Author's response to reviews

Title: Anticipating implementation of colorectal cancer screening in The Netherlands: a nation wide survey on endoscopic supply and demand

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Author's response to reviews: see over
Dear Editor,

Respectfully we hereby would like to submit a revised version of our manuscript “Anticipating implementation of colorectal cancer screening in The Netherlands: a nation wide survey on endoscopic supply and demand”.

We thank the reviewers for the critical comments on our manuscript, which have been helpful in improving the paper. Below, we respond to the comments made by the reviewers. All changes are marked in red in the manuscript.

We hope you will consider the revised manuscript for publication.

On behalf of the authors,

Yours sincerely,

Sietze van Turenhout
Response to reviewers

Reviewer 1

Major Compulsory Revisions

Abstract

1. Conclusions section of abstract repeats what is presented in Results section – an interpretation of the importance of the authors' findings is required here.

The conclusion section of the abstract indeed mainly summarizes the main results. This section is changed and practical consequences are mentioned, without neglecting to only refer to results of the present study:

Page 4: “Over the last years, endoscopic procedures increased markedly in The Netherlands without a corresponding increase in manpower. A FIT-based CRC screening program requires an additional 15% increase in endoscopic procedures. It is very likely, that current colonoscopy density varies widely across European countries.”

2. The use of the word ‘capacity’ is misleading/confusing in places and should be carefully defined from the outset. Current endoscopic use can be seen as current capacity. Capacity itself can contain more than endoscopic use.

Capacity is indeed a concept which may contain more than current endoscopic use. The number of endoscopists, endoscopic nurses, medical co-workers, disinfectant resources, number of endoscopes, and pre-medication are examples of factors involved. However, this study was not designed to determine all such relevant factors. We agree with the reviewer that the word ‘capacity’ may be misleading. We changed the use of this word accordingly, for proper interpretation. The current endoscopic procedures were seen as the minimal endoscopic capacity at the time of analysis. This is true as the data found are at least the minimal number of procedures which can be performed. An example of a more appropriate use of the definition is stated below:

Page 5: “On behalf of the Dutch Society of Gastroenterology, this study aims to update current estimates of minimal endoscopic capacity and determine the trends in endoscopic procedures performed in The Netherlands since 2004.”

Background, Methods, Results

3. The paper starts by claiming “The existing shortage of gastroenterologists and endoscopy staff would be compounded by the implementation of a nationwide screening program for colorectal cancer (CRC), as it would lead to a further increase in endoscopic demand.” This ‘shortage’ needs to be clearly and carefully detailed/referenced/explained as it is central to one of the main findings of the paper.
The current shortage is further clarified by a reference to data on vacancies and waiting lists in The Netherlands, described in the following sentence:

Page 5: “The existing shortage of gastroenterologists and endoscopy staff in The Netherlands is clear from waiting lists and vacancies.[1] This shortage is likely to be compounded by the implementation of a nationwide screening program for colorectal cancer (CRC), as it would lead to a further increase in endoscopic demand.”

Furthermore, the phrase “would be compounded” is a statement of opinion and needs to be backed up. For example, perhaps spare capacity, improvements in operational efficiency and/or technological advancements could help to meet extra demand in the future?

The reviewer is right that the current shortage is not compounded per se. Spare capacity, improvements in operational efficiency and/or technological advancements could influence current available capacity. However, by the need to perform more colonoscopies in a screening program, it is very likely that capacity needs to increase to at least some extend. This very relevant topic is now addressed in more detail in the discussion section:

Page 15: “The number of endoscopic procedures performed in 2009 are considered current minimal capacity. However, capacity also relies on endoscopy staff, medical co-workers, flexible endoscopes, (desinfecting) material, medication and effective use of resources. In addition, the number of endoscopies is also influenced by procedure guidelines and quality issues. For example, in 2004 the guideline for cleansing and desinfection of flexible endoscopes was intensified.[19] Current available facilities in Dutch endoscopy units are unknown. Improvements in operational efficiency and/or technological advancements could increase current capacity. Rest capacity is however unknown and warrants additional studies. Therefore, current capacity level may actually be higher or lower than production level.”

4. Closely related to this, the paper needs to give a better sense as to whether endoscopic units in The Netherlands are currently operating below/at/above capacity and to what extent there is room for increasing the number of endoscopies through measures other than extra endoscopists e.g. operational efficiencies, economies of scale, increases in support staff, etc. This is a fundamental question in relation to whether there is a need for more endoscopists to deal with the likely future demand discussed in the paper.

An increase in capacity, whether needed or not, could be accomplished by several means, as described by the reviewer. However, for The Netherlands no data exist on spare capacity even though CRC screening is advocated. Unfortunately, the current study was not designed to answer that question. In the discussion section, a call for more studies determining potential spare capacity and other resources is made:

Page 15: “Current available facilities in Dutch endoscopy units are unknown. Improvements in operational efficiency and/or technological advancements could increase current capacity. Rest capacity is however unknown and warrants additional studies.”
5. To address Question 4, “endoscopists associated with the United European Gastroenterology Federation were requested to report solid data on the number of colonoscopies per 100,000 inhabitants, when available”. This would appear to be a very unreliable way in which to gather comparable cross-country data in order to make inferences regarding differences in capacity across countries. For example, what does “solid data” mean? How is it defined? How did these endoscopists derive this “solid data”? If such an approach is valid, instead of the authors going to such an effort to sample every endoscopy unit in The Netherlands, why not just ask an expert in The Netherlands instead? Much more detail regarding this element of the study is required before the findings can be viewed with any confidence.

To compare the Dutch procedures per 100,000 individuals to surrounding countries, a literature search was performed. Unfortunately, we had to conclude that very little European data have been published. In an attempt to obtain objective data from surrounding countries, endoscopists for several countries were contacted for information from their national societies on the number of endoscopies performed. We acknowledge that these data provided by the endoscopists may not be a valid reflection of the actual performance. However, at this time, it was impossible to inventory all endoscopic procedures performed in all these countries as the number of endoscopic units in countries like the United Kingdom, Germany, France, Italy and Spain must be tremendous. However, many endoscopists contacted could provide data on endoscopic procedures, mostly acquired from central or regional registries. By this survey we provided an estimation on European procedures and show that more data on European countries are needed, as endoscopic production is relevant in gastroenterological care and CRC screening programs. We described this more in detail:

Page 7: “In addition, due to a lack of published data from European countries (see results section), endoscopists associated with the United European Gastroenterology Federation were requested to report data on the number of colonoscopies per 100,000 inhabitants from their country, when available.”

And:

Page 16: “Fifth, the data presented for other European countries should be interpreted with caution. The data provided by European colleagues were mainly obtained from national or regional registries. As these data were not collected in the same standardized manner and therefore were not validated by the authors of this manuscript, the European data may not be the exact reflection of each country. Still, these data are provided with discretion by the European endoscopists, and we believe this effort is a good first inventory of current endoscopic variety. In addition, the lack of published data warrants more studies especially from countries in which CRC screening is advocated, planned or already implemented.”

6. In relation to the number of endoscopists, the authors report: “For gastroenterologists, a 47% increase over 2004 was found, whereas the number of internists and surgeons decreased by 27% and 16%, respectively. In total, a 4.6% increase in the number of endoscopists was found over the past five years.” An important question here concerns whether gastroenterologists, internists and surgeons all spend the same proportion of their time performing endoscopies and/or
perform the same number of endoscopies per unit of time. If not, the 4.6% may be an underestimate/overestimate of the true change in the system’s supply/capacity to provide endoscopies and of whether or not the system is under/at/below capacity.

Unfortunately, the time that was spent on endoscopic procedures each week for all endoscopists is unknown, as is the time used for each endoscopy. These factors do influence capacity, but we are unable to make a correction. This is now stated in the discussion section:

Page 13: “Although the total number of endoscopists increased slightly, the number of gastroenterologists increased substantially whereas the number of internists and surgeons performing endoscopies in 2009 declined markedly. The increase in the total number of endoscopies performed might be related to this change as gastroenterologists might spend more full time equivalents on performing endoscopies, what could result in an increase in endoscopic production. However, full time equivalent volumes on endoscopic procedures per endoscopist’s specialty is unknown.”

7. The discussion of the likely impact of a future CRC screening programme and its impact across regions is interesting and potentially useful for resource allocation decisions. In this context an additional question worth addressing is whether there are economies of scale in the provision of colonoscopies?

The number of endoscopists is not equally distributed across The Netherlands. The number of inhabitants is not either. The number of endoscopists are the highest in the provinces with the highest number of inhabitants (i.e. Noord-Holland, Zuid-Holland, Noord-Brabant). However, more vacancies for gastroenterologist exist for the less crowded provinces (see reference 20). Some resource allocation seems to exist, as the number of endoscopies performed per unit varied from 250-12,871. Three small or specialized hospitals performed less than 1,000 endoscopies per year, whereas 6 performed more than 10,000. In general, Dutch hospitals provide health care for the surrounding area. Some hospitals might focus more on endoscopy than others (and have less time available on e.g. Hepatology, oncology, inflammatory bowel disease etc). Unfortunately, no data on sub regions are available, and it is unknown whether patients visit a hospital in a different province than were they live.

Discussion
8. In the Discussion section, the authors state that “differences might be related to variation in available endoscopists, patient demographics and morbidity patterns”. Further investigation of this would strengthen the paper and should at least be discussed in more detail.

Unfortunately, co-morbidities across different country regions are unknown. The age distribution of inhabitants per province was determined. However, the age category of 55-75 years (intended screening group) differed only 1% in all provinces. Only Flevoland has a younger population. This sentence is rephrased:
Page 14: “These differences might be related to variation in available endoscopists and, although speculative, morbidity patterns. A difference in patient demographics among provinces as a potential explanation, could not be found.[8]”

9. The conclusions drawn in the Discussion section concerning cross-country differences in endoscopy rates suffer from the concerns raised above. It is not enough to state “since hardly any of the European data that are presented here are published, they should be interpreted with caution.”

We agree with the reviewer, and refer to the changes made in the discussion:

Page 16: “Fifth, the data presented for other European countries should be interpreted with caution. The data provided by European colleagues were mainly obtained from national or regional registries. As these data were not collected in the same standardized manner and therefore were not validated by the authors of this manuscript, the European data may not be the exact reflection of each country. Still, these data are provided with discretion by the European endoscopists, and we believe this effort is a good first inventory of current endoscopic variety. In addition, the lack of published data warrants more studies especially from countries in which CRC screening is advocated, planned or already implemented.”

10. “an investment in increasing capacity appears to be mandatory”. The word mandatory is debatable if the current endoscopy system is working below capacity. The authors state that “Due to the substantial increase over the recent years without a considerable increase in manpower, the upper limit of capacity might have been reached already, and a further increase without sufficient investment might result in low quality colonoscopies.” Whether or not “the upper limit of capacity [has] been reached already” is central to the correct interpretation of the data in this paper, relates to Point 4 above, and needs to be addressed.

The reviewer addresses a relevant point. This point and other related topics noted by the reviewers are now discussed in one paragraph in the discussion section:

Page 14: “Anticipating a national screening program in The Netherlands, current capacity may be insufficient as the number of extra colonoscopies needed is expected to range from 10-22 per unit per week. Although subjective, 22% of endoscopy units expect to be able to cope with a 30% increase in workload in 2012, whereas the anticipated increase would only be 15%. The number of endoscopic procedures performed in 2009 are considered current minimal capacity. However, capacity also relies on endoscopy staff, medical co-workers, flexible endoscopes, (disinfecting) material, medication and effective use of resources. In addition, the number of endoscopies is also influenced by procedure guidelines and quality issues. For example, in 2004 the guideline for cleansing and disinfection of flexible endoscopes was intensified.[19] Current available facilities in Dutch endoscopy units are unknown. Improvements in operational efficiency and/or technological advancements could increase current capacity. Rest capacity is however unknown and warrants additional studies. Therefore, current capacity level may actually be higher or lower than production level. Still, there might be
no or little rest capacity as for years many vacancies for gastroenterologist exists in The Netherlands.[20] It can be expected that capacity needs to increase at least to some extent, as more colonoscopies need to be performed in a screening program. Also, an increase in workload for medical co-workers can be expected as e.g. in upper gastrointestinal endoscopies, it was shown that around 75% of total time was spent on pre- and postendoscopic operations.[21] Importantly, before implementing screening based on the present results, it should be ascertained that the increase in procedures performed does not hamper quality of the procedures. Due to the substantial increase over the recent years without a considerable increase in manpower, the upper limit of capacity might have been reached already, and a further increase without sufficient investment might result in low quality colonoscopies.”

_Minor Essential Revisions_

11. A number of spelling and grammatical errors are evident throughout and should be fixed.

The manuscript is carefully controlled for spelling and grammatical errors and changed accordingly.

12. There are discrepancies between the numbers reported in Table 5 and the discussion on Page 11: “Geographical distribution of the number of colonoscopies per 100,000 individuals ranged from 913 in Noord-Brabant to 1,620 in Limburg (mean in The Netherlands was 1,164)”

We thank the precise review of the reviewer; the 913 in the results section is a type error and is changed to 911.

Page 11:”Geographical distribution of the number of colonoscopies per 100,000 individuals ranged from 911 in Noord-Brabant to 1,620 in Limburg (mean in The Netherlands was 1,164).”

13. The authors report confidence intervals in Table 1 and some subsequent tables. Given that true population values are being reported, are these necessary? Is it because of the response rates?

The tables presented indeed report true population values. For table 1, confidence intervals are presented as in 1-4 of the respondents, the number of endoscopists (gastroenterologists, internists and surgeons) was not provided. Here, the confidence interval might give a more precise figure of true numbers. In table 2, again true population values are reported. We feel the confidence intervals do not add much to the data presented and are deleted.

_Reviewer 2_

_Major Compulsory Revisions_

1. In “Study design”, the authors should details about search words or search formula in literature review.
Detail of search words used are now stated in the methods section:

Page 7: “The terms used in the search were (gastrointestinal endoscopy AND supply), (gastrointestinal endoscopy AND capacity), (gastrointestinal endoscopy AND resource), (gastrointestinal endoscopy AND demand), (colonoscopy AND supply), (colonoscopy AND capacity), (colonoscopy AND resource), (colonoscopy AND demand).”

2. The authors need to be more careful about distinction between “capacity” and “production”. Around 22.4% of unit answered to be capable of coping with 30% increase in endoscopic procedures. In these units, present production level might be less than capacity level if present manpower and facilities are given. Increase in supply or production or service can be realized by more efficient use of present resources and enlargement of capacity by investing on resources. This distinction can be added in the 5th paragraph of Discussion.

The reviewer is certainly right. Capacity is not only a result of procedures performed, but also by availability and use of means. We have discussed this issue in more detail as cited above at point 10 of reviewer 1.

3. Distribution change of specialties in endoscopists is interesting. Gastroenterologists might be more trained for endoscopy and have more time to devote their time to gastroenterological cancer. The increase in the number of specialist can be associated with increase in endoscopic production without severe workload elevation. Please discuss this.

The change distribution in specialists performing endoscopy is indeed of interest. The number of procedures performed might indeed be depended on the type of doctor. This topic is now discussed in the discussion section, in a way without making generalizations.

Page 13: “Although the total number of endoscopists increased slightly, the number of gastroenterologists increased substantially whereas the number of internists and surgeons performing endoscopies in 2009 declined markedly. The increase in the total number of endoscopies performed might be related to this change as gastroenterologists might spend more full time equivalents on performing endoscopies, what could result in an increase in endoscopic production. However, full time equivalent volumes on endoscopic procedures per endoscopist’s specialty is unknown.”

4. This paper considers workloads for physician alone. The increase in number of colonoscopy is burdensome also for co-medical workers. Who is in charge of preparation of scopes and other facilities, pre-medications, cleansing of scope and assistance for patients? If these pre- and post-examination works are done by co-medicals, it is better to mention about workload of co-medicals (just in the Discussion). Actually, Goto et al. (2011) reported that three quarters of total operating time of gastroscopic procedures are pre- and post- examination works. Goto R. et al. (2011) Processing capacity of upper endoscopy for gastric cancer screening in Japan. Presentend in iHEA(international health economic association) world congress 2011.
The reviewer addresses a relevant point. This is taken into account and added to the discussion section:
Page 15: “Also, an increase in workload for medical co-workers can be expected as e.g. in upper gastrointestinal endoscopies, it was shown that around 75% of total time was spent on pre- and postendoscopic operations.[21]”

Discretionary Revisions
1. Is there changes in practice guideline for colonoscopy procedures? If there are changes in pre-medications, testing and washing and sterilization, this changes workload for colonoscopies.

Again, a relevant factor in capacity and workload. In this study, we did not aim to address all relevant factors influencing capacity, but the point of guidelines is introduced by an example in the discussion section:
Page 15: “In addition, the number of endoscopies is also influenced by procedure guidelines and quality issues. For example, in 2004 the guideline for cleansing and desinfection of flexible endoscopes was intensified.[19]”

2. Is there any changes across units in expectations of workload increase of endoscopy in 2012? For example, the proportion of gastroenterologists can be possible factors associated with potential workload increase.

For years there have been many vacancies for gastroenterologists in The Netherlands. Therefore, the workload is high already. This is addressed on page 15:
Page 15: “Therefore, current capacity level may actually be higher or lower than production level. Still, there might be no or little rest capacity as for years many vacancies for gastroenterologist exists in The Netherlands.[20]”