

# Dutch endoscopic capacity in the era of colorectal cancer screening

J.S. Terhaar sive Droste<sup>1\*</sup>, M.E. Craanen<sup>1</sup>, J.J. Kolkman<sup>2</sup>, C.J.J. Mulder<sup>1</sup>

<sup>1</sup>Department of Gastroenterology, VU University Medical Centre, Amsterdam, the Netherlands,

<sup>2</sup>Department of Gastroenterology, Medisch Spectrum Twente, Enschede, the Netherlands,

\*corresponding author: tel.: +31 (0)20-444 06 13, fax: +31 (0)20-444 05 54, e-mail: js.terhaar@vumc.nl

## ABSTRACT

**Background:** Future colorectal cancer (CRC) screening programmes should not (greatly) interfere with regular health care. Hence, we analysed the Dutch endoscopic practice to provide a clear insight into endoscopic workload and manpower with a special emphasis on the current ability to facilitate a successful implementation of a faecal occult blood test (FOBT)-based nationwide CRC screening programme.

**Methods:** A questionnaire was sent to all Dutch endoscopy units ( $n=100$ ) in the spring of 2005. The questionnaire included topics ranging from the numbers and specifications of endoscopies performed in 2004 and the numbers of endoscopists per unit to expected vacancies for gastroenterologists and waiting times.

**Results:** The response rate was 98%, representing a total of 49,253 hospital beds. Overall, a 26% increase in the number of endoscopies from 325,000 in 1999 to almost 410,000 in 2004 was found, accompanied by a 25% increase in manpower. The total number of endoscopists was 598. Regional differences were observed in the number of endoscopists, the total number of endoscopies and colonoscopies, and the number of endoscopies per endoscopist. A biannual FOBT-based screening programme would yield an additional workload of 25,385 colonoscopies a year amounting to a 22% increase in the total number of colonoscopies performed. However, the workload per unit would only have to increase by five extra colonoscopies a week.

**Conclusion:** Whereas an FOBT-based CRC screening programme is currently feasible without strongly interfering with regular health care, future plans regarding the scale and preferred mode of screening should incorporate solid data on the (regional) endoscopic capacity and manpower needed for a successful implementation.

## KEY WORDS

Colonoscopy, colorectal cancer, Dutch, endoscopy, screening

## INTRODUCTION

In view of the demographic changes and altered morbidity patterns in the Dutch general population, it is questionable whether the anticipated qualitative and quantitative changes in routine daily endoscopic practice can be met in the (near) future. In addition to an expected increase in the total number of endoscopies performed, the widespread clinical implementation of advanced imaging techniques, such as magnifying endoscopy, video capsule endoscopy and double-balloon enteroscopy, will undoubtedly lead to a qualitative change in endoscopic practice as well. If not adequately managed, these quantitative and qualitative changes will not only hamper future endoscopic practice but may also frustrate the successful implementation of a nationwide colorectal cancer (CRC) screening programme. Although the scale and optimal mode of screening is still controversial,<sup>1-4</sup> it is likely that a future Dutch CRC screening programme will use a biannual faecal occult blood test (FOBT)-based screening strategy for the general population between 50 to 75 years.<sup>1</sup> However, despite many arguments in favour of a screening programme,<sup>5-7</sup> a future CRC screening programme should not (greatly) interfere with regular health care in terms of endoscopic capacity and manpower. Hence, we analysed the current Dutch endoscopic practice to provide a clear insight into endoscopic workload and manpower with special emphasis for the additional requirements, if any, to accommodate a biannual FOBT-based CRC screening programme.

## METHODS

A questionnaire was sent, by mail and by e-mail, to all Dutch endoscopy units, either single- or multi-institutional ( $n=100$ ) in the spring of 2005. Nonresponders were sent several reminders and, if necessary, were contacted by phone at regular intervals of three to six weeks. The questionnaire included general topics ranging from the

numbers and specifications of endoscopies performed in 2004 and the numbers of endoscopists and nurses per unit to waiting times and expected vacancies for gastroenterologists. The mean numbers of endoscopies, gastroscopies, colonoscopies, sigmoidoscopies and endoscopic retrograde cholangiopancreatographies (ERCPs) per 100,000 inhabitants were calculated. Finally, the geographical distribution of endoscopic procedures, manpower and workload per endoscopist were assessed. SPSS for Windows version 11.0 was used for descriptive statistical analysis of the data.

## RESULTS

The response rate was 98%, representing a total of 49,253 hospital beds. Two centres with a combined total of 509 hospital beds did not respond despite several reminders. The total number of endoscopists was 598 (221 gastroenterologists, 213 internists, 123 surgeons and 41 paediatricians). Specification of the numbers of endoscopies per 100,000 inhabitants and the geographical distribution of endoscopic procedures are listed in tables 1 and 2, respectively. The

number of endoscopists per province and number of endoscopies per endoscopist are shown in table 3. The ratio between the number of colonoscopies and sigmoidoscopies was 1.7:1 (table 1). The mean waiting time for routine gastroscopy and colonoscopy was 3.0 weeks (range: 1 to 12 weeks) and 5.1 weeks (range 1 to 15 weeks), respectively. The expected number of vacant positions for gastroenterologists amounted to 60.4 FTE and 61.4 FTE in the period 2005–2006 and 2007–2010, respectively.

## DISCUSSION

Overall, a 26% increase in the number of endoscopies from 325,000 in 1999 to almost 410,000 in 2004 was found. This was accompanied by a 25% increase in manpower, i.e. from 480 endoscopists in 1999 to 598 endoscopists in 2004.<sup>8</sup> The endoscopic workload was nearly equally divided between gastroscopies and colonoscopies/sigmoidoscopies. The number of ERCPs represented less than 4% in total, despite a 22% increase compared with 1999.<sup>8</sup> The total number of endoscopies showed remarkable geographical differences ranging from 5687 in Flevoland to 92,172

**Table 1.** Number of endoscopies in the Netherlands in 2004, based on a 98% response rate

	Total number in the Netherlands	Endoscopies per 100,000 inhabitants/year*
Gastroscopies	184,915	1137
Colonoscopies	116,815	719
Sigmoidoscopies	70,049	431
Endoscopic retrograde cholangiopancreatography	14,596	90
Other**	22,607	139
<i>Total</i>	408,982	2514

\*Dutch population 2004: 16,258,032 ([www.cbs.nl](http://www.cbs.nl)). \*\*Other endoscopic procedures, i.e. duodenal feeding tubes, gastostomies, paediatric endoscopies, endoscopic ultrasound imaging and emergency procedures for haematemesis or haematochezia.

**Table 2.** Number of endoscopies per province, based on a 98% response rate

Province	Number of endoscopies	Number of colonoscopies	Endoscopies per 100,000 inhabitants/year*	Colonoscopies per 100,000 inhabitants/year*
Noord-Holland	62,359	16,798	2410 ( $\pm 71$ )	649 ( $\pm 17$ )
Zuid-Holland	92,172	26,992	2670 ( $\pm 66$ )	782 ( $\pm 19$ )
Noord-Brabant	51,128	11,932	2124 ( $\pm 66$ )	496 ( $\pm 17$ )
Utrecht	34,905	10,498	3003 ( $\pm 171$ )	903 ( $\pm 65$ )
Gelderland	47,181	13,716	2399 ( $\pm 132$ )	697 ( $\pm 45$ )
Overijssel	31,921	9799	2887 ( $\pm 353$ )	886 ( $\pm 127$ )
Groningen	19,767	5739	3441 ( $\pm 671$ )	999 ( $\pm 205$ )
Flevoland	5687	1822	1580 ( $\pm 62$ )	506 ( $\pm 35$ )
Zeeland	9026	2691	2381 ( $\pm 5$ )	710 ( $\pm 52$ )
Limburg	29,767	9487	2613 ( $\pm 195$ )	833 ( $\pm 72$ )
Friesland	14,880	4680	2318 ( $\pm 271$ )	729 ( $\pm 115$ )
Drenthe	10,189	2661	2112 ( $\pm 94$ )	552 ( $\pm 48$ )
The Netherlands	408,982	116,815	2514 ( $\pm 14$ )	719 ( $\pm 4$ )

\*Mean number ( $\pm$  standard deviation) per 100,000 inhabitants.

**Table 3.** Number of endoscopists per province and number of endoscopies per endoscopist/year

Province	Number of endoscopists	Number of endoscopies per endoscopist/year
Noord-Holland	101	617
Zuid-Holland	139	663
Noord-Brabant	69	741
Utrecht	47	743
Gelderland	68	694
Overijssel	34	939
Groningen	33	599
Flevoland	9	632
Zeeland	15	602
Limburg	42	709
Friesland	24	620
Drenthe	17	599
The Netherlands	598	684

in Zuid-Holland. This difference of up to 17-fold in all probability results from differences in the number of endoscopists per province and demographic characteristics, such as number of inhabitants, age distribution and, although speculative, morbidity patterns. Hence, it is not surprising that, in contrast to the 17-fold difference in total number of endoscopies, only a modest twofold difference was observed between the highest and lowest ranking province after correction for the number of inhabitants. Within this context, an interesting finding was the observation that the province Groningen, ranking 8th in total number of endoscopies, ranked first after correction for the number of inhabitants. Whether this finding is solely caused by demographic characteristics, morbidity patterns and/or differences in clinical practice, and endoscopic practice in particular, remains elusive. However, the number of endoscopies per endoscopist, being lowest in Groningen and Drenthe, suggests that differences in attitude towards endoscopic indications do not play a major role, if any. Similar geographical differences were observed with regard to the total number of colonoscopies, yielding a tenfold difference between the highest and lowest ranking province. Correction for number of inhabitants reduced the difference to less than twofold with the province Groningen ranking first in the number of colonoscopies per 100,000 inhabitants. Interestingly, the colonoscopy/sigmoidoscopy ratio of 1.7:1 was rather low compared with other countries, ranging from 4.1:1 in the United States to 9:1 in France.<sup>9-11</sup> This difference presumably reflects national differences in routine clinical practice with regard to for instance endoscopic indications, practice guidelines, CRC screening guidelines and reimbursement. Finally, the waiting times for routine endoscopy were fairly uniform. Yet, unacceptable waiting times of up to 12 to 15 weeks were encountered as well.

In view of the above, it is important to consider the impact of a nationwide CRC screening programme on (regional) endoscopic capacity, manpower and waiting times. Our data indicate that a biannual FOBT-based screening strategy<sup>1</sup> is currently feasible without greatly interfering with regular health care. Assuming a maximal compliance rate of 60% and an FOBT positivity rate of 2% analogous to other studies,<sup>12-14</sup> the programme would yield an additional workload of 25,385 colonoscopies per year ([www.cbs.nl](http://www.cbs.nl)) amounting to a 22% increase in the total number of colonoscopies performed in 2004. However, the workload per unit would have to increase by only a modest five extra colonoscopies per week.

## CONCLUSION

Whereas an FOBT-based CRC screening programme is currently feasible, future plans regarding the scale and preferred mode of screening should incorporate solid data on the (regional) endoscopic capacity and manpower needed for a successful implementation.

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