Gastroenterology service in a teaching hospital in rural New Zealand, 1991-2003

Michael Schultz, Andrew Davidson, Sarah Donald, Bogna Targonska, Angus Turnbull, Susan Weggery, Vicki Livingstone, John D Dockerty

INTRODUCTION

The worldwide demand for gastroenterological services is growing. In order to adapt a training curriculum for future gastroenterologists and to allocate health resources, disease trends and the workload of gastroenterologists need to be monitored closely [1-3]. The literature on this topic is sparse. In 1973, Switz first described the practice of gastroenterologists in Virginia, USA [4] but only a few studies followed, mainly focussing on specific procedures or diagnoses. Manning et al. (1980) surveyed the practice of a single gastroenterologist [5] and in 1984 an analysis of the working patterns of 500 members of the American Gastroenterological Association was published, focussing mainly on functional disorders [6]. A more general profile of a district hospital gastroenterology service in the United...
Kingdom was obtained by Holmes et al in 1987; there was little change over a 12 year period[7]. The most recent survey of practice patterns was conducted in the USA by Russo et al and was published in 1999[8].

However, each of these surveys had limitations and was therefore not suitable for generalisation. The Southern Island of New Zealand is mostly rural with approximately 182,000 people scattered over an area of about 32,000 sq km and is therefore comparable to many other regions outside the large population centres of Asia, Europe and the Americas. A difficult and often unmet task is to ringfence health resources (funding, staffing and facilities) prospectively so that the health needs of the population can be met. Long distances and a borderline population size make the justification for investments difficult. Projected data for disease and demand trends are of utmost importance. There is no published New Zealand data on the workload of gastroenterologists and the use of endoscopy procedures.

The goals of this study were (1) to retrospectively collect inpatient and outpatient data and (2) to assess the use of endoscopic procedures during the years 1991, 1997 and 2003 to examine the demographics of patients seen by the service and to analyse trends in diseases seen during these periods.

MATERIALS AND METHODS

Study population

This survey was conducted in the Dunedin Public Hospital Gastroenterology Unit. The hospital serves as the only secondary and tertiary public referral centre for a population of approximately 182,000 people mainly in the Otago Region of the South Island of New Zealand. The majority of people in this area identify themselves as European in ethnic origin, with 5.9% identifying themselves as Maori, 3.1% as Asian, and 1.5% as Pacific Islanders[9]. These numbers were relatively stable over the observed period. The next advanced public health care centres are to the north or to the south and approximately 4 h by car.

The Gastroenterology Unit is usually staffed by one full-time consultant, two part time (0.5) consultants and one full-time registrar. Patients have access through referrals from local general practitioners and hospital specialists. The unit offers in- and outpatient specialist consultations and diagnostic procedures such as upper and lower diagnostic and therapeutic endoscopies, endoscopic retrograde cholangiopancreatography (ERCP), trans-abdominal ultrasound, liver biopsy, and pH telemetry. Patients in general have the possibility to access private services but transfer to a public centre out of area is not possible.

Prior to the commencement of this study, ethical approval was obtained from the Lower South Regional Ethics Committee. The data collection was performed in two phases by two separate groups of final year medical students as part of their health-care evaluation projects during their attachment to the Department of Preventive and Social Medicine. Each phase included data from the same years: 1991, 1997 and 2003.

Data collection

The absolute number of patient contacts (i.e. individual patients might have been seen more than once) including inpatients (IP; first and subsequent admissions) and outpatients (OP; as new or follow-up visits) was determined for the years concerned. Disease trends were determined based on the diagnosis on first presentation of the disease. Excluded from analysis were deceased patients as their files had been destroyed, and those with missing files. At the time of our analysis in 2005/2006, 23.9% of all patients first seen in 1991 were deceased, compared to 10.4% and 4.1% first seen in 1997 and 2003, respectively. The proportion of missing data ranged from 1% to 4% for the three years combined.

Data was obtained via the hospital computerised patient management system. In addition, OP diagnoses were obtained by retrieving the relevant clinic letters from the hospital's medical record filing system.

Diagnostic data were in the form of International Classification of Disease Version 9 (ICD-9) codes (1991 and 1997) and ICD-10 codes (2003), providing all the diagnoses recorded during each admission. The ICD-9 codes were matched electronically to the ICD-10 codes so as to simplify analysis. When more than one gastrointestinal diagnosis was present in the raw data, it was ranked numerically by clinical coders but not necessarily in order of relevance to the clinical presentation (primary vs secondary diagnosis). Therefore, two investigators went through all the diagnoses listed for each admission, and chose the most likely primary and secondary diagnoses for that presentation. This resulted in more diagnoses than patients or patient contacts. If numbers for an entity were too small for analysis, codes were combined into broader diagnosis groups.

Endoscopic data were collected for all patients using the gastroenterology database and the computerised patient management system. Data on ERCP (n = 309), abdominal ultrasound and pH telemetry were not included in this analysis due to the small numbers of these procedures.

Statistical analysis

Differences between years for qualitative variables were tested using a chi-squared test or, in the case of small expected counts, Fisher’s exact test. If the chi-squared test was statistically significant, linear trends were investigated using the Cochrane-Armitage (C-A) test for trend. Quantitative data was compared using analysis of variance (ANOVA). The level of significance for all tests was set at 5% and all tests were 2-sided. All statistical analyses were performed in STATA (Version 9.2) or XLSTAT (Version 2008).

RESULTS

In- and outpatient demographic features

There was a statistically significant increase in the absolute numbers of patient contacts (IP-first admissions and subsequent admissions and OP-new patients and
follow-up visits) over the years (Figure 1: 1991: 2308; 1997: 2022; 2003: 2783; C-A test P < 0.0001). Also, first hospital admissions and first specialist consultations (patients not seen before by this service) showed a statistically significant increase over the thirteen years between 1991 and 2003 (C-A test P < 0.001 for both, Table 1). For the three years combined, more females were seen as both in- and outpatients (58% inpatients and 61% outpatients were female, P < 0.001 for both). Overall, there was no statistically significant difference in the percentage of females seen in the in- and outpatient setting (P = 0.123). The mean age of inpatients was higher than that of outpatients (P < 0.001).

Diagnoses of in- and outpatients
In the IP (Table 2) setting, the top 5 diagnostic groups over all the years studied were: liver disease and abnormal liver function tests (LFTs; 20.8%), biliary disease (16.1%), inflammatory bowel disease (IBD; 11.7%), malignancy (8.7%) and other diseases of the colon/anus/rectum (5.0%). In comparison, the top 5 diagnoses in OP (Table 2) were: liver disease and abnormal LFTs (11.4%), other functional disease (11.1%), abdominal pain of unknown cause (10.0%), constipation (7.3%) and oesophagitis/gastro-oesophageal reflux disease (GORD; 6.5%). The detailed results are presented in Table 2. The data excludes patients referred by open access for endoscopy.

Disease trends
The number (percentage) of diagnoses seen in the inpatient setting is presented in Table 2. Disease trends in IP showed a statistically significant linear decline over time for inflammatory bowel disease, other diseases of the colon, anus and rectum and for iron studies related disorders as a proportion of all diagnoses (C-A tests P = 0.015, 0.040 and < 0.001, respectively). Conversely, liver disease and constipation increased linearly over time (C-A tests P = 0.010 for both). The proportion of patients seen with biliary disease spiked in 1997 but then decreased again in 2003 to levels similar to those seen in 1991, therefore, the difference across the years for biliary disease was not statistically significant (chi-square test P = 0.502). There was no statistically significant difference in the proportions of malignant disease (chi-squared test P = 0.457).

The number (percentage) of diagnoses seen in the OP setting is presented in Table 2. The OP diagnosis of abdominal pain of unknown cause and other functional disease showed a statistically significant linear decrease over the years (C-A tests P < 0.001 for both). Conversely, liver disease and abnormal LFTs, family history of bowel cancer, constipation and iron studies related disorders showed a statistically significant linear increase (C-A tests P = 0.001, < 0.001, 0.003 and 0.002, respectively) (Table 2). All other diagnoses in the in- and outpatient settings showed no statistically significant linear trend over the years studied.

Use of endoscopies
The number of procedures and the patient demographics are presented in Table 3. Over the three years studied, a total of 6705 procedures were performed; 4795 (71.5%) were gastroscopies and 1910 (28.5%) were colonoscopies.

There was no statistically significant linear trend across the years for either procedure (C-A tests P = 0.379 and 0.392, respectively). Overall, there were no gender differences for both colonoscopies and gastroscopies (P = 0.132 and 0.078, respectively). The age distribution

### Table 1 Patient numbers and demographics

| Yr    | Inpatients | Outpatients |
|-------|------------|-------------|
|       | No. of admissions | Rate per 10000 population % | Age mean (SD) | Female % | No. of admissions | Rate per 10000 population % | Age mean (SD) | Female % |
| 1991  | 173        | 9           | 54.1 (19.7) | 97 (56)   | 553        | 30          | 49.0 (19.3) | 246 (62) |
| 1997  | 310        | 16          | 55.9 (18.9) | 196 (63)  | 469        | 25          | 47.0 (18.0) | 256 (63) |
| 2003  | 391        | 20          | 53.4 (19.1) | 210 (54)  | 756        | 39          | 50.1 (18.5) | 421 (59) |

1First hospital admissions and first specialist consultations showed a statistically significant linear increase over the years (P < 0.001 for both); 2Estimates of the Otago population obtained from the Ministry of Social Development website: http://www.socialreport.msd.govt.nz/regional/r-councils/otago.html; 3There was a statistically significant difference in the mean age of inpatients and outpatients (P < 0.001).
Table 2 Number (percentage) of diagnoses seen in the inpatient and outpatient setting

| Diagnosis | 1991 | 1997 | 2003 | Total |
|-----------|------|------|------|-------|
| Inpatient |      |      |      |       |
| Liver disease (including Hepatitis and Abnormal LFTs) | 33 (15.1) | 90 (20.3) | 124 (23.5) | 247 (20.8) |
| Biliary disease | 22 (10.1) | 91 (20.5) | 78 (14.8) | 191 (16.1) |
| Inflammatory bowel disease | 38 (17.4) | 47 (10.6) | 54 (10.2) | 139 (11.7) |
| Malignancy | 23 (10.6) | 34 (7.7) | 47 (8.9) | 104 (8.7) |
| Other diseases of colon/anus/rectum | 13 (6.0) | 30 (6.8) | 17 (3.2) | 60 (5.0) |
| Abdominal pain unknown cause | 12 (5.5) | 9 (2.0) | 35 (6.6) | 56 (4.7) |
| Iron studies related disorders | 14 (6.4) | 18 (4.1) | 7 (1.3) | 39 (3.3) |
| Constipation | 4 (1.8) | 5 (1.1) | 29 (5.5) | 38 (3.2) |
| Pancreatic disease | 7 (3.2) | 11 (2.5) | 17 (3.2) | 35 (2.9) |
| Infective | 5 (2.3) | 14 (3.2) | 8 (1.5) | 27 (2.3) |
| Oesophagitis/GORD | 4 (1.8) | 9 (2.0) | 8 (1.5) | 21 (1.8) |
| Peptic ulcer disease | 0 (0) | 4 (0.9) | 10 (1.9) | 14 (1.2) |
| Irritable bowel syndrome | 3 (1.4) | 2 (0.5) | 1 (0.2) | 6 (0.5) |
| Haemorrhoids | 0 (0) | 1 (0.2) | 1 (0.2) | 2 (0.2) |
| Other functional disease | 0 (0) | 1 (0.2) | 0 (0) | 1 (0.1) |
| Other gastroenterological diagnosis | 31 (14.2) | 67 (15.1) | 82 (15.6) | 180 (15.1) |
| Other functional disease | 9 (4.1) | 11 (2.5) | 9 (1.7) | 29 (2.4) |
| Non-Gastroenterological diagnosis | 218 (100) | 444 (100) | 527 (100) | 1189 (100) |
| Outpatient |      |      |      |       |
| Liver disease (including Hepatitis and Abnormal LFTs) | 29 (6.4) | 61 (13.5) | 108 (12.9) | 198 (11.4) |
| Abdominal pain unknown cause | 70 (15.5) | 60 (13.3) | 63 (7.6) | 193 (11.1) |
| Iron studies related disorders | 82 (18.2) | 36 (8.0) | 55 (6.6) | 173 (10.0) |
| Constipation | 23 (5.1) | 26 (5.8) | 78 (9.4) | 127 (7.3) |
| Oesophagitis/GORD | 27 (6.0) | 22 (4.9) | 64 (7.7) | 113 (6.5) |
| Irritable bowel syndrome | 26 (5.8) | 24 (5.3) | 60 (7.2) | 110 (6.3) |
| Family history of bowel cancer | 13 (2.9) | 25 (5.5) | 70 (8.4) | 108 (6.2) |
| Other diseases of colon/anus/rectum | 23 (5.1) | 39 (8.6) | 46 (5.5) | 108 (6.2) |
| Inflammatory bowel disease | 19 (4.2) | 23 (5.1) | 47 (5.6) | 89 (5.1) |
| Haemorrhoids | 16 (3.5) | 15 (3.3) | 47 (5.6) | 78 (4.5) |
| Iron studies related disorders | 10 (2.2) | 4 (0.9) | 41 (4.9) | 55 (3.2) |
| Infective (excluding Hepatitis) | 8 (1.8) | 26 (5.8) | 10 (1.2) | 44 (2.5) |
| Biliary disease | 8 (1.8) | 12 (2.7) | 14 (1.7) | 34 (2.0) |
| Malignancy | 4 (0.9) | 3 (0.7) | 12 (1.4) | 19 (1.1) |
| Peptic ulcer disease | 9 (2.0) | 1 (0.2) | 8 (1.0) | 18 (1.0) |
| Pancreatic disease | 2 (0.4) | 4 (0.9) | 7 (0.8) | 13 (0.8) |
| Other gastroenterological diagnosis | 73 (16.2) | 52 (11.5) | 78 (9.4) | 203 (11.7) |
| Non-Gastroenterological diagnosis | 9 (2.0) | 18 (4.0) | 26 (3.1) | 53 (3.0) |
| Total | 451 (100) | 451 (100) | 834 (100) | 1726 (100) |

1 Number of diagnoses adds to more than the number of inpatients as a patient could have more than one diagnosis. The top 5 diagnostic categories per year and overall are highlighted. 2 A statistically significant linear decrease over the years [Inpatient: Liver disease, other diseases of colon/anus/rectum and iron studies related disorders (P = 0.015, 0.040 and < 0.001, respectively); Outpatient: Abdominal pain of unknown cause and other functional disease (P < 0.001 for both)]. 3 A statistically significant linear increase over the years [Inpatient: Liver disease and constipation (P = 0.010 and 0.001, respectively); Outpatient: Liver disease, family history of bowel cancer, constipation and iron studies related disorders (P = 0.001, < 0.001, 0.003 and 0.002, respectively)].

Table 3 Procedure numbers and patient demographics

| Procedure | 1991 | 1997 | 2003 |
|-----------|------|------|------|
| Colonoscopy |      |      |      |
| No. of procedures | 638 | 580 | 692 |
| Rate per 10,000 population | 34 | 31 | 36 |
| Age mean (SD) | 57.3 (14.5) | 58.2 (15.0) | 59.4 (14.7) |
| Female n (%) | 319/632 (50) | 295/537 (55) | 349/692 (50) |
| Gastroscopy |      |      |      |
| No. of procedures | 1439 | 1812 | 1544 |
| Rate per 10,000 population | 77 | 96 | 80 |
| Age mean (SD) | 58.9 (17.9) | 58.1 (17.5) | 58.4 (18.6) |
| Female n (%) | 726/1432 (51) | 824/1595 (52) | 793/1540 (51) |

1 Estimates of the Otago population obtained from the Ministry of Social Development website: http://www.socialempt.msd.govt.nz/regional/r-councils/otago.html; 2 Denominator given as data on sex was not available for all patients.

for colonoscopies changed over time (P = 0.027) while the age distribution for gastroscopies did not change (P = 0.527).

Indications and findings

The patient indications and findings following the colonoscopies are illustrated in Figures 2 and 3, respectively. The indications and findings following the gastroscopies are illustrated in Figures 4 and 5, respectively. Some patients had more than one finding so the percentages added up to more than 100% for each of the years.

Indications for colonoscopy

Most colonoscopies were performed to investigate rectal bleeding or as part of the surveillance for colorectal cancer and polyps in patients with a positive family history. Interestingly, while there was a further statistically significant increase in colonoscopies performed for cancer surveillance and for patients with a family history of cancer (C-A tests P = 0.014 and P < 0.001, respectively), there was a statistically significant decrease in the frequency of colonoscopies performed for unexplained anaemia (chi-squared test P < 0.001), change in bowel habit (C-A test P < 0.001), and IBD surveillance/ulcerative colitis (C-A test P = 0.018) over the years studied. There was a tendency towards an increase in colonoscopies for unexplained anaemia (chi-squared test P = 0.057). The remaining indications showed no statistically significant linear trend (Figure 2).

Colonoscopy findings

Most colonoscopies were either reported as normal or showed polyps or diverticulae. Over the study timeframe, statistically significant increases in cancer (C-A test P = 0.007) and diverticulae (C-A test P < 0.001) were seen. In contrast, IBD decreased (C-A test P < 0.001), and there was a tendency towards an increase in polyps (C-A test P = 0.057). The proportion of normal findings did not change across the years (chi-squared test P = 0.493) (Figure 3).
Indications for gastroscopy

Over the study timeframe, significantly more gastroscopies were performed for unexplained anaemia and heartburn (C-A test $P < 0.001$ for both), GI bleeding (C-A test $P = 0.034$), dysphagia (C-A test $P = 0.014$) and cancer surveillance (C-A test $P = 0.010$). Conversely, the frequency of gastroscopies carried out for nausea/vomiting, abdominal pain and healing surveillance decreased (C-A test $P < 0.001$ for all). There were no significant changes in the proportion of gastroscopies performed for dyspepsia (chi-squared test $P = 0.114$) (Figure 4).

Gastroscopy findings

Most gastroscopies showed only inflammatory changes. The number of ulcers, healed ulcers and scarring/strictures (C-A test $P < 0.001$ for all) and the proportion of normal findings (C-A test $P = 0.005$) decreased significantly over the years. There was no significant difference in Barrett’s oesophagus (chi-squared test $P = 0.313$) and cancer (chi-squared test $P = 0.424$) observed over time. Findings of inflammatory changes and hiatus hernia differed significantly across the years (chi-squared $P < 0.001$ and $0.005$, respectively), but there was no significant linear trend across the years (C-A test $P = 0.148$ and 0.478, respectively) (Figure 5).

DISCUSSION

Our retrospective analysis over 13 years (1991-2003) aimed to collect data on in- and outpatient demographics, disease trends and endoscopic procedures in a secondary and tertiary but rural referral centre in southern New Zealand. This analysis has produced data which can be used for prospective planning in order to allocate health resources and in curriculum development for the future gastroenterological workforce.

Our study has several interesting findings, demonstrating that the working pattern for gastroenterologists over the last 13 years has changed dramatically in several aspects. This was not only true for absolute numbers of patient contacts, but also for indications and findings. These results may permit speculation on possible trends. However, this analysis was not aimed at explaining observed disease trends in the wider context as this is very complex and needs to take both contractual arrangements as well as local characteristics into account.

The absolute numbers of patient contacts by this service increased significantly over time, despite a stable workforce both inside and outside the hospital (e.g. consultants and general practitioners). This was mainly seen for in- and outpatient contacts, while the number of investigations remained stable over the years studied. Our results show distinct differences in the types of conditions seen in inpatient versus outpatient settings (Table 2). The gastroenterology service continues to see consistently more females (60%) than males (inpatients and outpatients; $P < 0.001$), in contrast to the 50:50 ratio seen in the study by Bohra in Ireland[10]. Age distributions have also remained stable over the thirteen year observation period, with a mean age of 48.9 years for outpatients and 54.4 years for inpatients ($P < 0.001$).

Excluding endoscopies, the gastroenterology service sees approximately 660 patients for a first specialist
assessment each year. The top five OP diagnoses (liver diseases, functional disorders, abdominal pain, constipation and reflux) were similar across the three years studied. This is largely in agreement with statistics published by Russo et al ranking abdominal pain, reflux, gastroenteritis, gastritis, haemorrhoidal disease and irritable bowel disease first but with liver disease in 16th place [11]. A survey among 376 members of the American Gastroenterological Association revealed Irritable Bowel Syndrome (19%) as the most common diagnosis, followed by oesophageal reflux and peptic disorders (17% and 10%, respectively), IBD (14%) and liver diseases (11%) [8]. If we summarise abdominal pain and constipation as a likely presentation of a functional disorder, this indication made up 27.3% and is therefore very much in agreement with the above survey by Russo et al [8]. However, in contrast to the view by Powell [1], but in agreement with others [5-7], there were significantly fewer patients with functional disorders compared with the beginning of the period. It is difficult to speculate on a reason for this finding, however, due to long waiting times of up to 6 mo for non-urgent referrals it is likely that only treatment-resistant cases are seen by this service.

Patients with liver disorders made up 8.5% of our outpatients and over 20% of the inpatient population with a significant increase seen over time. This might be a reflection of treatment options for Hepatitis C (testing available since 1992 in NZ), and the understanding of the significance of non-alcoholic fatty liver disease (NAFDL). However, most of these patients are admitted as day cases for liver biopsies and are therefore not truly reflecting inpatients. Such a trend was suspected by Powell [1] and in part confirmed by Russo et al [8].

We found that the absolute number of endoscopies (gastroscopies and colonoscopies) performed in our centre remained largely the same over the study period, approaching 80/10 000 gastroscopies and 36/10 000 colonoscopies in 2003 with 77/10 000 and 34/10 000 in 1991, respectively. This was largely due to contractual constraints. Scott and Atkinson in their 5-year review found that the annual number of gastroscopies doubled in the early 80’s and was expected to reach 120/10 000 in the 90’s with a similar trend expected for colonoscopies [2,12]. The Working Party of the Clinical Services Committee of the British Society of Gastroenterology stated in 1991 that an annual requirement of 100/10 000 gastroscopies and 20/10 000 colonoscopies were needed for a district general hospital [13].

In a study by Westbrook, gastroscopies were recorded at 179/10 000 population in 1997/98 in New South Wales, Australia [8]. Our almost stable lower numbers for endoscopic services can have several explanations and
might not necessarily reflect the actual demand. Due to a
strictly limited budget, the service in Dunedin can offer
open access for gastroscopy but not for colonoscopy.
Colonoscopy referrals undergo rigorous evaluation
before an investigation is granted. Throughout the
years the percentage of normal colonoscopies remained
stable at approximately 35%. While it is relatively
easy to judge the appropriateness of an investigation
retrospectively, prospectively this task is difficult. It
has been reported that the indication for up to 24.5%
of colonoscopies[20] and 15-39% of gastroscopies[16-18]
might not be appropriate. In contrast, we observed a
significant increase in the number of cases of colorectal
cancer at colonoscopy. This has to be seen on the
background of more than a doubling of the incidence
of colorectal cancer between 1956 and 1996 from
32/100000 to 80/100000 in male New Zealanders[19]. A
significant relative increase in colonoscopies performed
for cancer surveillance and for a positive family history
of colorectal cancer (from 20 in 1991 to 168 in 2003)
and also for unexplained anaemia was also observed
reflecting our increasing understanding of preventative
measures in medicine.

The relative increase in gastroscopies performed
for unclear anaemia is probably a result of our
greater understanding of the changing face of coeliac
disease[20,21]. The awareness of Barrett’s oesophagus in the development of oesophageal cancer[22] is possibly reflected in the increased number of endoscopies performed for dysphagia and cancer
surveillance. However, we did not find an increased
incidence of Barrett’s oesophagus (approximately
5.5%-6.8%)[16] or cancer of the upper gastrointestinal
tract (1.5%-1.2%) over the years.

In summary, we have presented data that reflect
changes in the working pattern of a rural tertiary
gastroenterology service over 13 years. Most of our
findings are in agreement with those of previous studies.
However, this analysis is unique in that we studied
the whole spectrum of gastroenterology contacts in a
hospital setting providing secondary and tertiary services. This study provides dynamic information to aid allocation of health resources and emphasises the importance of preventive medicine and also workforce development.
A substantial proportion of colonoscopies and
outpatient consultations are already undertaken to screen
for colorectal cancer in an at-risk population. This
proportion is likely to grow further, and New Zealand
is no exception. In the United States, about 13% of the
population is over 65 years, and projections estimate
this figure may rise to 20% over the next twenty years[23].
Our study showed that the median age of patients
undergoing endoscopy in Dunedin Public Hospital was
almost 60 years, and our aging population means that
more patients will require endoscopic procedures in the
coming years.

A larger workforce will probably be necessary to
meet these increasing demands. A recent review of
the gastroenterology workforce available in the United
States suggests that there will be a significant shortfall
in gastroenterologists by 2010[24]. The baby boom
generation is not only providing more patients, but
those gastroenterologists who are also part of that era
are now nearing retirement. In 1997, about 30% of
American gastroenterologists were within 5-10 years
of retirement[23]. All of this has huge implications for
the recruitment and training of the next generation of
gastroenterologists.

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