Colorectal Cancer Screening Committee Meeting
Program and Abstracts

October 18, 2019
Barcelona

Hotel Catalonia Plaza
Barcelona, Spain

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Overview of content

- Program main meeting
- Overview of supporters
- Agendas of the Expert Working Group meetings
- Faculty overview
- Abstracts (in sequence of program)
Program

WEO Colorectal Cancer (CRC) Screening Committee Meeting

Friday, October 18, 2019 – 8.00 am – 5.15 pm
Hotel Catalonia Barcelona Plaza
Plaza España 6-8, 08011 Barcelona

Themes:
- Colonoscopy: good, better, best?
- New light on CRC epidemiology
- The international perspective: what is happening...where?
- Issues to consider...

Goals of the meeting:
- To update the attendees on recent advances in CRC screening
- To seek advice on future initiatives
- To reach consensus on controversial areas

Expert Working Group meetings
Parallel sessions

8.00 am Right-Sided Lesions and Interval Cancers
Evelien Dekker (Netherlands), Matt Rutter (UK)

8.00 am WEO Coalition to Reduce Inequities in CRC Screening
Sarah Marshall (UK)

9.45 am Coffee break

10.15 am FIT for Screening
Ernst Kuipers (Netherlands), Sally Benton (UK)

10.15 am Surveillance after Colorectal Neoplasia
Rodrigo Jover (Spain)

10.15 am Image Enhanced Endoscopy and Endoscopic Therapy
Evelien Dekker (Netherlands), Cesare Hassan (Italy)

12.00 pm Lunch

1.00 pm Welcome
Linda Rabeneck (Canada) & Ernst Kuipers (Netherlands)

Session 1: Colonoscopy: good, better, best?
Chairs: Linda Rabeneck (Canada), Ernst Kuipers (Netherlands)

1.10 pm Training for optical recognition of early cancer
Krijn Haasnoot (Netherlands)

1.20 pm How to improve colonoscopy quality
Sergey Kashin (Russia)

1.30 pm Update on the CONFIRM study
Jason Dominitz (USA)

1.40 pm Discussion

Session 2: New light on CRC epidemiology
Chairs: Matt Rutter (UK), Jill Tinmouth (Canada)

1.55 pm Early onset colorectal cancer
Marc Bardou (France)

2.05 pm Effect of CRC screening on incidence
Gavin Clark (UK)

2.15 pm Mortality due to screen-detected and interval cancer
Montse Garcia (Spain)

2.25 pm Comparison of screen-detected and interval cancers in FIT screening
Isabel Portillo Villares (Spain)

2.35 pm Discussion
2.55 pm  Coffee break

Session 3: The international perspective: what is happening...where?
Chairs: Stephen Halloran (UK), Beatrice Lauby-Secretan (France)

3.25 pm  Cancer screening in five continents: the IARC initiative  Eric Lucas (France)
3.35 pm  Update on CRC screening in Germany  Ulrike Haug (Germany)
3.45 pm  CRC screening in Eastern Europe  Marcis Leja (Latvia)
3.55 pm  Impact of CRC screening on incidence and mortality in the Czech Republic  Stepan Suchanek (Czech Republic)

4.05 pm  Discussion

Session 4: Issues to consider...
Chairs: Chyke Doubeni (USA), Maria Pellisé (Spain)

4.25 pm  Targeting FIT screening participation and yield using urban density levels  Manon van der Vlugt (Netherlands)
4.35 pm  Increase in faecal occult bleeding with time  Robert Steele (UK)
4.45 pm  CRC screening: are we doing the right things?  Michael Bretthauer (Norway)
4.55 pm  Discussion

5.10 pm  Wrap-up and Adjourn  Linda Rabeneck (Canada) & Ernst Kuipers (Netherlands)
We thank the following partners for their support:
Friday, October 18, 2019  
**Time:** 8.00 – 9.45 am  
**Venue:** Hotel Catalonia Barcelona Plaza  
**Meeting room:** Barcelona A

**Chairs:** Evelien Dekker (The Netherlands), Matt Rutter (UK)

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<th>Time</th>
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<tr>
<td>8.00 am</td>
<td>Welcome</td>
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| 8.05 am| “Modifiable Failures in the Colorectal Cancer Screening Process and Their Association With Risk of Death” paper  
Chyke Doubeni (USA) |
| 8.25 am| Questions                                                                   |
| 8.30 am| How can application of the WEO consensus on PCCRC aetiology help reduce rates  
Nick Burr (UK) |
| 8.50 am| Questions                                                                   |
| 8.55 am| PCCRC rate in the Dutch CRC program, work in progress  
Manon Spaander (The Netherlands) |
| 9.15 am| Questions                                                                   |
| 9.20 am| General discussion on barriers in implementing a PCCRC aetiology programme |
| 9.45 am| Adjourn                                                                     |
Friday, October 18, 2019  
**Time:** 8.00 – 9.45 am  
**Venue:** Hotel Catalonia Barcelona Plaza  
**Meeting room:** Barcelona B

**Chair:** Sarah Marshall (UK) on behalf of Christian von Wagner (UK) and Peter Liang (US)  
**Co-chairs:** Robert Kerrison (UK), Andrew Prentice (UK)

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**8.00 am**  
Introduction

**8.05 am**  
My best 10 seconds campaign  
Jolanta Gore Booth (Belgium)

**8.30 am**  
Improving uptake of bowel cancer screening in the South Asian community  
Lesley Smith (UK)

**8.55 am**  
Ethnic differences in bowel cancer screening awareness: findings from a pharmacy-based community survey  
Andrew Prentice (UK) & Sarah Marshall (UK)

**9.20 am**  
Exploring non-attendance at colonoscopy among socioeconomically deprived and ethnically diverse populations taking part in FIT-based screening  
Robert Kerrison (UK)

**9.45 am**  
Adjourn
## WEO Colorectal Cancer Screening Committee

**FIT for Screening**

**Expert Working Group meeting agenda**

**Friday, October 18, 2019**

**Time:** 10.15 am – 12.00 pm

**Venue:** Hotel Catalonia Barcelona Plaza

**Meeting room:** Barcelona A

**Chairs:** Ernst Kuipers (The Netherlands), Sally Benton (UK)

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<td>Welcome &amp; Introduction from the Chair</td>
<td>Ernst Kuipers (The Netherlands)</td>
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<tr>
<td>10.20 am</td>
<td>How to best classify the risk of advanced neoplasia based on previous negative FIT results?</td>
<td>Andrea Buron Pust (Spain), Carlo Senore (Italy)</td>
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<td>10.33 am</td>
<td>Discussion</td>
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<tr>
<td>10.38 am</td>
<td>Colorectal cancer screening and choice of the positive cut–off level. Are French decision-making criteria optimal in regards to a person’s equal access to colonoscopy in regards to advanced neoplasia risk?</td>
<td>Aldis Kaufmanis (France)</td>
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<td>10.51 am</td>
<td>Discussion</td>
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<tr>
<td>10.56 am</td>
<td>CRC screening in the European region countries outside the EU: preliminary results of the survey</td>
<td>Marcis Leja (Latvia), Sergey Kashin (Russia)</td>
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<tr>
<td>11.09 am</td>
<td>Discussion</td>
<td></td>
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<tr>
<td>11.14 am</td>
<td>Optimal FIT Screening for Men and Women in Case of Limited Colonoscopy Capacity: A Cost-Effectiveness Analysis</td>
<td>Iris Lansdorp-Vogelaar (The Netherlands)</td>
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<tr>
<td>11.27 am</td>
<td>Discussion</td>
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<td>11.32 am</td>
<td>IFCC Update</td>
<td>Sally Benton (UK)</td>
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<td>11.45 am</td>
<td>Discussion</td>
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<tr>
<td>11.50 am</td>
<td>Closing remarks</td>
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<tr>
<td>12.00 pm</td>
<td>Adjourn</td>
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WEO Colorectal Cancer Screening Committee
Surveillance after Colorectal Neoplasia
Expert Working Group meeting agenda

Friday, October 18, 2019
Time: 10.15 am – 12.00 pm
Venue: Hotel Catalonia Barcelona Plaza
Meeting room: Barcelona B

Chair: Rodrigo Jover (Spain)

10.15 am  Introduction and summary of previous meetings
Rodrigo Jover (Spain)

10.20 am  WEO recommendations. Redefining surveillance after removal of colorectal polyps
Michael Bretthauer (Norway)

10.45 am  New British guidelines on surveillance after polyp excision
Matt Rutter (UK)

11.10 am  New Spanish guidelines on surveillance after polyp excision
Carolina Mangas-Sanjuan (Spain)

11.35 am  New ESGE guidelines: do we need so many guidelines?
Cesare Hassan (Italy)

12.00 pm  Adjourn
Friday, October 18, 2019
Time: 10.15 am – 12.00 pm
Venue: Hotel Catalonia Barcelona Plaza
Meeting room: Barcelona C

Chairs: Evelien Dekker (The Netherlands), Cesare Hassan (Italy) on behalf of Heiko Pohl (USA)

10.15 am  Implementation of AI in real-life colonoscopy
           Alessandro Repici (Italy)

10.35 am  What we need from AI in clinical practice
           Tom Eelbode (Belgium)

10.55 am  How to integrate AI with endoscopic characterization?
           • Upper GI: Raf Bisschops (Belgium), 15 min
           • Lower GI-adenoma vs HP: Yuichi Mori (Japan), 15 min
           • Lower GI-superficial vs advanced: Leon Moons (Netherlands), 15 min

11.40 am  Discussion

12.00 pm  Adjourn
Faculty Overview

Dr Marc Bardou  
CIC - Centre d'investigation clinique de Dijon  
CHU Dijon-Bourgogne  
Dijon, France

Professor Michael Bretthauer  
University of Oslo  
Blindern, Oslo, Norway

Mr Gavin Clark  
NHS National Services Scotland  
Edinburgh, UK

Dr Jason A. Dominitz, MD, MHS  
VA Puget Sound Health Care System  
University of Washington School of Medicine  
Seattle, Washington, USA

Montse Garcia  
Catalan Institute of Oncology  
Spain

Dr Krijn Haasnoot  
PhD-candidate  
University Medical Center Utrecht  
Utrecht, The Netherlands

Professor Ulrike Haug  
Leibniz Institute for Prevention Research and Epidemiology - BIPS  
Bremen, Germany

Dr Sergey Kashin  
Yaroslavl Regional Cancer Hospital  
Yaroslavl City, Russia

Professor Marcis Leja  
Institute of Clinical and Preventive Medicine  
University of Latvia & Digestive Diseases Centre GASTRO  
Riga, Latvia

Mr Eric Lucas  
International Agency for Research on Cancer - IARC  
Lyon, France

Dr Isabel Portillo  
Osakidetza-the Basque Health Service  
Bilbao, Spain

Professor Robert J. C. Steele  
Ninewells Hospital & Medical School  
Dundee, UK

Dr Stepan Suchanek  
Department of Internal Medicine  
1st Faculty of Medicine  
Charles University  
Military University Hospital  
Prague, Czech Republic

Dr Manon van der Vlugt  
Academic Medical Center  
Amsterdam, The Netherlands
OPTICAL II: an e-learning to improve optical diagnosis of T1 colorectal carcinoma in large non-pedunculated polyps

K.J.C. Haasnoot, L. Meulen, Y. Backes, F. Wolfhagen, J. Geesing, M. Schwartz, W. de Vos tot Nederveen Cappel, J. Bergeijk, F. ter Borg, J. Groen, P. Didden, M. Laclé, S. Elias, F. Vleggaar, R. Bogie, A. Masclee, L. Moons, on behalf of the OPTICAL II-STAR LNPCP study group and Dutch T1 CRC working group

Background & Objectives:
Many endoscopists lack sufficient skills in optical diagnosis to discriminate T1 CRCs, with sensitivities for optical diagnosis of T1 CRCs reported as low as 30-44%. Consequently, endoscopic resection of a superficial invasive CRC perceived as non-invasive is often oncological inadequate and prompts salvage surgery. Recently, a validated and structured prediction model (OPTICAL I) was developed, with a sensitivity of 78% for T1 CRCs and a specificity of 94% for non-invasive neoplasia. This study aimed to improve discrimination between non-invasive (benign) neoplasia and T1 CRC with optical diagnosis by training community endoscopists in using the OPTICAL model by an online e-learning.

Methods:
In this prospective study, endoscopists of 39 Dutch hospitals were trained in the OPTICAL prediction model. The OPTICAL model provides a weighed estimate of the risk of a T1 CRC based on the presence or absence of polyp characteristics such as location in the colorectum, surface morphology (granularity), malignant features (depression, spontaneous bleeding) and advanced imaging (NBI using the Hiroshima classification). The training consisted of a 1.5 hour e-learning with 6 chapters on the individual parameters of the OPTICAL model combined with a specific training in application. Prediction accuracy was tested before and after an online e-learning with a pre- and post-test consisting of 40 handpicked, real life cases. The pre-test showed photos and videos of non-pedunculated polyps (white light and narrow-band imaging). With histology as the golden standard, polyps were categorized as being benign (low-grade dysplasia [LGD]; n=19), potentially superficial invasive (high-grade dysplasia [HGD]; n=11 or superficial T1 CRC; n=3), or deep invasive (n=7). Each participant was asked to fill the polyp characteristics and give their optical diagnosis. The post-test was completed 4-6 weeks after the training. Mean absolute differences between pre- and post-test were calculated with paired t-tests.

Results: Of 219 participants that started the e-learning, 147 completed both pre- and post-test. The median pre- and post-test scores for optical diagnosis (LGD, HGD, superficial T1 CRC or deep invasive T1 CRC) were 27.5% and 50.0% respectively, with a mean absolute difference of 20.4% (95%-CI 18.8-21.9, p<0.001). For differentiating between benign or malignant polyps the median pre- and post-test scores were 52.5% and 75.0%, with a mean difference of 22.1% (95%CI 20.6-23.6 (p<0.001). For differentiating between LGD vs. HGD or superficial T1 CRC vs. deep invasive carcinoma, the pre- and post-test scores were 37.5% and 60.0%, with a mean difference of 20.6% (95%CI 19.0-22.1 (p<0.001). Furthermore, a positive difference between pre- and post-test was also seen for each individual parameter in the OPTICAL model.

Conclusion: An e-learning for training in optical diagnosis of non-pedunculated polyps improved the participants’ accuracy discriminating between benign, potentially superficial invasive and deep invasive polyps as assessed by a pre- and post-test set of 40 real-life cases.
Several colonoscopy performance measures (inspection time, adenoma detection rate and
time interval cancers, among others) have been identified over the last decade. Because of the
variation in physicians' performance and the introduction of nationwide colorectal cancer
(CRC) screening programs, colonoscopy was the first area of endoscopy to address
quality. In Russia, CRC is the second most common cancer and the number of new cases
has risen during last 10 years up to 29 %. Only 10 % of CRC are detected at an early
stage. In 2014 we conducted the QuaCol study - the first prospective evaluation of quality
indicators of colonoscopy in Russia. 8829 (males: 35%; mean age: 57 + 14 years) patients
were included (with 11 centres enrolling at least 100 patients). Main quality indicators (i.e.
caecal intubation rate, (advanced) adenoma detection rate, rate of adequate cleansing
and sedation) were collected. According to our study, quality of colonoscopy in Russia is
still suboptimal, both in terms of adenoma detection- and caecal intubation-rates.
In order to increase the suboptimal levels of key quality indicators the QuaCol educational
project was created with european leading experts Alessandro Repici and Cesare Hassan.
The main aims: to implement international guidelines and quality indicators in colonoscopy
into practice, to improve the quality of colonoscopy and finally to start CRC screening
regional programs in Russia. With the strong support of Russian Endoscopy Society and
Russian Coloproctology Accosiation special lectures, interactive discussions, intensive
hands-on-training, colonoscopy championships and testing were organized in 50 Russian
cities for more than 1400 doctors in 2015 – 2019. After the courses all the main quality
indicators were assessed in 82 endoscopy centers, 189 physicians were involved in the
second study. The data were collected from 22380 patients (table 1.)

Table 1. Main quality indicators of colonoscopy in Russian hospitals before and after implementation of
national educational program QuaCol (Quality of Colonoscopy) for endoscopists.

<table>
<thead>
<tr>
<th>Main quality indicators</th>
<th>QuaCol I - n=8829, 14 centers</th>
<th>QuaCol II 2019 N= 22380, 82 centers</th>
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<tbody>
<tr>
<td>ADR</td>
<td>18%</td>
<td>25,8%</td>
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<tr>
<td>Bowel cleansing</td>
<td>77%</td>
<td>89%</td>
</tr>
<tr>
<td>Ceacal intubation rate</td>
<td>86%</td>
<td>96.2%</td>
</tr>
<tr>
<td>Patients with Colonoscopy withdrawal time measurement</td>
<td>64 %</td>
<td>74,5%</td>
</tr>
<tr>
<td>Bowel cleansing with split regimen</td>
<td>25%</td>
<td>70%</td>
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Thus, implementation of educational campaigns, such as QuaCol, obviously influences the
quality of colonoscopy in emerging country.
The Colonoscopy vs. Fecal Immunochemical Test (FIT) in Reducing Mortality from Colorectal Cancer (CONFIRM) Study, a randomized study comparing annual FIT vs. colonoscopy in average risk adults aged 50-75, recently completed enrollment of 50,126 US military Veterans and is now following participants for cancer outcomes.

**Aims & Methods:** To determine 1) findings on baseline colonoscopy, 2) factors associated with baseline neoplasia and 3) 30-day complication rate. Univariable logistic regression was used to determine the association between baseline variables and findings of adenomas, advanced adenomas (AA), and sessile serrated lesions (SSLs). Variables found to be significant at $p \leq 0.1$ were included in a multivariable logistic regression model, stratified by site. Participants found to have colorectal cancer were excluded from this analysis as this study is ongoing. All serious adverse events (SAEs) were recorded, as were non-serious adverse events (AEs) deemed to be at least possibly related to colonoscopy.

**Results:** CONFIRM enrolled 50,126 average risk adults, with a mean age of 59.1 years, 93% male, 72% white, 25% black and 3% native American. 15,806/17,340 colonoscopies were complete with cecal intubation (97.3%) and adequate preparation (92.4%). Polyps were found in 66.0%. Among those without polyps, mean withdrawal time was 11.1 minutes. Adenomas were found in 45.7%, AA in 9.4% (not including CRC) and SSL in 3.7%. Factors associated with adenoma and AA are shown in the table. Factors associated with AA included age, male sex, smoking and alcohol use. Black race, college degree, NSAIDs and prior colonoscopy were inversely associated with AA. Independent predictors of SSL’s included BMI and smoking; while Blacks had 62% reduced odds of SSL’s. There were 235 SAEs reported (1.3%), with 52 related (0.36%) and 38 possibly related (0.25%) to colonoscopy, including 31 serious bleeding events (0.18%), 31 cardiovascular events (0.18%) and 5 perforations (0.03%). 585 AEs were reported (2.9%), most (84%) were mild, 15% were moderate and 0.1% were severe.

CONFIRM Biorepository substudy enrolled 10,703 participants (blood, FIT, tissue).

**Conclusion:** The CONFIRM ADR is much higher than published benchmarks. Our study also confirms the importance of several demographic and environmental risk factors for adenomas, AA and SSL. AEs and SAEs related to colonoscopy occur in approximately 3% and 0.5% of colonoscopies, respectively. CONFIRM is following participants through 2027 for cancer outcomes and will provide interesting new data on the comparative effectiveness of FIT and colonoscopy.

For details on the design of CONFIRM, see: Dominitz and Robertson et al. Am J Gastroenterol 2017;112:1736-46.
The overall crude incidence of colorectal cancer (CRC) increased in most European countries over the last decade. The annual increase ranged in different countries between 0.4% and 3.6%. The recent introduction of CRC screening in most European countries will likely reverse this trend. These screening programmes typically target subjects aged 50 years and above. However, accumulating evidence from studies of cancer registry data indicates that favourable overall trends are masking an increase in young-onset CRC in several developed countries in North America, Europe, and Asia. Although the absolute risk of CRC in adults younger than 50 years is low relative to older adults, disease trends in young age groups are a key indicator of recent changes in risk factor exposures and often foreshadow the future cancer burden. The possible reasons for this increasing incidence are unknown, but may be related to the increasing prevalence of obesity, lack of exercise and to dietary factors such as alcohol and processed meat. Furthermore, urbanisation and pollution have been implicated in the overall increase in cancer incidence. CRC in young adults is in part due to hereditary cancer syndromes, but most cases are sporadic. The changing epidemiology of CRC may also have practical implications, in particular for age to start screening.

In this presentation we will discuss 1) the earliest available evidences for an increased incidence for early onset colorectal cancer, 2) the pathogenesis and risk factors, and 3) the potential implication for colorectal cancer screening.
Effect of CRC Screening on Incidence
Gavin Clark

**Background:** Many recent studies have reported stabilising or decreasing CRC incidence in high-income countries, with decreases seen particularly in those aged 50 and over. A hypothesised mechanism for the reduction seen in this age-range is the endoscopic removal of adenomatous polyps, particularly as this group tends to be targeted by CRC screening programmes. Trials of flexible sigmoidoscopy and the Minnesota trials of gFOBT have shown reductions in incidence, although the Nottingham trial of screening in the UK did not find such a reduction. CRC screening was piloted in Scotland from 2000-2006 and introduced nationwide from 2007 using gFOBT. Scotland has also seen a reduction in CRC incidence over the last 10 years. The aim of this study was to investigate the association between screening participation and CRC incidence over time, in a national screening programme.

**Methods:** Men and women aged 50-69 were invited to participate in the pilot rounds of CRC screening in Scotland from 2000-2006 using gFOBT. From 2007 onwards, the age range was extended to 50-74 and the programme was rolled out across Scotland, with nationwide screening achieved by the end of 2009. In addition, those aged 75+ are able to request a test kit should they choose from 2013. Data on returned kits are collected centrally. Populations at risk were created from these data and divided into participant (at least one return of a correctly completed kit) and non-participant (never returned a correctly completed kit) groups. These populations were followed over time from the date of first completed kit (in the case of participants) or first invite (non-participants). Linkage with the National Records of Scotland Deaths registry allowed removal from analysis at the point of death. The populations were then linked to the Scottish Cancer Registry to identify cases of colorectal cancer and the date of diagnosis. Data were analysed over time using age-sex standardised incidence rates.

**Results:** From 2000 to 2017, there were a total of 2.4m invitees (1.5m participant, 0.9m non-participant) with 24,817 cases of colorectal cancer diagnosed through both screening and non-screening pathways. Comparison of incidence using a standardised rate ratio (SRR) showed a decrease in CRC incidence for participants relative to non-participants from 2010 (SRR: 1.03, 95% CI: 1.15 to 0.92) to 2017 (SRR: 0.86, 95% CI: 0.93 to 0.79).

**Conclusions:** Scottish CRC incidence data show a downward trend, consistent with other high-income countries. This study demonstrates a negative association between CRC screening participation using a gFOBT kit and CRC incidence in a population-wide setting. This implies that, as well as detecting CRC in its earlier stages, gFOBT and by inference FIT screening may be having a preventive role due to the detection and removal of adenomatous polyps.
Mortality due to screen-detected and interval cancer

Montse Garcia, Rebeca Sanz-Pamplona, Núria Milà, Carmen Vidal, Elvira Torné, Gemma Ibáñez-Sanz, Noémie Travier, Gemma Binefa, Víctor Moreno

**Objective:** The aim was to analyze the mortality in participants of a population-based fecal occult blood test screening diagnosed with colorectal cancer (CRC) comparing screen-detected and interval cancers.

**Methods:** The study population consisted of participants of a Catalan CRC screening program from February 2000 to December 2015, with a minimum of 30-month follow-up. Within the study period two screening tests were offered (guaiac and immunochemical). We used hospital administration data to identify CRC. A screen-detected case was defined as an invasive CRC diagnosed at colonoscopy triggered by a final positive screening test result. On the other hand, an interval cancer was defined as an invasive CRC diagnosed following a negative screening test and prior to the next scheduled screening examination. The next scheduled screening examination was defined to be 30 months after the previous screen. Screening interval was 24 months; however, it should be considered adequate up to 30 months (acceptable delay because of organizational and management issues).

Electronic medical records of the individuals identified as being diagnosed for CRC were revised to gather tumor characteristics. CRC were staged according to the tumor-nodal-metastasis (TNM) staging system and classified as early (TNM I/II) or late (TNM III/IV) stage. Tumor site was grouped in three categories: proximal defined as the region of the colon up to and including the splenic flexure, distal including the descending and sigmoid colon, and rectum.

Data from the National Statistics Institute was used to identify vital status as of April, 2019. Gender, age, screening type (initial vs successive), stage, and site distribution of interval cancers were compared with those in the screen-detected group. Cox proportional hazards regression for multivariate analysis was used. Survival length was calculated from date of diagnosis to death, or censored at five years.

**Results:** Overall, 269 screen-detected were compared against 127 interval cancers. The interval cancer rate was lower when the immunochemical test was used. (20.0%). Mortality within five years after CRC diagnosis was 8.6% for screen-detected and 16.5% for interval cancers. Cox proportional hazards regression showed that diagnostic group (screen-detected cases) and cancer staging (early stages) were found to have a significant impact on the survival of patients (p<0.05). No differences were found according sex, age and tumor location.

**Conclusions:** It would be necessary to clarify whether differences in survival rates could be due to a false-negative screening tests result, or aggressive, fast-growing tumors that have developed between screening rounds.

**Funding:** This study was partially cofunded by the Carlos III Health Institute, the European Regional Development Fund – a way to build Europe- (PI12/00992, PI16/00588).
Comparison of screen-detected and interval cancers in FIT screening

Isabel Portillo. The Basque Health Service & Biocruces Bizkaia Health Research Institute. Bilbao, Spain

**Background:** The Colorectal Cancer (CRC) Screening in the Basque Country started in 2009 targeted at women and men between 50 to 69y (586,700 residents), with biennial FIT (threshold 20µg Hb/g faeces) and colonoscopy under sedation in positive cases. Overall coverage was reached in 2013 and at the end of 2018, 96% of the population target had been invited for a third round.

**Aim:** To compare the features of the detected and undetected CRC by the programme 2009-2018.

**Methods:** All invitees from 2009-2018 were included in the study and follow-up by the Screening Coordination Centre according to the European Guidelines. Linking all cases with Population Cancer Registry. Variables included: age at invitation, sex, type of participant (initial, regular, and irregular), TNM stage, and location (C-18.0-C-20.0), FIT threshold. CRC was categorized in: detected by the programme after positive FIT (SD-FIT), Interval Cancer after negative FIT (IC-FIT), detected by surveillance protocol after FIT positive and colonoscopy (SD-S) and Interval Cancer post-colonoscopy (IC-Col). IC Incidence, Sensitivity and LR ratios were performed throughout all the period for FIT test. SPSS 23.0 v

**Results:** 1,901,970 invitees were included in the study. 74,360 cases were positive and 1,258,127 negative for FIT. In 93% of the cases the colonoscopy was performed with a definitive diagnosis. The total cases of CRC found were: 3,395 SD-FIT, 444 IC-FIT, 87 SD-S and 50 IC-Col. The comparison between the cases detected and undetected by the programme showed significant differences between sexes. 8.7% IC-FIT are diagnosed over 70y, more often in women. Initial and regular participants are more often in SD-FIT. Right location and more advanced stages are more often in all cases in IC-FIT, but women presents higher frequency than men. SD-S and IC-Col are located in right colon in 46.3% vs 46.0%. The cumulative incidence for IC-FIT was 3.52 (IC95% 3.21-3.87) x 10,000 negative cases. Sensitivity for FIT was lower in women than men (87.7; CI 95% 85.8-89.4 vs 88.9%; CI95% 87.6-90.1) but not significant. Cumulative incidence and positive LR for IC-FIT is significantly higher in men than women.

**Conclusions:** The comparison between CRC detected and undetected by the Programme show a high degree of sensitivity and low incidence in Interval Cancer due to FIT. However, right colon location and differences by sexes must be taken into account in further studies, in order to improve detection rates in CRC.
Background
Newly launched CanScreen5 project of IARC aims to collect information on the characteristics and performance of cancer screening programmes across the globe in a harmonized manner and disseminate the information for improved programme management and informed policy-making. Training of program managers to collect good quality data, use the same to estimate performance indicators and take corrective actions based on the estimates is a key objective of CanScreen5.

Methods
The CanScreen5 (http://canscreen5.iarc.fr) is a freely accessible web-based platform designed to collect, analyze and disseminate information on cancer screening programmes and activities in different countries with the core objective of motivating and supporting countries to collect and utilize cancer screening data in a consistent manner on a regular basis through an effective information system. The platform provides the requisite data collection tools, the standardized methodology for estimating the performance indicators and the facility to compare the indicators with national and international standards. A virtual learning platform will be integrated to the CanScreen5 website.

Results
The synthesized data from 28 European Union Member States (collected by IARC to prepare the second report on Cancer screening in the European Union- 2017) is uploaded. The screening data is presented for a given cancer type (cancer fact sheet), for a selected country (country fact sheet) or through analysis tools (interactive graphs and maps). We will invite data providers from other countries to collaborate and share data for their respected screening programmes. We will build networks with other organizations working towards the common goal of improving cancer screening quality.
In Germany, the guaiac test for fecal occult blood – offered since 1977 – has been the main tool for colorectal cancer (CRC) screening until 2002, but a high proportion of the population also underwent diagnostic colonoscopies. During the past 17 years, there have been several changes to CRC screening in Germany.

First, screening colonoscopy has been introduced in late 2002 along with several measures to improve quality of colonoscopy. Adherence to screening colonoscopy has been low (about 18% of the target population, i.e. among persons aged 55 or older) and differed between men, women and age groups (highest uptake in women aged 65-69 years).

In 2016, the guaiac test was replaced by the fecal immunochemical test (FIT) and it has been decided that only quantitative FITs are reimbursable. The test kits are not sent by mail, but are distributed by physicians and need to be returned to physicians. The first data on FIT screening in Germany suggest that 9.8% of the 2.9 million FITs distributed in 2018 were positive. There was a substantial variation in positivity rates between the different FIT brands, ranging between 5% to almost 20%.

Furthermore, there have been changes to the type of screening. While CRC screening in Germany used to be opportunistic, personal invitations are sent out from July 2019 onwards. Men and women will receive four invitation letters (at ages 50, 55, 60 and 65) with general information on CRC screening. Finally, the starting age for screening colonoscopy has been decreased to 50 years for men in 2019, while it is still at 55 years for women.

It remains to be seen which effects these changes will have and whether the trend towards declining CRC incidence that has been observed in Germany (about 14% decline between 2003 and 2012 in men and women) will continue in the coming years.

Room for improvement includes amongst others a better monitoring of the uptake of surveillance colonoscopy. Recent claims data analyses suggest a substantial underuse of repeat colonoscopy among persons with prior polypectomies (one third without another colonoscopy within 10 years) as well as an overuse among persons with negative colonoscopy at baseline. Also the large variation in FIT positivity rates requires urgent attention.
A web-based survey was conducted to gather information about CRC screening activity in European countries that are outside of the EU. For comparison purpose, the three Baltic States, Estonia, Latvia and Lithuania, were included in the survey.

The survey consisted of two parts, part one addressed existing screening programmes, and part two, pilot programmes and pilot studies. The survey requested a response to 52 questions.

Where possible, this survey was completed by identified experts in the target country field and the answers reflected the screening situation on January 1, 2019.

This interim analysis includes responses for 20 of the 23 targeted countries. 45% of the responders were from gastroenterologists.

10 (50%) respondents considered their countries to have established nationwide CRC screening programmes, 4 (20%) claimed at least one established regional screening programme and 6 (30%) were described as not having a CRC screening programme. 3 countries (15%) were considered to be conducting pilot studies. From the details provide in the survey, the authors conclude that of the ‘established programmes’, few complied with the international recognised principles of organized population-based screening.

Personalized invitation letters were claimed to used by 9 screening programmes, however none were mailed directly to their target population. Two programmes delivered their tests by mail.

Among countries with CRC screening programmes, 6 used quantitative FIT tests and 5 used gFOBT. Quantitative FIT tests were used in all pilot studies.

Conclusions. Although a high proportion of countries in the region claim to have active nationally organised population-based screening programmes, most do not meet the appropriate international criteria.
Impact of CRC screening on incidence and mortality in the Czech Republic

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Background: The organized non-population based National Colorectal Cancer (CRC) Screening Program in the Czech Republic was running since year 2000. In January 2014, the transition to population-based setting has been implemented. Currently, the annual immunochemical fecal occult blood test (FIT) is offered at the age 50 – 54, followed by FIT+ colonoscopy, if positive. In age of 55, there is a choice of either FIT biennially or screening colonoscopy in 10 years interval. Besides these preventive colonoscopies, adenomas and colorectal cancers might be detected by diagnostic colonoscopy and diagnostic FIT (performed in laboratory). The upper age limit at 69 years is being considered.

Aim: Analyses of the screening target population (aged 50 – 69 years) coverage in the Czech Republic by available tests: screening and diagnostic FIT, screening colonoscopy or diagnostic colonoscopy.

Methods: The analysis was done by using the newly available database (National Registry of Reimbursed Health Services), which contains individual data on reimbursed healthcare in the Czech Republic. Overall coverage was assessed over a three-year period (2015-2017).

Results: In years 2006 – 2016 the CRC incidence has been reduced by 18.4 % and mortality by 32.4 %. The screening target population at age 50-69 years consists of 2,701,006 individuals. The methods distribution was as follows: screening colonoscopies in 27,400 people (1.0 %), colonoscopies indicated by screening FIT in 1,157,920 individuals (42.9 %) persons, diagnostic colonoscopies in 163,396 persons (6.0 %) and diagnostic FIT in 61,077 people (2.3 %). Altogether, the total coverage reached 52.2 %.

Conclusion: The newly introduced database was built using the most comprehensive and validated data from reimbursed healthcare. The overall target population coverage of CRC screening and diagnostic tests has reached the recommended level according to the European guidelines (45-60 %). The high number of preventive and diagnostic colonoscopies might be the reason for the observed CRC incidence and mortality reduction in the Czech Republic.

Acknowledgments: supported by projects MO1012, Progress Q28/LF1 and Czech Health Research Council grants 16-29614A, 17-31909A and NV18-08-00246.
Targeting FIT screening participation and yield using urban density levels

C.M. de Klerk, M. van der Vlugt, E. Toes-Zoutendijk, I. Lansdorp-Vogelaar, E. Dekker, P.M. Bossuyt.

Introduction
Inequalities in participation and yield in colorectal cancer (CRC) screening with fecal immunochemical testing (FIT) related to socioeconomic status (SES) are well-known. Regional differences could also exist, providing additional starting points for targeting participation barriers.

Aim
To analyse differences in participation and yield in FIT-based CRC screening related to screening region and urban density level.

Methods
Data from all 1,873,639 invitees to the Dutch CRC screening programme in 2014-2015 were included. Primary outcomes were participation with FIT and advanced neoplasia (AN) detected in participants. Differences were investigated between five regional screening organisations and five levels of urban density, varying from most urban to most rural.

Results
Between the 5 screening organisations in the Netherlands, participation with FIT ranged from 70.1% (South-West) to 75.4% (South, p<0.0001). Detection of AN varied from 2.0% (South-East) to 2.4% (East) (p<0.0001). PPV of AN was between 56.6% (South) and 59.3% (East). In the most urban areas FIT participation was 62.8%, versus 77.3% in the most rural areas (RR 1.23; 95%CI 1.22 to 1.24). AN yield was lower in the most urban areas (1.8%) compared to the most rural areas (2.3%). PPV showed a similar trend: 55.2% in the most urban areas compared to 58.6% in the most rural areas (RR 1.061; 95% CI 1.037 to 1.085).

Conclusions
In the Dutch national CRC screening program, participation is lower and fewer cases of AN are detected in areas with a high urban density. These results could be used to develop tailored regional strategies to target barriers in CRC screening.
Changes in Faecal Occult Bleeding with Time

Robert J C Steele

Background:
In Scotland, a guaiac Faecal Occult Blood Test (gFOBT) - based Screening Programme was rolled out across the country in July 2007 and was replaced by a programme based on Quantitative FIT (threshold 80 µg haemoglobin / g faeces) in November 2017. A Quantitative FIT Pilot had been conducted between July and December 2010 in two health boards involving 60,000 invitations. The positivity in the pilot (which was conducted at the same threshold as the programme) was 2.4% but in the first year of the programme across the whole of Scotland the positivity was 3.1%.

Method:
Because one of the potential explanations for this difference was a change in background faecal occult bleeding with time it was decided to examine the positivity of the initial gFOBT in 50 year olds between 2007 and 2017. This age range was chosen because using all the results in the programme would have resulted in a mix of prevalence and incidence screening at different ages which would have made interpretation impossible.

Results:
It was found that the positivity in the study group had risen from 4% to 10% between 2007 and 2017. It was also found that the positive predictive value for cancer had dropped in this time interval whereas the positive predictive value for adenoma had increased slightly.

Conclusions:
Changes in background faecal occult bleeding may impact on colorectal screening programmes. Possible explanations for these findings will be discussed.
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