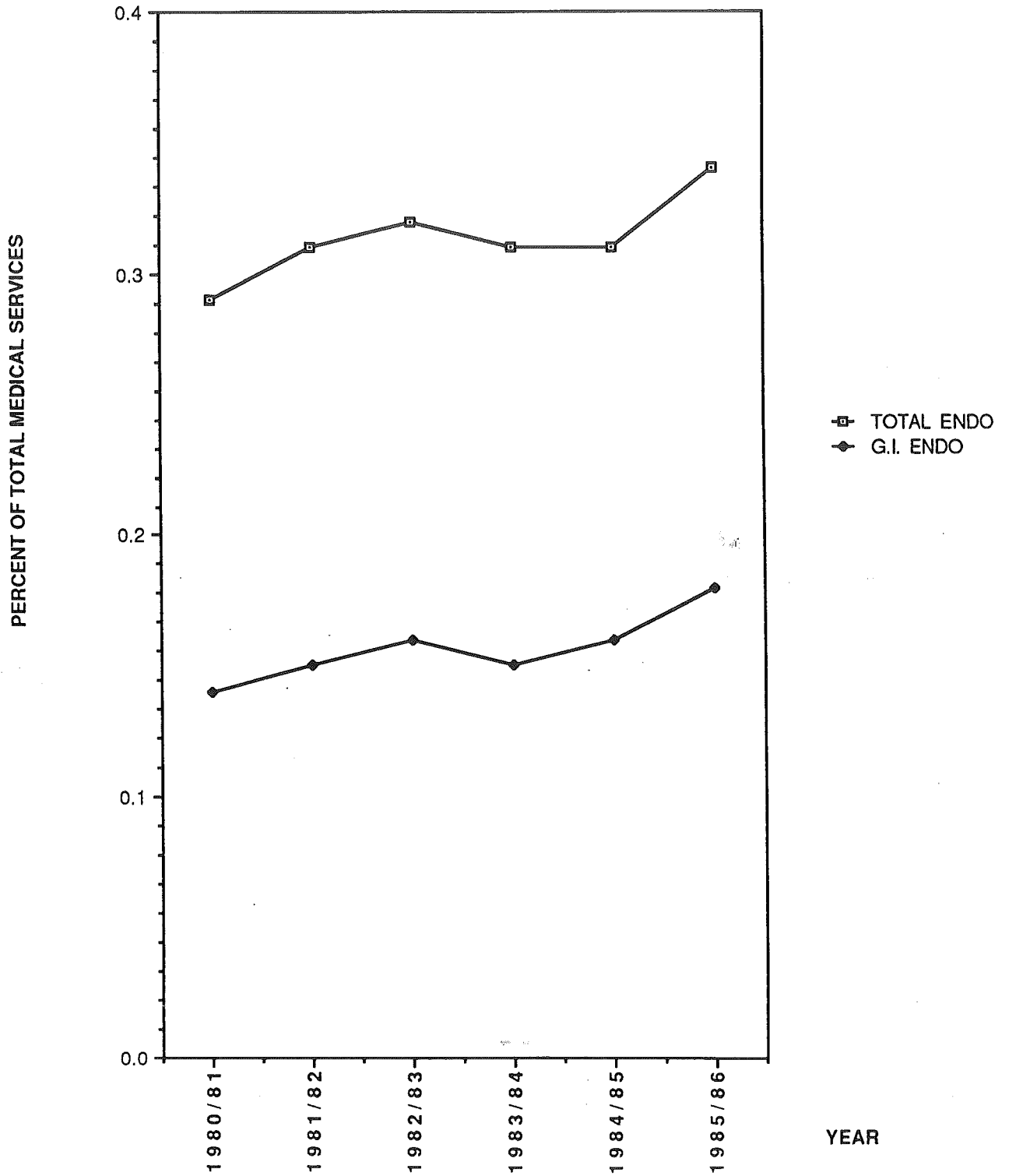
(a) Financial year: 1982/83

(b) Financial year: 1979/80

(c) Financial year: 1979/80 to 1983/84 inclusive

Source: State and Territory Health Authorities.

FIGURE 2: TRENDS IN ENDOSCOPIC SERVICES
AS PERCENTAGES OF TOTAL MEDICAL SERVICES FOR WHICH
MEDICAL BENEFITS WERE PAID



Gastrointestinal (GI) Endoscopy

GI endoscopy in 1985/86 comprised 57% of the endoscopic procedures identified in Table 1. Table 3 provides a breakdown of these procedures into upper and lower GI endoscopy.

TABLE 3

NUMBERS OF ENDOSCOPIC PROCEDURES OF THE UPPER
AND LOWER GI TRACT FOR WHICH MEDICAL BENEFITS WERE PAID
1980/81 - 1985/86

	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86
<u>Upper GI</u> <u>Endoscopy</u> (Items 3846 - 62)	41879	54122	62188	70487	74337	89281
<u>Lower GI</u> <u>Endoscopy</u>						
<u>Rigid</u> <u>Sigmoidoscopy</u> (Items 4354 - 4367)	64754	75634	74574	81584	83544	97929
<u>Fibreoptic</u> (Items 4383 - 4394)	7059	11384	18734	24976	31499	48361
<u>TOTAL</u>	113692	141140	155496	177047	189380	235571

Source: Commonwealth Department of Health

Upper GI endoscopy is applied to the diagnosis of peptic ulcer, cancer and a number of other conditions including reflux oesophagitis, and gastrointestinal haemorrhage (12). The Gastroenterological Society of Australia has pointed out the high prevalence and clinical importance of upper GI disease. Peptic ulcer is a major community problem with high medication costs and significant mortality (705 deaths in 1980). Cancer of the stomach and oesophagus caused 2984 deaths in 1980 (12).

During the period under review upper GI endoscopic procedures increased by 113%. The bulk of these procedures (67%) in 1985/86 were claimed under item 3847, covering diagnostic examinations with a flexible endoscope of the oesophagus, stomach and duodenum.

One of the more difficult procedures in upper GI endoscopy is endoscopic retrograde cholangiopancreatography (ERCP) which uses both endoscopic and radiological techniques to visualize the biliary and pancreatic ducts. The entry into the ducts from the duodenum is located with a side-viewing duodenoscope, and a catheter is used to introduce contrast material for radiographic visualization. The technique allows the better diagnosis of biliary tract and pancreatic disease, including common bile duct stones and cancer.

The Gastroenterological Society of Australia has advised that use of the procedure is confined largely to specially trained gastroenterologists in a limited number of centres (12). However, concern has been expressed that the procedure could be over-used (13). Over the period 1980/81 to 1985/86 the number of ERCP procedures identified increased by 78%, from 1299 to 2307. The increase from 1984/85 (1999 procedures) to 1985/86 was 15%.

The Gastroenterology Society of Australia has advised the Panel that significant growth is occurring in upper GI endoscopic therapeutic manipulations, such as dilatation of strictures, insertion of tubes to allow swallowing of food in cases of oesophageal obstruction, and treatment of bleeding (12). It was not possible in all cases to separate diagnostic and therapeutic procedures in the medical benefits data. For example, before August 1987 item 3849 covered both endoscopic biopsy procedures and treatment of bleeding varices. In 1985/86 29% of upper GI endoscopic procedures were claimed under this item.

Endoscopic sphincterotomy is a procedure for the removal of common bile duct stones. As yet, it is not widely used in Australia. Claims were made for 360 procedures in 1985/86.

Some of the major applications of endoscopy in the lower GI tract are related to large bowel cancer, which is now the commonest internal malignancy affecting Australians. It has been estimated that one in 25 Australians will develop large bowel cancer during their lifetime (14). There is now considerable evidence that the majority of large bowel cancers

arise from pre-existing polyps (14). Endoscopy is used in the diagnosis of large bowel cancer and polyps, and therapeutically in the removal of polyps to prevent development of cancer. Sigmoidoscopes, which may be either rigid or flexible, are used to examine the anal canal and rectum, while colonic investigations are carried out with flexible colonoscopes. Increasingly colonoscopy and sigmoidoscopy are being used in the regular screening of high risk groups for the early detection of bowel cancer in follow-up investigations of patients after removal of polyps or colon surgery (3).

Other applications of endoscopy in the lower GI tract include the diagnosis of inflammatory bowel disease and a number of other conditions, the exclusion of more serious organic disease in cases of irritable bowel syndrome (12) the investigation of patients with iron deficiency anaemia and rectal bleeding (3), and treatment of haemorrhoids.

The medical benefits data indicate that the overall increase in lower GI endoscopy over the period was 104%. There has been a major increase in the use of flexible fiberoptic endoscopes in lower GI endoscopy. In 1980/81 these were used in 10% of the procedures whilst in 1985/86 this proportion had increased to 33%. Diagnostic sigmoidoscopic examination (Item 4354) represents 96% of rigid endoscope use. Removal of polyps using flexible instruments (Items 4386 & 4394) increased substantially during the period from 1377 procedures to 7617.

Antiulcerants and Endoscopy

The introduction of the histamine H₂-receptor antagonists cimetidine (Duractin, Tagamet) and ranitidine (Zantac), has had a significant impact on the management of ulcer and oesophagitis.

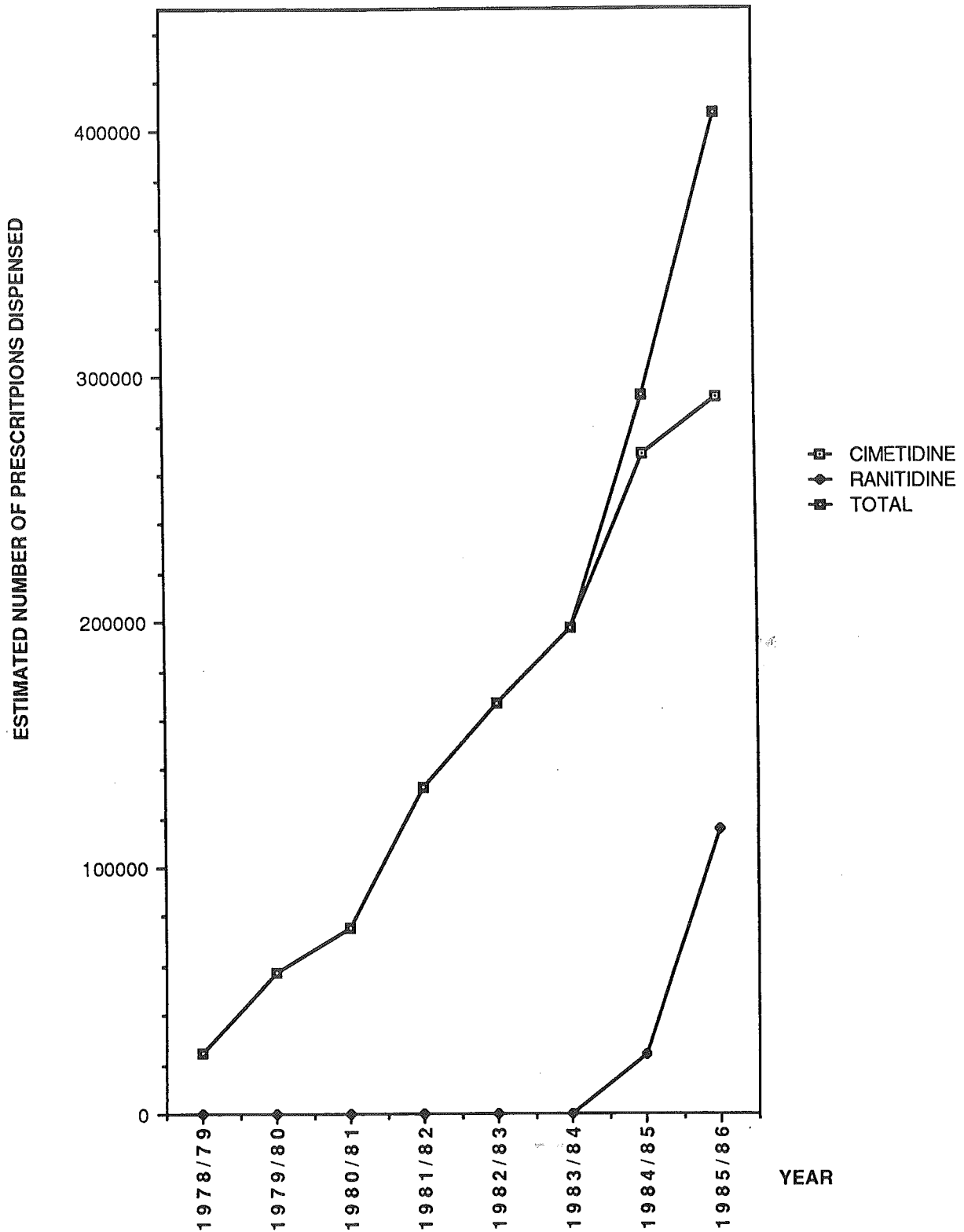
Cimetidine was introduced to Australia in May 1977 and became available in August 1978 as a Pharmaceutical Benefit, subject to restriction, under the Pharmaceutical Benefits Scheme (PBS). Ranitidine was introduced in April 1982 and was included in the PBS in August 1984, also subject to restriction. For both drugs the restriction was the requirement for confirmation of the presence of a lesion by a diagnostic test (such as barium meal or endoscopy), or surgery, before authority for use was granted. Each prescription required the same authority.

Figure 3 shows the increase in the number of prescriptions dispensed under the PBS for cimetidine and ranitidine since 1978/79. Some of the increase in the use of diagnostic endoscopic procedures during this period would have been associated with the increasing use of these drugs.

Piper et al reported on a placebo-controlled prospective study of the effect of cimetidine maintenance therapy on socioeconomic life of patients with gastric ulcers in the year after healing and the extent to which treatment was cost effective (15). They found that fewer endoscopies were performed in the treated group and the resultant cost saving was equivalent to the cost of cimetidine treatment.

FIGURE 3

Estimated No of prescriptions for Cimetidine and Ranitidine
dispensed under the PBS



Following a review of antiulcerants in June 1986 the Pharmaceutical Benefits Advisory Committee (PBAC) recommended that the restriction for the histamine H₂-receptor antagonists be amended to provide up to 12 months' therapy for patients with gastric ulcer who had one positive diagnostic test. The PBAC also recommended the de-restriction of the antiulcerants Sucralfate (Ulsanic) and bismuthate complex (De-Nol), eliminating the need for patients to undergo diagnostic tests before benefits are allowed. The PBAC envisaged that these drugs would be prescribed as 'first-line' agents for the treatment of peptic ulcer and related disorders, rather than cimetidine and ranitidine. The recommendations of the PBAC took effect on 1 November 1986.

These changes could tend to reduce the number of endoscopic procedures for the diagnosis of peptic ulcer.

Laparoscopy

The apparent increase in laparoscopic procedures after 1983/84 is an artefact related to the transfer of new items (4192-4194) from the Gynaecological Division of the MBS to the General Surgical Division. The 41716 laparoscopic procedures recorded for 1985/86 are almost equally distributed between diagnostic (Item 4192) and therapeutic (Item 4194) procedures.

Other laparoscopic procedures are described in the Gynaecological section of the MBS (Items 6611 and 6612) and relate to sterilization by transection or resection of fallopian tubes. These procedures totalled 27529 in 1985/86. However laparoscopic procedures could not be separated from non-endoscopic procedures in this section.

Urological Procedures

After an apparent large increase from 1980/81 to 1981/82, the number of endoscopic urological procedures increased by only 4% from 1981/82 to 1985/86.

The Urological Society of Australasia has advised that 60% of urological procedures would utilize endoscopy. The Society further commented that the use of endoscopy in recent years has been broadened to encompass direct vision of the ureter utilising the ureteroscope and direct vision of the renal pelvis and calyces via a percutaneous route. These procedures are not commonly practised in Australia, although they have become commonplace in various centres overseas. As practitioners become competent in carrying out these new techniques, their use is likely to increase in Australia (16). Ureteroscopy has recently been briefly reviewed (17).

Ear, Nose and Throat (ENT) Procedures

Bronchoscopy, and oesophagoscopy with a rigid endoscope are considered here, as they are included in the ENT Division of the MBS.

The level of use of endoscopic ENT procedures has remained relatively constant over recent years. However during 1985/86 the number of these procedures rose from 15605 to 17662, a growth of 13% in one year. Some 32% of these were bronchoscopic examinations (5708) whilst oesophagoscopy procedures (with rigid oesophagoscope - Item 5464) comprised 29% (5146 procedures). Sinuscopy - the endoscopic examination of the paranasal sinuses - is a new technique and accounted for 1437 procedures (8%).

In its "Statement on Fibreoptic Bronchoscopy" (18), the Thoracic Society of Australia commented that the development of flexible fibreoptic bronchoscopy techniques in the last 15 years has been a significant advance in thoracic practice, contributing to the diagnosis and treatment of inflammatory, infectious, malignant and occupational diseases of the chest. Flexible bronchoscopic procedures have largely replaced or extended those previously available using the rigid bronchoscope. A survey of bronchoscopic practice in Britain in 1983 showed that at least 40,000 bronchoscopies had been performed (87% with fibreoptic instruments), compared with an estimated 15,000 in 1974 (19).

The Otolaryngological Society of Australia has advised the Panel that endoscopy is used by its members for the purposes of diagnosis and treatment of lesions of the upper airway and food passages (20). The Society noted the value of oesophagoscopy in the diagnosis and treatment of diseases of the oesophagus, hypopharynx and in the identification and removal of foreign bodies. The Society also referred to the value of bronchoscopy and laryngoscopy in examinations of the larynx, bronchii and trachea and of microlaryngoscopy in operations on the larynx. The Society commented that improved visualisation of the post-nasal space, larynx and pyriform fossae have been achieved by the aid of endoscopes with angled lenses.

Obstetrics and Gynaecology

These procedures totalled 50969 in 1985/86 of which 68% were colposcopic examinations (Items 6415) and 18% amnioscopic or amniocentesis procedures (Item 278). The apparent decline in recent years (from 74327 in 1983/84) is an artefact resulting from changes in the classification of laparoscopic items in the MBS. Laparoscopic procedures associated with sterilization or resection of fallopian tubes (Items 6611 and 6612) have not been counted because they could not be separated from the non-endoscopic procedures described for these items.

Colposcopy is now part of the routine evaluation to which all women with an abnormal Pap smear should have access. Colposcopy allows the use of conservative local techniques such as diathermy or laser evaporation for the destruction of premalignant cervical lesions, and the avoidance of more radical surgical procedures.

There has been a very large increase in colposcopic procedures in recent years, from 21 855 in 1980/81 to 41 453 in 1985/86.

Orthopaedic

After an apparent large increase during 1981/82, the number of diagnostic arthroscopic examinations of the knee appeared to decline. Arthroscopic surgical procedures could not be separated from other types of knee surgery in the MBS data.

Thoracic

The only endoscopic procedures included in this division are thoracoscopic examinations, the number of which remained small over the period and totalled 50 procedures in 1985/86.

PROVIDERS OF ENDOSCOPIC SERVICES

Commonwealth Department of Health records for the financial years 1982/83 and 1985/86 have been analysed to determine the main medical specialty groups providing endoscopic services. The proportions of the groups providing these services are given in Table 4.

The data suggest that specialists are providing the great majority of endoscopic services. However, general practitioners are undertaking a small but increasing proportion of endoscopic procedures of the lower gastrointestinal tract. This is in accord with the view of the Royal Australian College of General Practitioners that proctoscopy and sigmoidoscopy fall within the scope of general and family practice (21).

The category "Consultant Physician" used in Table 4 includes gastroenterologists as well as other consultant and specialist physicians. A further examination of the Medicare data indicates that in 1985/86 gastroenterologists provided 41% of upper GI endoscopy, 14% of rigid sigmoidoscopy, and 33% of fiberoptic lower GI endoscopy, for which medical benefits were paid. The figures given here and in Table 4 should be treated with considerable caution as they have the limitation that providers are assigned to specialty groups on the basis of the majority of services they provide, not on their qualifications.

TABLE 4

PROVIDERS OF ENDOSCOPIC SERVICES 1982/83 & 1985/86
(1985/86 FIGURES ARE BRACKETED)

Type of Service	PROVIDER - PERCENTAGE OF SERVICES									
	General Practitioner %	Consultant Physician %	General Surgeon %	Obstetrician or Gynaecology %	Urological Surgeon %	Thoracic Surgeon %	ENT Surgeon %	Orthopaedic Surgeon %	Other %	
Gastrointestinal										
- upper	3 (4)	72 (74)	21 (19)	-	-	-	-	-	4 (3)	
- lower	11 (13)	28 (32)	58 (54)	-	-	-	-	-	3 (1)	
Laparoscopy *	(3)	(1)	(-)	(95)	-	-	-	-	(1)	
ENT	3 (3)	22 (29)	16 (9)	-	-	11 (9)	44 (47)	-	4 (3)	
Urological	-	-	5 (-)	2 (3)	51 (91)	-	-	-	4 (2)	
Obstetrics and Gynaecology	5 (4)	-	5 (-)	88 (96)	-	-	-	-	2 (-)	
Orthopaedic	2 (1)	-	12 (-)	-	-	-	-	85 (98)	1 (1)	
Thoracic	-	20 (34)	21 (18)	-	-	-	-	56 (58)	3 (-)	

* 1985/86 figures given only

Source: Commonwealth Department of Health.

TRAINING IN ENDOSCOPY

There has been some discussion in the medical profession on the desirability or otherwise of some form of certification to provide evidence of competence in endoscopy. While the Gastroenterological Society of Australia favours certification, other bodies tend to the view that training in endoscopy should be incorporated in specialty training without specific recognition.

In 1976, the Council of the Gastroenterological Society of Australia began providing certification for competency in upper gastrointestinal endoscopy and colonoscopy (12). This certification scheme is largely confined to medical practitioners undergoing formal training courses within major institutions. Gastroenterology units are encouraged to provide structured training in endoscopy as part of a broad training in clinical gastroenterology. The programs include graduated responsibility for performance of procedures, systematic correlation of results with radiological and pathological findings and instruction in the newer diagnostic and therapeutic techniques, with critical review of the role of endoscopy in patient management.

By November 1984, 278 medical practitioners had been certified as competent to perform upper gastrointestinal endoscopy and 134 certified as competent to perform colonoscopy (12).

Two other bodies concerned with gastrointestinal endoscopy, the Royal Australian College of Physicians (RACP) and the Royal Australasian College of Surgeons (RACS), do not administer certification schemes, but are putting greater emphasis on endoscopy in Fellowship training.

In the interest of maintaining standards in endoscopy in Australia, the Endoscopy Subcommittee of the Gastroenterological Society of Australia has sponsored the publication of the two booklets, "Infection and Endoscopy" (22) and "Electrosurgical Safety in Therapeutic Endoscopy" (23).

The Thoracic Society of Australia considers that training in fiberoptic bronchoscopy should be part of a specialty training program such as is available through the RACP and RACS for Thoracic Medicine and Thoracic Surgery respectively (18). In 1980 the Society set out basic guidelines for training programs in fiberoptic bronchoscopy, and for the ongoing competency of established bronchoscopists. In September 1986 the Society issued a further statement expanding on these basic guidelines (17), and issued guidelines for the use of fiberoptic bronchoscopy in clinical practice (24).

In 1984 Speer et al expressed concern regarding training in sigmoidoscopy (25). A survey to assess the standard of training in postgraduate sigmoidoscopy in three Melbourne teaching hospitals showed that practical instruction in the technique was inadequate, and that most individuals performed

too few sigmoidoscopic procedures to become competent at either examining or recognizing lesions. The authors suspected that similar deficiencies existed in other hospitals in Australia and recommended that action be taken to improve the standard of training.

Dowsett expressed similar concerns and cited data from a survey of intern training at the Westmead Centre of the Parramatta Hospital in 1982. Some 54% of interns had not used a proctoscope (26). He also referred to a symposium on intern training at a conference of the Australasian and New Zealand Association for Medical Education in 1982 which showed that similar situations existed in South Australia, Queensland, New South Wales and Western Australia.

The NHTAP has not arrived at any conclusions as to whether certification for endoscopy should be extended beyond the scheme operated by the Gastroenterological Society of Australia. However, the Panel notes that supervised training including an adequate case load would be essential for the development of competence in endoscopy in any field. Continuing adequate case load would also be necessary for endoscopists to maintain their expertise. The Panel suggests that it would be desirable for organizations involved in establishing guidelines on endoscopy to consult with one another to assist in achieving consistent training.

EFFECT OF ENDOSCOPY ON ALTERNATIVE PROCEDURES

Effect on Radiological Studies

While barium radiographic studies have traditionally been the principal diagnostic procedures available for the routine investigation of the gastrointestinal tract, they are beginning to be challenged by endoscopy. Upper GI endoscopy can be regarded as an alternative to barium meal for the diagnosis of disease in the oesophagus, stomach or duodenum, with colonoscopy an alternative to barium enema in the diagnosis of colonic disease. (Sigmoidoscopic examination of the rectum is considered as complementary rather than an alternative to barium enema which does not give good results in the rectum).

There have been reports (27) of a decrease in the gastrointestinal fluoroscopic workload in the United States. However, Commonwealth Department of Health statistics indicate that in Australia barium radiographic investigations for which medical benefits were paid increased by 30% over the period 1980/81 to 1985/86. If it is assumed that barium studies for which medical benefits are paid are about 70% of the total, about 0.5 million studies were performed in Australia in 1985/86, or 3 per 100 persons. By comparison, in the United States roughly 15 million barium examinations, or 6 per 100 persons, are performed yearly (28).

Table 5 and Fig 4 show trends in use of barium meal and enema investigations compared with usage of diagnostic upper GI endoscopy and colonoscopy. The colonoscopy figures include colonoscopic examinations with polypectomy, as it is assumed that most of these therapeutic procedures would also have a diagnostic function. Sigmoidoscopic examinations of the sigmoid colon are not included. They are not considered as comparable to barium enema as they do not allow examination of the whole of the colon.

TABLE 5

TRENDS IN THE USE OF BARIUM RADIOLOGY PROCEDURES
AND ALTERNATIVE DIAGNOSTIC GI ENDOSCOPY:
NUMBERS OF SERVICES FOR WHICH
MEDICAL BENEFITS WERE PAID

	1980/81	1981/82	1982/83	1983/84	1984/85	1985/8
Barium meal (Items 2706-14)	188282	214016	211389	231897	230531	230583
Upper GI Endoscopy (Items 3846-49, 5464,5480)	42564	53792	61254	69144	72849	87569
Barium Enema (Items 2716, 2718)	88333	102353	102366	111982	112829	129848
Colonoscopy (Items 4388-89, 4394)	5111	8423	12301	15774	19860	30862
Total Barium Studies	276615	316369	313755	343879	343360	360431
Total Alternative GI Endoscopy	47675	62215	73555	84918	92349	118431

Source: Commonwealth Department of Health

FIGURE 4: TRENDS IN BARIUM RADIOLOGY PROCEDURES

AND ALTERNATIVE GASTRO-INTESTINAL ENDOSCOPY

FOR WHICH MEDICAL BENEFITS WERE PAID

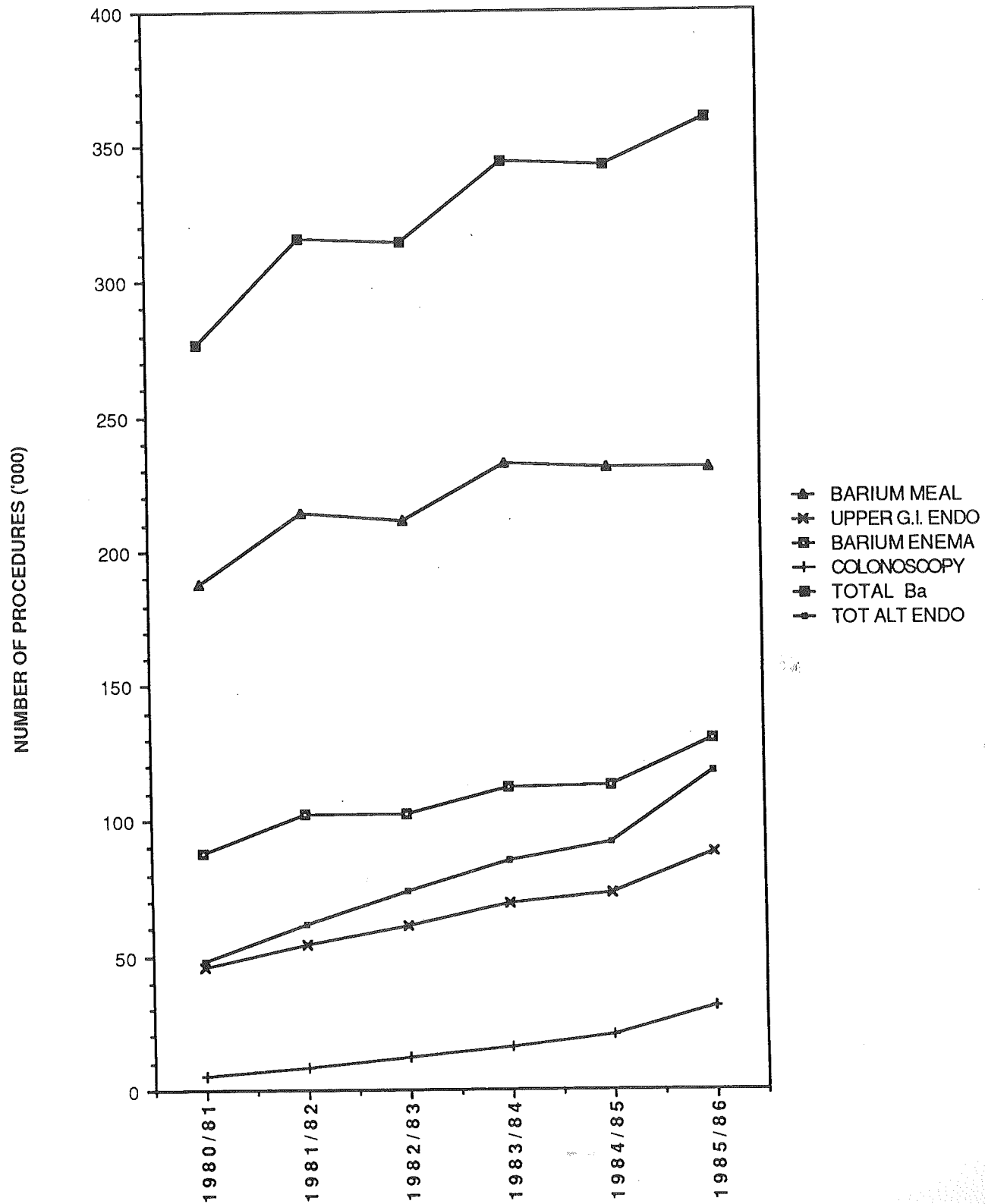
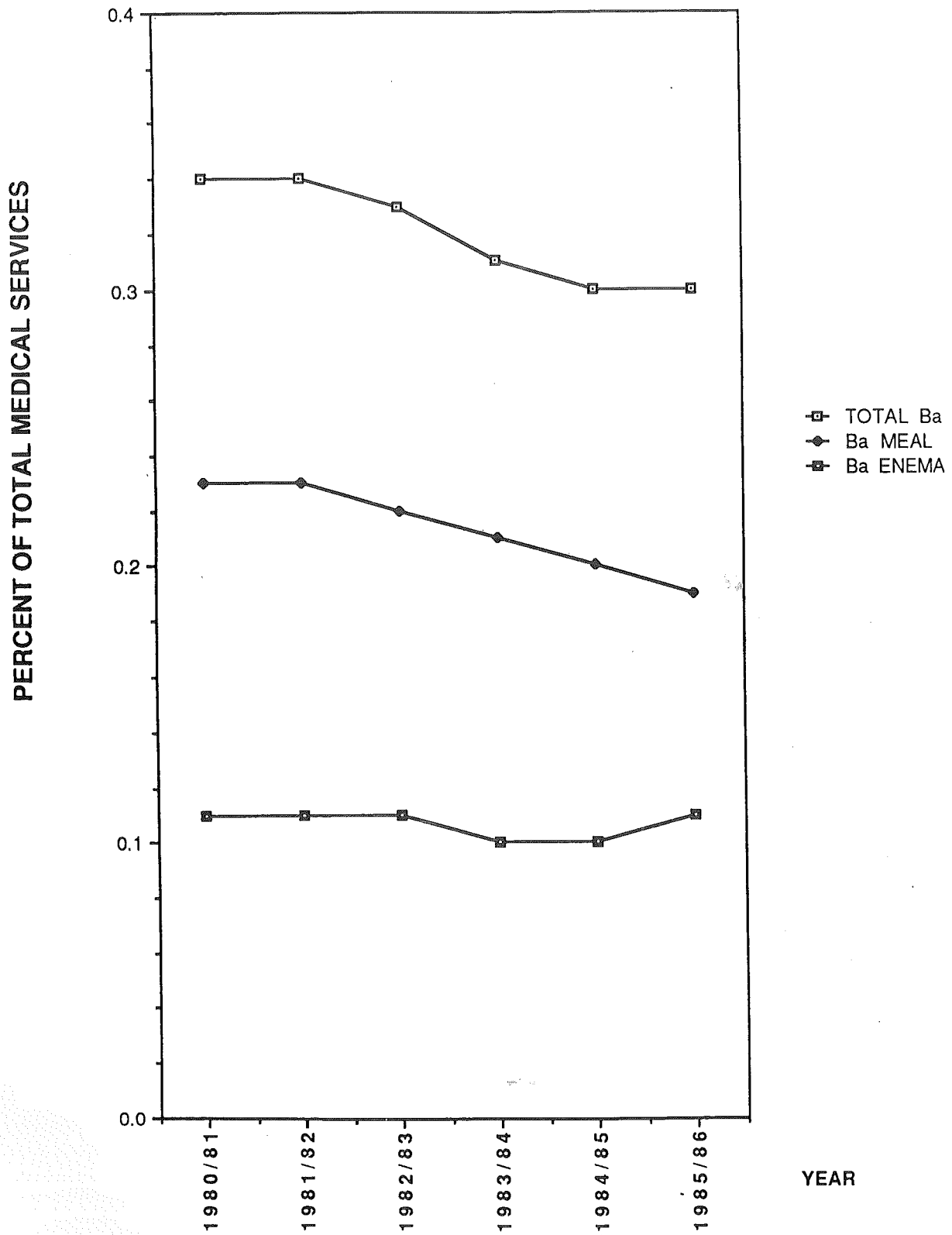


FIGURE 5: TRENDS IN BARIUM STUDIES AS PERCENTAGE

OF TOTAL MEDICAL SERVICES FOR WHICH

MEDICAL BENEFITS WERE PAID



The incidence of barium meal investigations levelled off in the last three years of the period under review whilst barium enema investigations increased by 16% (from 111982 to 129848). Although alternative gastrointestinal endoscopic examinations are still much less numerous than barium investigations they showed a more rapid increase in the last year under review.

As in the case of endoscopy, the Panel was unable to determine whether the increase in the number of barium studies could in part be due to variations in medical benefits coverage. The trends in the numbers of barium studies as percentages of total medical services are shown in Fig 5. The percentage of barium meal studies declined over the period while the percentage of barium enema studies remained relatively constant.

Doessel has reported a study of the utilisation of barium meal radiology and fiberoptic endoscopy for the upper GI tract. Using Commonwealth Department of Health medical benefits statistics for 1975/76 - 1982/83 inclusive and multiple linear regression analysis techniques, he determined time trends for these procedures (2). Doessel concluded that per capita utilisation of both procedures in Australia rose at an annual rate of 2.4 per cent per annum while barium meal radiology alone fell by approximately 0.45 per cent per annum over this period. Doessel considered that these procedures were alternative, but not perfectly substitutable means of diagnosis. The data analysed could not indicate whether fiberoptic endoscopy had substituted for radiology, or whether medical practitioners had responded to the advent of endoscopy by employing both procedures on some patients (2).

Faithfull and Goulston examined the changes that occurred during 1977-1983 in the frequency of some of the gastrointestinal investigations performed at the Repatriation General Hospital, Concord (29). A significant fall in the number of barium examinations was recorded whilst the number of gastroscopies and colonoscopies increased.

Overall, it would appear that although the increasing use of endoscopy has not resulted in an absolute decline in the number of barium studies for which medical benefits are paid, it has halted the growth in barium meal studies and slowed growth in barium enema studies.

The Otolaryngological Society of Australia has advised that alternative and adjunctive methods of examination in its specialty are X-rays of the chest, post-nasal space and lateral pharyngeal airways, barium swallow, and CT (20). Bronchography and

xeroradiography of the airways are also of value. The Society considers that endoscopy is not displacing these X-ray procedures, but tends to be used after they have been carried out. In general, oesophagoscopy and bronchoscopy would be performed only after clinical and office examination and not as initial procedures.

Effect on Surgical Procedures

Therapeutic endoscopic procedures are now accepted alternatives to conventional surgery for the treatment of a number of disorders. For example, endoscopic sphincterotomy can be used instead of choledochotomy for the removal of common bile duct stones. Table 6 indicates a recent decline in the number of choledochotomy procedures, which may be associated with increasing use of the endoscopic technique.

TABLE 6

TRENDS IN NUMBERS OF ENDOSCOPIC SPHINCTEROTOMY AND
CHOLEDOCHOTOMY PROCEDURES

	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86
Endoscopic Sphincterotomy (Item 3862)	-	54	145	186	287	360
Choledochotomy (Item 3820)	1803	2092	1804	1671	1378	1482

Source: Commonwealth Department of Health

In most cases a direct comparison of the incidence of alternative procedures was not possible, because the figures required could not be separated out from the medical benefits data. For example, colonoscopic polypectomy (removal of polyps) is an alternative to polypectomy with trans-abdominal colotomy, a procedure for which the incidence could not be determined as it is included with several other surgical procedures under Item 3722 (laparotomy).

Nevertheless, a comparison of the incidence of colonoscopic polypectomy with total figures for Item 3722, shown in Table 7, is of interest. Table 7 shows that the number of colonoscopic polypectomies in 1985/86 was higher than the combined total of the two items in earlier years. Apparently, the endoscopic procedure is not just substituting for conventional surgery. There appears to be a strong trend towards performing increasing numbers of polypectomies, possibly as a result of the relative ease of the endoscopic procedure. The Panel notes that the increasing application of polypectomy may lead to a substantial reduction in the incidence of large bowel cancer but at this stage it is not possible to quantify the benefits of this operation.

TABLE 7

TRENDS IN COLONOSCOPIC POLYPECTOMY AND
LAPAROTOMY PROCEDURES

	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86
Colonoscopic Polypectomy (Items 4386, 4394)	1377	2118	2800	3671	4611	7617
Laparotomy (Item 3722)	4531	3889	3574	3341	2755	2947

COST EFFECTIVENESS CONSIDERATIONS FOR GASTROINTESTINAL ENDOSCOPY

Diagnostic Endoscopy

In Australia, endoscopy is more expensive than barium radiography. For example, the Medicare Schedule fee for a barium meal is \$77 while the fee for an upper GI tract endoscopic examination is \$124. If anaesthetic is used fees for the endoscopic examination total \$171-180. The fee for a barium enema is \$77 while the fee for colonoscopy is \$205, increasing to \$247-256 with anaesthetic. In addition, hospital costs would be higher for endoscopy.

It has been noted that endoscopy is being used increasingly as an outpatient procedure with sedation rather than anaesthesia (29). Nevertheless, if endoscopy is to be cost effective in comparison with barium radiography, it must have substantial advantages in terms of patient benefit.

Many studies have been performed (cited in ref 30) comparing the diagnostic accuracy of upper GI endoscopy to that of barium meal with single contrast or the more accurate double contrast. Most have given results indicating that endoscopy is superior. These studies have been criticized as prone to bias, for example through the use of endoscopy as the 'gold standard' (28, 29, 30, 31). In a prospective, double-blind trial designed to exclude sources of bias as far as possible, endoscopy was still found to be more accurate than double contrast barium meal for the diagnosis of lesions of the upper GI tract (30). The endoscopic procedure had a sensitivity of 92% compared to 54% for the barium meal, and a specificity of 100% compared to 91% for the barium study.

There can be little doubt that endoscopy is more accurate than barium meal for the diagnosis of upper GI tract disorders, but it does not necessarily follow that endoscopy should always be the preferred modality or that its use is always cost effective. There is a need to define the most cost-effective patterns of use of the two modalities. These may vary depending on the patient's condition, and the impact of the diagnostic information from the modalities on patient management.

The American College of Physicians has suggested that for patients with uncomplicated dyspepsia, neither modality should be used until a 6-8 week course of therapy has been undertaken (32). The College argued that the diagnostic information provided would be of little value before the course, since the treatment would be the same regardless of whether the diagnosis was ulcer, gastroduodenitis, or normal mucosa. The College considered that endoscopy should be reserved for those with persistent symptoms after 6-8 weeks or no response at all after 7-10 days, or those with complications, severe illness or symptom recurrence. Endoscopy was seen as preferable to barium meal, and the use of both modalities was not favoured. The suitability of such an approach in Australia would be a matter for consideration by relevant professional bodies.

Another approach which has been suggested is the selection of one or other of the modalities on the basis of the expected diagnosis and the patient's condition, taken in conjunction with the different advantages of the two techniques (30). For example, barium meal has the advantage that it avoids the risks of infection and other complications which, though rare, can occur with endoscopy. It would be the modality of choice with an infectious patient or one with conditions which increase the risk of complications (31). Again, the duplication of investigations was seen as unnecessary.

In the lower GI tract, endoscopy (proctosigmoidoscopy) is required for the detection of anorectal lesions, and flexible sigmoidoscopy has clear advantages over barium enema for investigations of the lower sigmoid colon. For full colonic investigation, colonoscopy or barium enema is required. There has been some controversy over which of these is the more accurate, and which should be the first line investigational procedure. Overall, the evidence suggests that colonoscopy is more accurate. The Gut Foundation and the NSW Cancer Council have given references to eight studies during the period 1975-1982 which indicated that colonoscopy had superior accuracy for the detection of polyps, cancers, and other lesions (4).

However, in one study published in 1982, double contrast barium enema was found to be more sensitive than colonoscopy for the detection of polypoid lesions in the ascending colon and caecum (33), while in another study, published in 1984 colonoscopy gave better results in the detection of polyps and carcinoma in the sigmoid colon (34). The relative performance of the two modalities may be affected by the anatomic regions being examined. In addition, the expertise with which they are performed will have an important effect. For example, the efficacy of endoscopy relative to barium enema will be reduced if regions of the colon are missed in the endoscopic examination.

Durdey, Weston and Williams have recently reported the results of a trial to determine whether double contrast barium enema (DCBE) or fiberoptic examination should be the first line investigation for colonic disease (35). Colonoscopy was found to be more accurate than DCBE alone or in combination with flexible sigmoidoscopy. There was some patient preference for colonoscopy and incomplete examinations with this technique did not emerge as a major problem in the trial. These authors suggest that initial investigation of patients with colorectal symptoms presenting after normal physical examination and rigid sigmoidoscopy should be by flexible sigmoidoscopy and not DCBE. If no abnormality is detected then colonoscopy is indicated. Flexible sigmoidoscopy followed by DCBE is considered to be a suitable interim (though inferior) alternative if facilities for colonoscopy are not available. They suggest that the costs of colonoscopy (at present greater than those for DCBE) will fall as the number of procedures rises.

A significant advantage of colonoscopy over barium enema is that it permits the combination of surgical procedure and diagnostic examination. Thus polypectomies can be performed during colonoscopy.

It is possible that colonoscopy and double contrast barium enema are frequently used in investigations on the same patient. This may well be justified in many cases, but unnecessary duplication would be a matter for concern. As in the case of upper GI tract investigations, there is a need for professional bodies to define the most cost effective patterns of usage in patient management.

Therapeutic Endoscopy

The RACS has provided some examples of comparisons of endoscopic procedures with other methods which show various outcomes and indications of cost effectiveness (36). A straightforward example involves removal of a large polyp in the descending colon (Table 8). Colonoscopic polypectomy is clearly safer and much cheaper than surgery.

A more difficult problem is demonstrated by the comparison of surgical with endoscopic placement of a Celestin tube to palliate dysphagia in carcinoma of the oesophagus (Table 9).

In this example procedural and total mortality have been distinguished, since most of the deaths following placement of existing tubes are due to the carcinoma. The conclusion is that endoscopic placement is best for some, but not all patients. It would be the preferred technique for those who have inoperable tumours (and this is not always clear), or who are unsuitable for surgery (36).

TABLE 8

COMPARISON OF ENDOSCOPIC AND SURGICAL REMOVAL
OF A 2cm POLYP IN THE DESCENDING COLON

	Surgical polypectomy (before colonoscopy was available)	Colonoscopic Polypectomy
Total Mortality	1%	<0.05%
Morbidity	15% (approx)	0.1%
Additional Benefits	Full laparotomy is possible	Detection and removal of other polyps
Time in hospital	10-12 days	same day
Hospital costs * (\$300 per day)	\$3000-3600	\$300
Medicare Benefits		
Item No.	3722	4394
Fee	\$300 (plus \$116 anaesthesia)	\$300 (plus \$106 for anaesthesia)
* These costs were included by the NHTAP.		

Source: Royal Australasian College of Surgeons

TABLE 9
 CELESTIN TUBE PLACEMENT FOR CARCINOMA OF
 THE OESOPHAGUS (35)

	Surgical	Endoscopic
Procedural mortality	1-2% (approx)	1-2% (approx)
Total mortality	20%	20%
Morbidity	10%	5%
Other benefits or disadvantages	resection or bypass may be possible	a resectable tumour may be missed
Days in hospital	8-10	2-3
Medicare Benefits	3745	5470
Item No.	(No specific item no)	
Fee	\$335 (plus \$126 for anaesthesia)	\$190 (plus \$74 for anaesthesia)
Hospital Costs * (\$300 per day)	\$2400-\$3000	\$600 - \$900
* These costs were included by the NHTAP		

Source: Royal Australasian College of Surgeons

Another more difficult comparison is that between endoscopic and surgical removal of retained common bile duct stones. Endoscopic removal involves sphincterotomy and extraction of the stones (Item 3862); surgical removal is usually achieved by choledochotomy (Item No. 3820), and sphincterotomy is only necessary in a small number of patients. The sphincterotomy contributes significantly to the mortality of the endoscopic procedure (about 1.5%) whereas the risk of death associated with surgical removal in young patients is lower (less than 1%) For older patients the risks of surgery would be substantially increased. The long term effects of endoscopic sphincterotomy are still uncertain. On balance, the endoscopic approach is considered better for older and sicker patients. In this example, the endoscopic and surgical techniques are clearly complementary (36).

OFFICE AND OPEN ACCESS ENDOSCOPY

Upper GI endoscopy has generally been performed in a hospital setting, although increasingly as an outpatient procedure. There is now a trend towards its use outside hospitals, in private offices or clinics. Goy has commented that three such clinics have a combined experience of over 20,000 procedures without major complications or fatalities, and has suggested that they can provide a more efficient and cost effective service than hospitals (13).

Associated with the development of office endoscopy is a move towards open access endoscopy, that is, referral of patients for upper GI endoscopy by general practitioners without specialist consultation. It is common practice for general practitioners to refer patients directly for barium meal examination. Goy et al consider that endoscopy could be an alternative first investigation (37). In a discussion of this approach it has been pointed out that reports on minor mucosal disorders detected by endoscopy could be misleading to the referring doctor (38). The need for high standards of training for clinicians practising open access endoscopy has been stressed (38).

The value of open access endoscopy is controversial. One British study found that it led to a large increase in the number of endoscopic examinations without a fall in barium meal studies or an increase in diagnostic yield, but other studies have arrived at more favourable conclusions (39). In Australia, Goy et al reported significantly fewer positive findings in patients referred for specialist consultation before endoscopy, as compared with those who underwent open access endoscopy (37).

The Panel considers that increasing acceptance of open access endoscopy could tend to increase the number of endoscopic examinations performed in Australia. Consideration of how upper GI endoscopy could most effectively be used need to take into account the trend towards open access endoscopy. General practitioners referring patients for endoscopy or barium radiography would be assisted by advice on the most cost effective patterns of usage of these modalities.

CONCLUSIONS

The number of endoscopic examinations in Australia, particularly those with fiberoptic endoscopes, has been rising rapidly in recent years.

Gastrointestinal endoscopy continues to be the principal growth area. Future trends in the use of gastrointestinal endoscopy will be influenced in part by two factors which may tend to counter balance each other. On the one hand growth could be encouraged by the trends towards the provision of endoscopic services in private offices or clinics, and towards open access to endoscopy services. On the other, the decision to remove requirements for diagnostic tests before each prescription of antiulcerants may tend to reduce the demand for endoscopy.

There is growing evidence that colonoscopy is more accurate than barium enema for investigations of the colon. Given the high incidence of bowel cancer and the potential for prevention of this disease, the role of endoscopy in lower gastrointestinal tract investigations, including the screening of groups at high risk for bowel cancer, is likely to increase further. Trends will also be influenced by levels of remuneration.

Therapeutic endoscopy is becoming increasingly popular. It might be expected that the availability of an endoscopic technique for a therapeutic procedure which would otherwise require conventional surgery could lead to the procedure being performed more often. This appears to be occurring with the removal of polyps in the lower GI tract.

The great majority of endoscopic procedures appear to be performed by specialists. The numbers of endoscopic services provided by GPs are significant only in the case of lower GI tract examinations. These appear to be increasing but the growth rate is not large.

As a result of the increasing use of endoscopes, concerns have been expressed by various professional bodies and individuals with regard to training and certification of competency in the use of these instruments. Clearly, supervised training with an adequate case load is essential for the development of competence. More emphasis is being placed on endoscopy during training in some specialties, but only the Gastroenterological Society of Australia provides accreditation.

The total number of barium studies still exceeds the number of diagnostic GI endoscopic examinations, and has not fallen in spite of the increasing use of endoscopy. However, growth in the number of barium meals appears to have halted.

The coexistence of the two diagnostic techniques adds to the costs of the Australian health care system. There is a need to discourage unnecessary duplication of investigations, and to promote the most cost effective patterns of usage of the two modalities. Guidelines are needed on how they should best be used in different situations, taking into account patient condition and clinical history, the potential impact of the diagnostic information obtained on patient management and outcome, the relative advantages and disadvantages of the two modalities, and the need to contain costs.

The Panel suggests that the Royal Australasian College of Physicians, the Gastroenterological Society of Australia, the Royal Australasian College of Surgeons, and the Royal Australasian College of Radiologists might consider cooperating in the preparation of such guidelines. These should be made available to general practitioners, as well as to specialists, to assist them in making decisions on referring patients for endoscopy.

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