International Asian Cancer and Chronic Disease Screening Network

# THE 14TH IACCS

## 15-16 DEC, 2023

### Precision Cancer Screening with AI Perspectives

**TOKYO, JAPAN**
Hotel Villa Fontaine Grand Tokyo-Ariake

# 16 *IACCS, Colorectal Cancer*

Room 5 & 6

# 16

## IACCS, Colorectal Cancer

### 08:30-17:10

I

**Room 5 & 6**

*Bellesalle Ariake Conference Center*
*4F, Hotel Villa Fontaine Grand Tokyo Ariake*

| Time | Topic | Speaker | Moderator |
|---|---|---|---|
| 08:30-08:50 | Registration | | |
| 08:50-09:00 | Opening Remarks<br>*Prof. Takahisa Matsuda / Prof. Han-Mo Chiu / Prof. Tony Hsiu-Hsi Chen* | | |
| | **Keynote Speech** | | |
| 09:00-9:30 | Smart Cancer Screening | *Prof. Linda Rabeneck* | *Prof. Robert Smith* |
| 09:30-10:00 | Colorectal Cancer Prevention with Smart Health Approach | *Prof. Han-Mo Chiu* | *Prof. Graeme Young* |
| 10:00-10:20 | **Coffee Break** | | *Room 4* |
| | **Colorectal Cancer Session (I) (Co-Organized with Olympus)**<br>Digital Science in Colorectal Cancer Screening | | |
| 10:20-10:40 | Challenges of Digitization in Colorectal Cancer Screening in Japan | *Dr. Nozomu Kobayashi* | |
| 10:40-11:00 | AI in Colorectal Cancer Screening: A Special Emphasis on its Application in ctDNA Biomarker and Colonoscopy | *Prof. Jeong-Sik Byeon* | *Prof. Linda Rabeneck* |
| 11:00-11:20 | AI-based Personalized Risk Assessment model for Colorectal Cancer Screening | *Prof. Amy Ming-Fang Yen* | *Prof. Takahisa Matsuda* |
| 11:20-11:40 | Big Data Analytics for Screening in Prolonging Life-expectancy Attributed to Colorectal Cancer | *Prof. Sam Li-Sheng Chen* | |

# 16 | IACCS, Colorectal Cancer

**08:30-17:10**

II

**Room 5 & 6**

*Bellesalle Ariake Conference Center*
*4F, Hotel Villa Fontaine Grand Tokyo Ariake*

| Time | Topic | Speaker | Moderator |
|---|---|---|---|
| | **Special Speech** | | |
| 11:40-12:00 | Micro-elimination of hepatitis C in populations of diabetes and chronic kidney disease | *Prof. Tsung-Hui Hu* | *Dr. Xi-Mo Wang* |
| | **Lunch** | | |
| 12:00-13:30 | **Poster Exhibition (I)**<br>*1. Digital Science in Colorectal Cancer Screening*<br>*2. Evaluation of Colorectal Cancer Screening*<br>*8. Other Related Topics* | | *Room 7* |
| | **Keynote Speech (Co-Organized with Fujifilm)** | | |
| 13:30-14:00 | Precision-oriented Screening Tools for Early Detection of Colorectal Cancer | *Prof. Graeme Young* | *Prof. Stephen Duffy* |
| 14:00-14:30 | AI-assisted Colorectal Cancer Screening: Operational Viewpoint | *Prof. Takahisa Matsuda* | *Prof. Robert Smith* |
| | **Colorectal Cancer Session (II) (Co-Organized with Olympus)**<br>Evaluation of Precision Colorectal Cancer Screening | | |
| 14:30-14:50 | Evaluation of Colorectal Cancer Screening from EBM to P4 Medicine | *Dr. Masau Sekiguchi* | *Prof. Stephen Duffy* |
| 14:50-15:10 | Evaluation of Precision Colorectal Cancer Screening with Digital Twin Approach | *Dr. Ting-Yu Lin* | *Prof. Ruth Etzioni* |
| 15:10-15:25 | **Coffee Break** | | *Room 4* |

# 16

III

# *IACCS, Colorectal Cancer*

## 08:30-17:10

Room 5 & 6

*Bellesalle Ariake Conference Center*
*4F, Hotel Villa Fontaine Grand Tokyo Ariake*

| Time | Topic | Speaker | Moderator |
|---|---|---|---|
| | **Colorectal Cancer Session (III)**<br>Screening and Surveillance of Colorectal Cancer in Asian Countries | | |
| 15:25-15:40 | Key Insights from the FIT Screening Trial | *Dr.*<br>*Satimai Aniwan* | *Prof.*<br>*Yi-Chia Lee* |
| 15:40-15:55 | Colorectal Cancer Screening in Tianjin: Past, Present and Future | *Dr.*<br>*Xi-Mo Wang* | *Prof.*<br>*Han-Mo Chiu* |
| 15:55-16:10 | Cancer Screening and Care in India | *Prof.*<br>*Ravi Mehrotra* | |
| 16:10-16:20 | Surveillance within National FIT screening program | *Dr.*<br>*Chen-Yang Hsu* | *Dr.*<br>*Kinichi Hotta* |
| 16:20-16:30 | Exploring Survival of T1 Colorectal Cancer | *Dr.*<br>*Wen-Feng Hsu* | |
| 16:30-16:50 | **Panel Discussion** | *All Participants* | *Prof.*<br>*Takahisa Matsuda*<br>*Prof.*<br>*Han-Mo Chiu*<br>*Prof.*<br>*Tony Hsiu-Hsi Chen* |
| 16:50-17:10 | **Poster Award &<br>Closing Remarks** | *Prof. Takahisa Matsuda*<br>*Prof. Han-Mo Chiu*<br>*Prof. Tony Hsiu-Hsi Chen*<br>*Prof. Yeol Kim (IACCS 2024 Chairman)* | |

# Opening Remarks

**Congress Chair, IACCS 2023**
**Prof. Takahisa Matsuda**
*Toho University*

**Congress Co-Chair, IACCS 2023**
**Prof. Han-Mo Chiu**
*National Taiwan University Hospital*

**IACCS President**
**Prof. Hsiu-Hsi Chen**
*National Taiwan University*

*IACCS, Colorectal Cancer*
International Asian Cancer and Chronic Disease Screening Network, IACCS 2023

Keynote Speech

Smart Cancer Screening

Prof. Linda Rabeneck
University of Toronto

Prof. Robert Smith
American Cancer Society

IACCS, Colorectal Cancer
International Asian Cancer and Chronic Disease Screening Network, IACCS 2023

**Robert Smith**
**American Cancer Society**

- Cancer epidemiologist and Senior VP, Cancer Screening, and Director, ACS Center for Cancer Screening at ACS, Atlanta, Georgia, U.S.
- Adjunct Professor of Epidemiology at Emory University and Honorary Professor at Queen Mary University of London.
- Research interests: cancer epidemiology, prevention programs, health service quality, and survivorship.
- PhD from State University of New York at Stony Brook (1983).
- Previous positions at Boston University School of Public Health and Centers for Disease Control.
- Leads ACS in developing cancer screening guidelines and policy projects.
- Author of 400+ peer-reviewed publications and frequent lecturer on cancer screening.
- Serves on national and international advisory committees.
- Founding member of American Cancer Society's National Colorectal Cancer Roundtable and National Lung Cancer Roundtable.
- Honored with awards, including Cancer Prevention Laurel and Medal of Honor from IARC.

**Linda Rabeneck**
**University of Toronto**

- Professor of Medicine and Professor, Dalla Lana School of Public Health, University of Toronto
- Senior Scientist at the Institute for Clinical Evaluative Sciences (ICES) in Toronto
- Known for research on the quality and effectiveness of colorectal cancer screening with approximately 290 peer-reviewed publications
- Key leadership in launching Ontario's Colon Cancer Check and organized screening programs for women at high risk for breast cancer, and for persons at high risk for lung cancer
- Ex-Chair of the Colorectal Cancer Screening Committee of the World Endoscopy Organization (WEO)
- Serve as President of the Canadian Academy of Health Sciences in 2017-2019

# Smart Cancer Screening

*Linda Rabeneck MD MPH FRCPC*
*Professor of Medicine, University of Toronto*

Colorectal cancer (CRC) is a global health issue, and Asia accounts for more than 40 percent of the burden of disease, worldwide. CRC screening programs have been launched in many regions in the past decade, and in most jurisdictions, these are population-based, organized programs, using the fecal immunochemical test (FIT) as the initial screening test, followed by colonoscopy in those who test positive. Organized CRC screening is a major public health intervention, requiring a substantial investment in infrastructure (IT system, kit distribution, mailing invitations, etc.) and a team of people to run the program. To date, the target population for these programs is defined by only by age (50-74 years in most jurisdictions), even though many clinical risk factors for CRC beyond age (such as sex, family history, smoking, diet, etc.) have been identified.

Efforts have been made to develop risk prediction models that could be used to refine the target population, to be more precise in terms of who is invited, and to tailor the initial screening test (e.g., FIT vs colonoscopy) depending on risk. Many of these models are based on clinical information (age, sex, smoking, family history, diet, alcohol use, prior screening history) that is structured into risk categories (e.g., low, medium, high). However, these models have not been widely implemented, and a meta-analysis has suggested that their performance could be improved and called for moving beyond clinical risk factors and incorporating genetic information into risk prediction.

Several large consortia have conducted genome-wide association studies (GWAS), constructed polygenic risk scores (PRS) based on genome-wide variants, and explored the association of PRS and risk for CRC. Some approaches have incorporated lifestyle and environmental risk factors as well as PRS. The field is rapidly evolving, and these approaches hold promise for tailoring risk prediction to better target the invited population to CRC screening, but in evaluating their contribution to risk prediction, it will be important to determine what additional prognostic information they provide, beyond the well-known clinical risk factors.

# Smart Cancer Screening

*Linda Rabeneck MD MPH FRCPC*
*Professor of Medicine, University of Toronto*

In addition to GWAS, another emerging approach is the use of biomarkers (e.g., blood based cfDNA) to refine risk prediction, intended to detect either a single or multiple cancers early. Large-scale studies of Multicancer Early Detection (MCED) tests are underway in the US (Pathfinder) and in the UK (NHS-Galleri Trial) that will begin to evaluate this approach.

To evolve risk prediction from straightforward risk categories (such as the Asia-Pacific Risk Score) to incorporating genomic information and the use of multiple biomarkers means moving from logistic regression to AI. And this also means access to large datasets of clinical, genomic, environmental and biomarker information.

Finally, the IT, data sources, people and other key aspects of the infrastructure currently used to support organized screening will need to evolve as we move forward toward precision screening. It seems likely that we will make greater use of digital technologies, for example, to invite members of the target population, navigate them through the steps in the process and recall them at an appropriately tailed interval to repeat screening.

This is an exciting time in cancer screening and research. We are on the cusp of evolving our approaches to risk prediction and its computation, coupled with moving navigation of the steps in the screening process on to the phone!

Keynote Speech

Colorectal Cancer Prevention with Smart Health Approach

Prof. Han-Mo Chiu
National Taiwan University Hospital

Prof. Graeme Young
Flinders University

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**Graeme Young**
Flinders University

- Matthew Flinders Distinguished Emeritus Professor, Flinders University of South Australia
- South Australian Scientist of the Year 2013, winner of the Australian Museum Eureka Prize for Innovation in Medical Research, and the Distinguished Research Prize of the Gastroenterological Society of Australia
- Member of the Order of Australia (AM) for services to Medicine
- Past-Chair of the Colorectal Cancer Screening Committee of the World Endoscopy Organization (WEO)
- Pivotal leadership in establishing the Australian National Bowel Cancer Screening Program, one of the first national FIT-based organized screening programs
- Fellow of: the Australian Academy of Technological Science and Engineering, the American Gastroenterological Association, and Australian Academy of Health and Medical Sciences

**Han-Mo Chiu**
National Taiwan University Hospital

- Clinical Professor at National Taiwan University.
- Chief of the Health Management Center at National Taiwan University Hospital.
- Deputy Secretary General at the Gastroenterological Society of Taiwan (GEST)
- Councilor member of the Digestive Endoscopy Society of Taiwan.
- His primary research and clinical interests encompass colorectal cancer screening, enhanced endoscopy (IEE) of the colorectum, and endoluminal therapy (EMR/ESD) for colorectal neoplasms, clinical application of artificial intelligence
- Principal investigator of the Taiwan Colorectal Cancer Screening Program
- Asian Chair of World Endoscopy Organization (WEO) Colorectal Cancer Screening Committee
- Professor Chiu actively participates in various multi-center cooperative studies and formulation of guidelines in colorectal cancer screening

# Colorectal Cancer Prevention with Smart Health Approach

*Han-Mo Chiu, MD, PhD*
*National Taiwan University Hospital*

In the past decade, cutting-edge technologies such as big data analytics, the Internet of Things (IoT), and artificial intelligence (AI) have emerged as "game changers," impacting not only the field of information technology but also our daily lives, including healthcare.

The threat posed by colorectal cancer (CRC), one of the most prevalent malignancies in developing and developed countries, and its associated mortality, has been mitigated through the promotion of healthy lifestyles, the adoption of novel therapeutic approaches, and, notably, the widespread implementation of population screening. Screening commences by targeting populations at a higher risk of CRC, followed by offering screening tests, diagnostic examinations, and subsequent treatment if significant lesions are detected. While this approach has proven effective, as reported in numerous population screening studies, its reported effectiveness is not flawless. In the context of screening, risk estimation is often approximate and lacks individual tailoring. The application of smart technology has the potential to determine the optimal age to initiate and conclude screening, establish inter-screening intervals, and even select the most suitable screening modality. Primary prevention through a healthy lifestyle has also demonstrated effectiveness in reducing the risk of CRC, albeit in a less strategic manner. Through the integration of wearable devices and the gamification of preventive measures, we can construct a platform for primary prevention of CRC.

The holistic and multifaceted approaches presented in this discussion envisions a future in which smart health technologies significantly contribute to reducing the incidence of CRC and its related mortality. By fostering a proactive and personalized healthcare paradigm, the synergy between preventive measures and advanced technologies aims to revolutionize CRC prevention, ultimately improving health outcomes and alleviating the societal burden associated with this prevalent malignancy

## Colorectal Cancer Session (I) (Co-Organized with Olympus)
## Digital Science in Colorectal Cancer Screening

### Challenges of Digitization in Colorectal Cancer Screening in Japan

**Dr. Nozomu Kobayashi**
*National Cancer Center*

**Prof. Linda Rabeneck**
*University of Toronto*

**Prof. Takahisa Matsuda**
*Toho University*

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## Colorectal Cancer Session (I) (Co-Organized with Olympus)
## Digital Science in Colorectal Cancer Screening

### AI in Colorectal Cancer Screening: A Special Emphasis on its Application in ctDNA Biomarker and Colonoscopy

**Prof. Jeong-Sik Byeon**
*University of Ulsan College of Medicine*

**Prof. Linda Rabeneck**
*University of Toronto*

**Prof. Takahisa Matsuda**
*Toho University*

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# Colorectal Cancer Session (I) (Co-Organized with Olympus)
## Digital Science in Colorectal Cancer Screening

### AI-based Personalized Risk Assessment model for Colorectal Cancer Screening

**Prof. Ming-Fang Yen**
*Taipei Medical University*

**Prof. Linda Rabeneck**
*University of Toronto*

**Prof. Takahisa Matsuda**
*Toho University*

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**International Asian Cancer and Chronic Disease Screening Network, IACCS 2023**

# Colorectal Cancer Session (I) (Co-Organized with Olympus)
## Digital Science in Colorectal Cancer Screening

### Big Data Analytics for Screening in Prolonging Life-expectancy Attributed to Colorectal Cancer

**Prof. Li-Sheng Chen**
*Taipei Medical University*

**Prof. Linda Rabeneck**
*University of Toronto*

**Prof. Takahisa Matsuda**
*Toho University*

*IACCS, Colorectal Cancer*
**International Asian Cancer and Chronic Disease Screening Network, IACCS 2023**

**Linda Rabeneck**
**University of Toronto**

- Professor of Medicine and Professor, Dalla Lana School of Public Health, University of Toronto
- Senior Scientist at the Institute for Clinical Evaluative Sciences (ICES) in Toronto
- Known for research on the quality and effectiveness of colorectal cancer screening with approximately 290 peer-reviewed publications
- Key leadership in launching Ontario's Colon Cancer Check and organized screening programs for women at high risk for breast cancer, and for persons at high risk for lung cancer
- Ex-Chair of the Colorectal Cancer Screening Committee of the World Endoscopy Organization (WEO)
- Serve as President of the Canadian Academy of Health Sciences in 2017-2019

**Takahisa Matsuda**
**Toho University**

- Professor, Department of Gastroenterology and Hepatology, Faculty of Medicine, Toho University, Tokyo
- Professor, Division of Gastroenterology and Hepatology, Toho University Omori Medical Center, Tokyo
- Board Member of Directors of the Japanese Society of Gastrointestinal Cancer Screening (JSGCS)
- Councilor of the Japan Gastroenterological Endoscopy Society (JGES)
- Councilor of the Japanese Gastroenterological Association (JGA)
- Councilor of the Japan Society of Colon Examination
- Councilor of the Japanese Association for Cancer Prevention
- Member of the Future Planning Committee of the Japan Digestive Disease Week (JDDW)
- Principal investigator of the Japan Polyp Study
- Principal investigator of the Niijima/Oshima Study
- Chairman of the Endoscopy Screening Certification Program Committee (JGES)
- Chairman of the Colorectal Cancer Screening Quality Control Committee (JSGCS)

**Nozomu Kobayashi**
**National Cancer Center**
**Hospital**

- Director of Cancer Screening Center, National Cancer Center Hospital
- Chief, Division of Screening Technology, National Cancer Center Institute for Cancer Control
- Staff Physician of Endoscopy Division, National Cancer Center Hospital
- Councilor of the Japanese Gastrointestinal Endoscopy Society
- Fellow of the Japanese Gastrointestinal Endoscopy Society (FJGES)
- Councilor of the Japanese Society of Coloproctology
- Councilor of the Japanese Society of Colon Examination
- Representative of the Japanese Society of Gastrointestinal Cancer Screening
- JPS (Japan Polyp Study) Collaborator
- Secretariate of CREATE-J (Colorectal ESD activation team of Japan)



**Jeong-Sik Byeon**
**University of Ulsan College of**
**Medicine**

- Bachelor, Seoul National University College of Medicine, Seoul, Korea
- Ph.D. in Medical Science, University of Ulsan College of Medicine, Ulsan, Korea
- Medical Residency, Seoul National University Hospital, Seoul, Korea
- Professor, GI endoscopist and Specialist for advanced diagnostic/therapeutic colonoscopy & small bowel endoscopy University of Ulsan College of Medicine, Asan Medical Center, Seoul, Korea
- Member, Secretary General of Korean Society of GI Endoscopy, 2021/11-2023/11
- Member, Secretary General of Korean Association for the Study of Intestinal Diseases, 2019/04-2021/04

**Amy Ming-Fang Yen**
Taipei Medical University

- Professor at Taipei Medical University
- Obtained PhD in statistics from University College London
- Specialized in cancer screening evaluation using stochastic processes
- Key contributor to population-based screening programs for oral, breast, and colorectal cancer
- Continues research in the evaluation of cancer screening and community-based intervention program

**Sam Li-Sheng Chen**
Taipei Medical University

- Professor at Taipei Medical University.
- Associate Dean at College of Oral Medicine, Taipei Medical University
- Director at School of Oral Hygiene, College of Oral Medicine, Taipei Medical University.
- Co-Principal investigator of the Taiwanese Nationwide Breast Cancer/Oral Cancer/Colorectal Cancer Screening Program
- Executive Member at Taiwan Association of Medical Screening

# Challenges of Digitization in Colorectal Cancer Screening in Japan

*Nozomu Kobayashi, M.D., Ph.D.*
Cancer Screening Center, National Cancer Center Hospital, Tokyo, Japan

In Japan, colorectal cancer screening by fecal immunochemical test has been conducted since 1992. However, colorectal cancer is still on the rise, ranking first in the cancer incidence and second in the cancer deaths, and further measures are still needed. One of the reasons that colorectal cancer screening in Japan is not fully effective is the diversity of screening systems and the accompanying data collection problems. In Japan, there are three types of examinations: population-based, occupational, and comprehensive health checkup system. Only population-based screening is based on legal grounds and data are managed, while the actual status of occupational screening, which are performed by the majority of the population, is not understood.

In order to solve these problems, it is necessary to introduce organized screening by linking the results of cancer screening to personal identification numbers and using these data for quality control of screening systems. However, Japan has lagged behind in the introduction of digitalization, and only recently, in 2022, Headquarters for Medical DX Promotion headed by the Prime Minister was established.

At present, digitalization is progressing only in limited purposes, such as web-based reservations and the linking of personal identification numbers with the results of population-based screening in some municipalities, but electronic medical records become mandatory to be introduced to all medical institutions by 2030, and the digitalization of medical care as a whole will be promoted. In response to this trend, we must strive to promote the digitization of cancer screening and provide more accurate cancer screening to the public.

# AI in Colorectal Cancer Screening: A Special Emphasis on its Application in ctDNA Biomarker and Colonoscopy

*Jeong-Sik Byeon*
*Department of Gastroenterology, Asan Medical Center University of Ulsan College of Medicine, Seoul, Korea*

Fecal immunochemical test (FIT) and colonoscopy are the two main methods for colorectal cancer (CRC) screening. The sensitivity of FIT for CRC is 70-90%, but the sensitivity of FIT for advanced adenoma is low with only about 10-40%. cfDNA including ctDNA can be used as an alternative non-invasive CRC screening modality. However, the analysis of complex cfDNA is a hurdle of its widespread use. Artificial intelligence (AI) may improve the accuracy and efficiency of analysis of the complex cfDNA pattern and can distinguish cfDNA pattern of patients with CRC and advanced adenoma from that of normal healthy control. We performed whole genome sequencing of cfDNA from plasma samples of patients with CRC and advanced adenoma and healthy controls. We developed an AI algorithm by using this sample as the training data and validated the developed algorithm. The algorithm showed good performance in differentiating CRC, advanced adenoma and normal colon, which suggests the possibility of AI assisted cfDNA analysis as a CRC screening option. Besides AI use in cfDNA analysis, AI can also improve the quality of colonoscopy by computer-aided detection (CADe) and computer-aided diagnosis (CADx). A meta-analysis of 5 randomized controlled trials showed significantly higher adenoma detection rate in the CADe group. Another meta-analysis showed a pooled sensitivity of 92.3% and specificity of 89.8% in the differential diagnosis of neoplasia and non-neoplasia by CADx. In conclusion, AI can improve the performance and quality of both non-invasive and invasive CRC screening options such as cfDNA analysis and colonoscopy.

# Big Data Analytics for Screening in Prolonging Life-expectancy Attributed to Colorectal Cancer

*Prof. Sam Li-Sheng Chen*
*Taipei Medical University, Taiwan Association of Medical Screening*

**Objective**

Previous research has shown that screening asymptomatic individuals with either fecal occult blood testing or endoscopic procedures can reduce colorectal cancer mortality. The impact of CRC screening on life-expectancy (LE) has received little attention. In terms of health care, a CRC screening program using a fecal immunochemical test (FIT) has been implemented in the Taiwan community since 2000. These allow us to investigate how and what FIT screening may affect the average LE in comparison to the non-screened group, as well as how and whether the LE among those who used FIT varied with different individual characteristics. We aim to assess the long-term effectiveness of FIT screening in terms of potentially extending life-expectancy using data from the community-based CRC screening with fecal immunochemical test.

**Methods**

Data used for analysis were derived from three community cohorts (Keelung, Changhua, and Tainan) in Taiwan targeting at 729,476 residents aged 50-69 years that included 166,444 participants in the community-based integrated screening between 2000 and 2018.Demographic information, fecal hemoglobin concentration, lifestyle, BMI, and metabolic syndrome were collected. Data on death was followed until 2022. The impact of FIT screening on all-cause mortality was assessed. The average and personalized characteristic life-expectancy derived from FIT screening using big data analytics was also estimated.

**Results**

The overall hazard ratio for the screened versus the unscreened was 0.43 (95%CI: 0.42-0.544), being 0.40 (95%CI: 0.39-0.41), 0.58 (95%CI: 0.53-0.64), and 0.71 (95%CI: 0.65-0.76) for low f-Hb (0-49 ng/mL), moderate f-Hb (50-99 ng/mL), and high f-Hb (≥100 ng/mL), respectively. The average LE in the screening cohort was longer than the unscreened cohort by 2.31. Male would prolong longer LE (2.69 years) than Female (1.40 years). Furthermore, we demonstrate that the various combinations of individual characteristics associated with the risk of colorectal cancer contribute to the attributable prolonging LE.

**Conclusion**

Using big data form three communities, we demonstrate half of significant all-cause mortality reduction, leading to the gain of life expectancy, contributed from FIT screening.

## Special Speech

**Micro-elimination of hepatitis C in populations of diabetes and chronic kidney disease**

**Prof. Tsung-Hui Hu**
*Kaohsiung Chang Gung Memorial Hospital*

**Dr. Xi-Mo Wang**
*Tianjin Third Central Hospital*

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International Asian Cancer and Chronic Disease Screening Network, **IACCS 2023**

## Xi-Mo Wang
**Tianjin Third Central Hospital**

- Doctoral Supervisor at Nankai University, Tianjin University, and Tianjin Medical University.
- Specializes in general surgery.
- Focuses on the prevention and treatment of digestive diseases.

## Tsung-Hui Hu
**Chang Gung Memorial Hospital, Kaohsiung, Taiwan**

- Professor of Kaohsiung Chang Gung Memorial Hospital
- Research primarily focuses on hepatocellular carcinoma (HCC) and gastrointestinal stromal tumors (GIST).
- Considered a pioneer in the study of the PTEN-AKT signaling pathway in liver cancers in Taiwan.
- Significant contributions to understanding the molecular basis of GIST in Taiwan.
- Interests also encompass the treatment of hepatitis B and C, as well as antiviral therapies post-liver transplantation.
- Has established predictive models for HCC development after antiviral therapies, particularly for individuals with sustained virological response.
- Explores the impact of antiviral therapies such as telbivudine, entecavir, and tenofovir on kidney function.
- Actively involved in community-based HCC screening and hepatitis C micro-elimination efforts in Changhua County, Taiwan.
- Boasts a substantial publication record, including 288 academic papers in peer-reviewed journals and 68 papers as the first or corresponding author, in addition to one book chapter.
- Has served as the principal investigator for 36 research grants and 34 clinical trial programs.

# Micro-elimination of hepatitis C in populations of diabetes and chronic kidney disease

*Tsung-Hui Hu*
*Chang Gung Memorial Hospital, Kaohsiung, Taiwan*

The Changhua integrated program to stop HCV infection (CHIPS-C) adopted a multidisciplinary care approach since 2019. We aim to examine how a shared care model could eliminate HCV in patients with diabetes (PwD) and chronic kidney disease (CKD) in primary care of Changhua county. Of a 10,684 eligible PwD, 93.4% (n = 9984) underwent HCV screening, resulting in a 6.18% (n = 617) anti-HCV seroprevalence. Of 597 eligible individuals, 84.9% (n = 507) completed the RNA test, obtaining 71.8% (n = 364) positives. 327 (91.6%) of 357 eligible viremic patients started treatment, with 96.3% completion (315/ 327). In 294 completed follow-ups, 98.3% (n = 289) had a cure. Overall, the cumulative treatment coverage increased substantially from 4.65% to 73.78%, yielding a 69.70% (95% CI: 63.64%-77.03%) absolute reduction in HCV infection prevalence.

The elimination of HCV among dialysis population has also been successfully completed in Changhua in 2019. We move forward to the HCV elimination in CKD population to prevent new infection and disease burden in dialysis units from new participants. Following the initiation of CHIPS-C for pre-ESRD cohort in Changhua in 2019, there were total 8933 subjects included. The HCV antibody screening rate reached 94.45% (8,438 people), with HCV antibody positive rate of 7.44% (628 people), HCV RNA virus checking rate of 91.7% (576 people), detectable HCV RNA rate of 63.0% (363 people), eligible treatment rate was 98.6% (358 people), and final treatment rate was 91.1% (326 people). Furthermore, there have been total 71,949 CKD subjects initially included. The HCV antibody screening rate reached 81.4% (58,536 people), with HCV antibody positive rate of 6.6% (3,883 people), HCV RNA virus checking rate of 83.1% (3,226 people), detectable HCV RNA rate of 59.4% (1,916 people), and final treatment rate was 89.2% (1,710 people).

We further evaluate the impact of treatment of CKD cohort on the dialysis unit. There have been 1959 new participant of dialysis since 2019 in Changhua County. The positivity rate of HCV RNA was 50% at the end of 2019; 28.6% at the end of 2020; 7.7% at end of 2021, and 0% at June of 2022. Zero HCV before ESRD could serve as a surveillance surrogate indicator to monitor the progress of HCV elimination in CKD

Keywords: Hepatitis C, Elimination, Diabetes, Chronic Kidney Disease (CKD), End Stage Renal Disease (ESRD), CHIPS-C

# Poster Exhibition

◆*Digital Science in Colorectal Cancer Screening*
◆*Evaluation of Colorectal Cancer Screening*
◆*Other Related Topics*

**Room 7**

*IACCS, Colorectal Cancer*
International Asian Cancer and Chronic Disease Screening Network, **IACCS 2023**

## Keynote Speech (Co-Organized with Fujifilm)

### Precision-oriented Screening Tools for Early Detection of Colorectal Cancer

**Prof. Graeme Young**
*Flinders University*

**Prof. Stephen Duffy**
*Queen Mary University of London*

*IACCS, Colorectal Cancer*
**International Asian Cancer and Chronic Disease Screening Network, IACCS 2023**

**Stephen Duffy**
**Queen Mary University of London**

- **Affiliations**
  - The professor of Cancer Screening at Queen Mary, University of London
  - Centre Lead, Centre for Prevention, Detection and Diagnosis
- **Education**
  - MSc, University of Edinburgh and Imperial College, London
- **Experience**
  - Member of the National Screening Committee
  - Screening Editor, European Guidelines Development Group for Breast Cancer Screening and Early Diagnosis
  - Member of the Breast Screening Advisory Committee
  - Member of the Bowel Screening Advisory Committee
  - Alexander Margulis Prize for Scientific Excellence by the Radiological Society of North America

**Graeme Young**
**Flinders University**

- Matthew Flinders Distinguished Emeritus Professor, Flinders University of South Australia
- South Australian Scientist of the Year 2013, winner of the Australian Museum Eureka Prize for Innovation in Medical Research, and the Distinguished Research Prize of the Gastroenterological Society of Australia
- Member of the Order of Australia (AM) for services to Medicine
- Past-Chair of the Colorectal Cancer Screening Committee of the World Endoscopy Organization (WEO)
- Pivotal leadership in establishing the Australian National Bowel Cancer Screening Program, one of the first national FIT-based organized screening programs
- Fellow of: the Australian Academy of Technological Science and Engineering, the American Gastroenterological Association, and Australian Academy of Health and Medical Sciences

# Precision-oriented Screening Tools for Early Detection of Colorectal Cancer

*Graeme P Young*
*Flinders University*

The use of tests in the screening context, if we are to achieve precision, requires consideration of the population's risk, an individual's lifetime risk (who to screen and when to start), the goal of screening in that individual (what to screen for and how often), what test to use to best estimate the likelihood for colorectal neoplasia at that point-in-time (PIT), and when to proceed to colonoscopy.

There are three dimensions to likelihood for colorectal neoplasia: the population risk, a person's lifetime risk and their point-in-time (PIT). For example, lifetime risk for colorectal cancer (CRC) might be 5% in a given population but PIT risk would be only 0.5%.

Lifetime risk can be estimated from lifestyle, demographic, genetic and medical information, when available. Instead of depending primarily on age, it would be possible to apply algorithms that combine all these factors to personalise how we plan screening for an individual.

If our intention is to manage the colonoscopy resource and minimise subjecting people to colonoscopy who are not destined to have colorectal neoplasia (the majority of the population), then we need reliable PIT tests, specifically non-invasive screening tests (NIST). At present, quantitative faecal immunochemical tests (qFIT) are widely used in populations but they can be better used to individualise screening. qFIT provide flexibility to balance test accuracy across age, gender and ethnic variables, to reduce risk by individualising the testing frequency, and to better manage colonoscopic resources. However, qFIT ability to detect important precursors is limited and faecal tests that also incorporate DNA markers are superior in this regard. Blood-based biomarker panels show promise for CRC detection but are inferior to qFIT for precursor detection.

Personalisation should now replace a one-size-fits all approach to CRC screening.

**Keynote Speech** *(Co-Organized with Fujifilm)*

*AI-assisted Colorectal Cancer Screening:*
*Operational Viewpoint*

**Prof. Takahisa Matsuda**
*Toho University*

**Prof. Robert Smith**
*American Cancer Society*

*IACCS, Colorectal Cancer*
**International Asian Cancer and Chronic Disease Screening Network, IACCS 2023**

## Robert Smith
**American Cancer Society**

- Cancer epidemiologist and Senior VP, Cancer Screening, and Director, ACS Center for Cancer Screening at ACS, Atlanta, Georgia, U.S.
- Adjunct Professor of Epidemiology at Emory University and Honorary Professor at Queen Mary University of London.
- Research interests: cancer epidemiology, prevention programs, health service quality, and survivorship.
- PhD from State University of New York at Stony Brook (1983).
- Previous positions at Boston University School of Public Health and Centers for Disease Control.
- Leads ACS in developing cancer screening guidelines and policy projects.
- Author of 400+ peer-reviewed publications and frequent lecturer on cancer screening.
- Serves on national and international advisory committees.
- Founding member of American Cancer Society's National Colorectal Cancer Roundtable and National Lung Cancer Roundtable.
- Honored with awards, including Cancer Prevention Laurel and Medal of Honor from IARC.

## Takahisa Matsuda
**Toho University**

- Professor, Department of Gastroenterology and Hepatology, Faculty of Medicine, Toho University, Tokyo
- Professor, Division of Gastroenterology and Hepatology, Toho University Omori Medical Center, Tokyo
- Board Member of Directors of the Japanese Society of Gastrointestinal Cancer Screening (JSGCS)
- Councilor of the Japan Gastroenterological Endoscopy Society (JGES)
- Councilor of the Japanese Gastroenterological Association (JGA)
- Councilor of the Japan Society of Colon Examination
- Councilor of the Japanese Association for Cancer Prevention
- Member of the Future Planning Committee of the Japan Digestive Disease Week (JDDW)
- Principal investigator of the Japan Polyp Study
- Principal investigator of the Niijima/Oshima Study
- Chairman of the Endoscopy Screening Certification Program Committee (JGES)
- Chairman of the Colorectal Cancer Screening Quality Control Committee (JSGCS)

# AI-assisted Colorectal Cancer Screening: Operational Viewpoint

*Takahisa Matsuda, MD, PhD*
*Department of Gastroenterology and Hepatology, Faculty of Medicine, Toho University, Tokyo*

The use of artificial intelligence (AI) in colorectal cancer (CRC) screening has recently attracted significant attention due to its potential to increase the efficiency and accuracy of abnormality detection. AI applications in CRC screening can analyze medical imaging data, such as colonoscopies and CT scans, with superior accuracy compared to humans. This capability is expected to enable early detection of potential malignancies and ultimately improve the overall effectiveness of the CRC screening program. The integration of AI in image analysis not only accelerates the diagnostic process, but also reduces the likelihood of false negatives and false positives, increasing the reliability of screening results. In addition, AI can contribute to risk stratification by analyzing patient data such as medical history and genetic predisposition. This allows healthcare providers to identify individuals at high risk of developing CRC, enabling tailored screening protocols that prioritize closer monitoring and more frequent screening. Such an individualized approach is expected to optimize resource allocation and increase the cost-effectiveness of CRC screening programs. Despite these promising benefits, the successful integration of AI into CRC screening presents challenges: robust validation and standardization of AI algorithms is essential to ensure the accuracy and reliability of AI and to gain the trust of healthcare providers and regulatory agencies. In addition, data privacy and security considerations are essential when using sensitive medical data for AI analysis. Comprehensive training for healthcare professionals, including endoscopists, is necessary for seamless implementation. This includes familiarizing clinicians with the complexities of AI algorithms, interpreting their output, and integrating these technologies into existing workflows. Collaboration among healthcare providers, researchers, and technology developers is essential to overcome these challenges and maximize the transformative potential of AI in CRC screening programs.

## Colorectal Cancer Session (II) *(Co-Organized with Olympus)*
# Evaluation of Precision Colorectal Cancer Screening

### *Evaluation of Colorectal Cancer Screening from EBM to P4 Medicine*

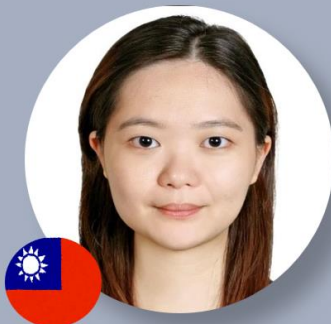**Dr. Masau Sekiguchi**
*National Cancer Center*

**Prof. Stephen Duffy**
*Queen Mary University of London*

*IACCS, Colorectal Cancer*
**International Asian Cancer and Chronic Disease Screening Network, IACCS 2023**

## Colorectal Cancer Session (II) *(Co-Organized with Olympus)*
# Evaluation of Precision Colorectal Cancer Screening

### *Evaluation of Precision Colorectal Cancer Screening with Digital Twin Approach*

**Dr. Ting-Yu Lin**
*National Taiwan University*

**Prof. Ruth Etzioni**
*Fred Hutchinson Cancer Center*

*IACCS, Colorectal Cancer*
**International Asian Cancer and Chronic Disease Screening Network, IACCS 2023**

**Stephen Duffy**
**Queen Mary University of London**

- **Affiliations**
  - The professor of Cancer Screening at Queen Mary, University of London
  - Centre Lead, Centre for Prevention, Detection and Diagnosis
- **Education**
  - MSc, University of Edinburgh and Imperial College, London
- **Experience**
  - Member of the National Screening Committee
  - Screening Editor, European Guidelines Development Group for Breast Cancer Screening and Early Diagnosis
  - Member of the Breast Screening Advisory Committee
  - Member of the Bowel Screening Advisory Committee
  - Alexander Margulis Prize for Scientific Excellence by the Radiological Society of North America

**Ruth Etzioni**
**Fred Hutchinson Cancer Research Center**
**University of Washington**

- Holder of Rosalie and Harold Rea Brown Endowed Chair, Fred Hutch Cancer Center, 2021 – present
- Member, American Cancer Society Cancer Early Detection Guidelines Panel and coauthor of ACS guidelines for breast, prostate, colorectal, lung, and cervical cancer screening
- Member American Urology Association and National Comprehensive Cancer Network Prostate Cancer Screening Guidelines Panels
- Primary Author, "Statistics for Health Data Science: An Organic Approach," Published by Springer Nature in 2022
- Fellow, American Statistical Association (2016) and past Chair of its Health Policy Statistics Section (2019)
- Principal Investigator, Prostate Cancer Co-ordinating Center, Cancer Intervention and Surveillance Modeling Network (CISNET) of the National Cancer Institute, USA
- Recipient of the Outstanding Investigator Award from the US National Cancer Institute, 2022-present

**Masau Sekiguchi**
**National Cancer Center**
**Hospital, Japan**

- Staff Doctor, Cancer Screening Center/ Endoscopy Division, National Cancer Center Hospital, Tokyo, Japan
- Staff Researcher, Division of Screening Technology, Center for Public Health Sciences, National Cancer Center
- Board Certified Gastroenterologist and Trainer of The Japanese Society of Gastroenterology
- Board Certified Endoscopist and Trainer of The Japan Gastroenterological Endoscopy Society
- Principal Investigator and/or Research Secretariat of multiple clinical studies, including international studies in the Asia Pacific region
- Collaborator of SCREESCO (a randomized controlled trial on colorectal cancer screening in Sweden)
- Several awards received (UEGW2012 Top Abstract Prize, JJCO Highly Commended Paper Award 2017, 2019 Japan Gastroenterological Endoscopy Society Award, and others)
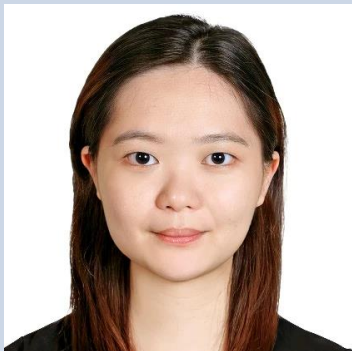
**Abbie Ting-Yu Lin**
**National Taiwan University**

- Post-Doctoral research fellow at the Institute of Epidemiology and Preventive Medicine, College of Public Health, National Taiwan University.
- Specialized in biostatistics and machine learning approaches for the evaluation of cancer screening.
- Research contributions spanning from Non-communicable NCD surveillance to addressing the multifaceted challenges of COVID-19.

# Evaluation of Colorectal Cancer Screening from EBM to P4 Medicine

*Masau Sekiguchi*

*Endoscopy Division/ Cancer Screening Center, National Cancer Center Hospital, Tokyo, Japan*

Colorectal cancer (CRC) screening is widely implemented to reduce CRC incidence and mortality. Typically, a singular uniform screening method is applied across the entire population in population-based screening. However, relying on this "one-size-fits-all" screening approach hinders maximizing the screening effectiveness. To improve the uptake rates and efficacy of screening, a risk-stratified approach, where different screening methods are provided to populations according to their CRC risks, may be helpful. Consequently, discussing applying the P4 medicine (predictive, preventive, personalized, participatory) approach to CRC screening is worthwhile. Currently, the most established risk-stratification tool for CRC screening is the Asia-Pacific Risk score, which employs age, sex, smoking status, and family history of CRC as risk assessment items (Yeoh KG et al., Gut 2011). Other available risk scores include the 8-point score developed and validated in Japan (Sekiguchi M et al., J Gastroenterol 2018). The Asia-Pacific consensus recommendations on CRC screening (Sung JJY et al., Gut. 2022) recommend using any of these risk stratification systems after validation in local regions. For the application of P4 medicine, further development of CRC screening modalities and risk prediction models, including genetic risk assessment, are warranted. The use of artificial intelligence is also expected. Regarding the participatory aspect, developing tools for promoting shared decision-making in screening is crucial. While P4 medicine for CRC screening sounds promising, it is essential to consider barriers associated with applying the "individual-oriented" concept to "population-oriented" screening.

*Colorectal Cancer Session (III)*
**Screening and Surveillance of Colorectal Cancer in Asian Countries**

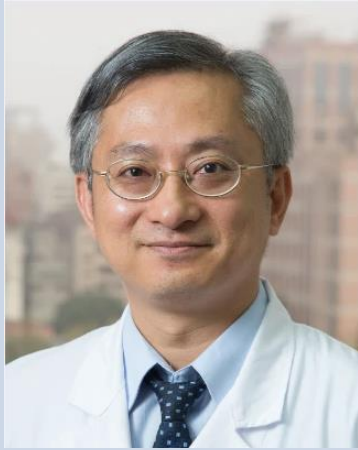*Key Insights from the FIT Screening Trial*

**Dr. Satimai Aniwan**
*Chulalongkorn University*

**Prof. Yi-Chia Lee**
*National Taiwan University Hospital*

*IACCS, Colorectal Cancer*
**International Asian Cancer and Chronic Disease Screening Network, IACCS 2023**

## Yi-Chia Lee
**Department of Internal Medicine, Taiwan University Hospital**

- A prominent gastroenterologist at National Taiwan University Hospital.
- Holds the positions of professor of internal medicine, Graduate Institute of Epidemiology and Preventive Medicine, and Institute of Clinical Medicine at the College of Medicine of NTU.
- The deputy director of the Department of Medical Research at NTUH.
- Research focus is stomach cancer screening and prevention, encompassing disease natural course evaluation, risk factor identification, and preventive program design and assessment.
- Groundbreaking work addresses H. pylori as the primary cause of stomach cancer and emphasizes the need for eradication.
- Major achievement lies in designing a comprehensive stomach cancer prevention program tailored to specific populations.
- This program has been successful in reducing stomach cancer incidence through innovative approaches like mass eradication, the two-in-one method, and the index case method.
- Work has provided long-term evidence of benefits and clarified theoretical risks, making it a successful healthcare policy in Taiwan.

## Satimai Aniwan
**Division of Gastroenterology, Chulalongkorn University**

- Chulalongkorn University graduate in medicine since 2003.
- Years of experience led to specialization in Gastroenterology (2011) and Hepatology (2018).
- Currently serves in Chulalongkorn Hospital's Gastroenterology division.
- Distinguished for significant research contributions in digestive tract studies.

# Using Two Fecal Immunochemical Test Cut-Offs to Improve Colon Cancer Screening Efficiency: A Population-Based Study in Thailand

*Satimai Aniwan*
*Division of Gastroenterology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand*

**Background:** Using the recommended fecal immunochemical test (FIT) cutoff of 20 μg/g (FIT20) can miss advanced neoplasia (AN) in high-risk subjects. This study aimed to assess the performance of two strategies. The first strategy involved using a FIT cutoff of 5 μg/g for high-risk subjects and a cutoff of 20 μg/g for non-high-risk subjects (FIT5/20 strategy), while the second strategy used a FIT20 for all subjects (FIT20 strategy).

**Methods:** The study included a population-based screening where subjects were categorized as high-risk or non-high-risk based on the Asia-Pacific Colorectal Screening score. FIT-positive subjects were offered colonoscopies. The two strategies were compared based on positive predictive value (PPV) and the number needed to screen (NNS) to detect AN through FIT.

**Results:** Of the 10,501 subjects, the FIT5/20 strategy resulted in a positivity rate of 13.0%, whereas the FIT20 strategy had 9.4%. The detection of AN and colorectal cancer (CRC) was higher in the FIT5/20 strategy compared to the FIT20 strategy, with 167 versus 141AN cases and 34 versus 33 CRC cases, respectively. The PPV for AN and CRC did not differ significantly between the two strategies. However, the NNS to detect one AN case was significantly lower in the FIT5/20 strategy (63; 95% CI, 62 - 64) compared to FIT20 (75; 95%CI, 73 - 76; $p<0.01$). The FIT5/20 strategy reduced the NNS by 18.4% compared to the FIT20 strategy, resulting in more efficient screening for AN.

**Conclusion:** This personalized FIT approach offers improved optimization of CRC screening while reducing the workload.

## Colorectal Cancer Session (III)
### Screening and Surveillance of Colorectal Cancer in Asian Countries

**Colorectal Cancer Screening in Tianjin: Past, Present and Future**

**Dr. Xi-Mo Wang**
*Tianjin Third Central Hospital*

**Prof. Han-Mo Chiu**
*National Taiwan University Hospital*

*IACCS, Colorectal Cancer*
International Asian Cancer and Chronic Disease Screening Network, **IACCS 2023**

## Colorectal Cancer Session (III)
### Screening and Surveillance of Colorectal Cancer in Asian Countries

**Cancer Screening and Care in India**

**Prof. Ravi Mehrotra**
*Emory University*

**Prof. Han-Mo Chiu**
*National Taiwan University Hospital*

*IACCS, Colorectal Cancer*
International Asian Cancer and Chronic Disease Screening Network, **IACCS 2023**

**International Asian Cancer and Chronic Disease Screening Network**
**IACCS 2023**

## Han-Mo Chiu

**National Taiwan University Hospital**

- Clinical Professor at National Taiwan University.
- Chief of the Health Management Center at National Taiwan University Hospital.
- Deputy Secretary General at the Gastroenterological Society of Taiwan (GEST)
- Councilor member of the Digestive Endoscopy Society of Taiwan.
- His primary research and clinical interests encompass colorectal cancer screening, enhanced endoscopy (IEE) of the colorectum, and endoluminal therapy (EMR/ESD) for colorectal neoplasms, clinical application of artificial intelligence
- Principal investigator of the Taiwan Colorectal Cancer Screening Program
- Asian Chair of World Endoscopy Organization (WEO) Colorectal Cancer Screening Committee
- Professor Chiu actively participates in various multi-center cooperative studies and formulation of guidelines in colorectal cancer screening

## Xi-Mo Wang
**Tianjin Third Central Hospital**

- Doctoral Supervisor at Nankai University, Tianjin University, and Tianjin Medical University.
- Specializes in general surgery.
- Focuses on the prevention and treatment of digestive diseases.
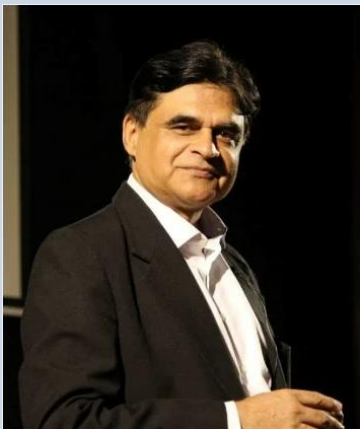
## Ravi Mehrotra
**Emory University**

- A renowned expert in cancer prevention, diagnostics, and treatment, Professor Mehrotra served as Founder-CEO of the ICMR-India Cancer Research Consortium.
- Former director of ICMR-National Institute of Cancer Prevention and Research (NICPR), contributing significantly to cancer prevention and tobacco control.
- Editorial board member of 10 international medical journals, Dr. Mehrotra boasts over 300 published scientific articles, cited over 25,000 times, with an H-index of 54.
- Recipient of the prestigious Dr. P.N. Wahi and Dr. Lachman awards in Cancer Prevention and the Dr Prem Nath Wahi and Ernest Fernandes Award from the Indian Academy of Cytologists.
- Past President of the Indian Academy of Cytologists, Dr. Mehrotra's research has influenced national cancer services in India and other LMICs.
- Instrumental in raising awareness and political support for cancer, leading to the establishment of new screening services like the cervical cancer screening program in India.
- Founded the WHO-FCTC Knowledge Hub on Smokeless Tobacco at NICPR.

## Colorectal Cancer Session (III)
### Screening and Surveillance of Colorectal Cancer in Asian Countries

## Surveillance within National FIT screening program



**Prof. Chen-Yang Hsu**
*National Taiwan University*



**Dr. Kinichi Hotta**
*Shizuoka Cancer Center*

*IACCS, Colorectal Cancer*
International Asian Cancer and Chronic Disease Screening Network, IACCS 2023

## Colorectal Cancer Session (III)
### Screening and Surveillance of Colorectal Cancer in Asian Countries

## Exploring Survival of T1 Colorectal Cancer



**Dr. Wen-Feng Hsu**
*National Taiwan University*



**Dr. Kinichi Hotta**
*Shizuoka Cancer Center*

*IACCS, Colorectal Cancer*
International Asian Cancer and Chronic Disease Screening Network, IACCS 2023

**Kinichi Hotta**

Shizuoka Cancer Center

- Deputy Director, Division of Endoscopy, Shizuoka Cancer Center
- Councilor of the Japan Gastroenterological Endoscopy Society (JGES)
- Councilor of the Japanese Society of Gastroenterology (JSGE)
- Councilor of the Japanese Gastroenterological Association (JGA)
- Councilor of the Japan Association for Capsule Endoscopy
- Board member of the Japan Society of Colon Examination
- Fellow of the Japan Gastroenterological Endoscopy Society (FJGES)
- Committee member of JSCCR Guideline for the Treatment of Colorectal Cancer
- Committee member of JSGE Screening and Surveillance Guideline for Colonoscopy
- Known for research on the colorectal cancer screening and colonoscopy with approximately 200 peer-reviewed
- His primary research and clinical interests encompass colorectal cancer screening, quality indicator of colonoscopy, enhanced endoscopy (IEE) of the colorectum, endoscopic resection for colorectal neoplasms, and clinical application of artificial intelligence
- He has served as principal investigator and co-investigator on numerous clinical trials

**Chen-Yang Hsu**
Daichung Hospital, Miaoli, Taiwan
National Taiwan University

- Biostatistician with expertise in assessing population-based intervention programs, particularly screening initiatives, utilizing stochastic methodologies.
- Holds a Ph.D. and M.Sc. in Biostatistics, both awarded by the Institute of Epidemiology and Preventive Medicine, School of Public Health, National Taiwan University.
- Completed postdoctoral research fellowship training focused on evaluating processes and outcomes within population-based cancer screening programs.
- Actively involved in academic research with a primary focus on applying stochastic processes to understand complex disease progression, including colorectal cancer, breast cancer, oral cancer, and emerging infectious diseases, within the College of Public Health at National Taiwan University.
- Currently engaged in the practical application of disease prevention methods, including the design and implementation of screening initiatives in clinical practice and community-based services.
- Currently holds the position of Chairman at the Taiwan Association of Medical Screening

**Wen-Feng Hsu**
National Taiwan University Hospital

- Attending physician in the Department of Internal Medicine at National Taiwan University Hospital
- Assistant professor, Department of Internal Medicine, National Taiwan University College of Medicine
- Ph.D. , Institute of Epidemiology and Preventive Medicine, College of Public Health, National Taiwan University (2019)
- Clinical expertise in colorectal cancer, colonoscopy, and colorectal cancer screening
- Research focus on outcomes research, early detection of colorectal cancer, natural history of colorectal cancer, and cost-effectiveness analysis of colorectal cancer screening

# Surveillance within National FIT screening program

*Chen-Yang Hsu*

*1. Taiwan Association of Medical Screening, 2. College of Public Health, National Taiwan University, Taipei, Taiwan*

Colorectal cancer (CRC) poses a significant global health challenge. Effective early detection at the population level, primarily through stool-based screening methods like the fecal immunochemical test (FIT), has been instrumental in reducing CRC mortality and incidence. This success is largely due to the early identification and treatment of precancerous adenomas, followed by regular surveillance colonoscopies for high-risk individuals. Such measures aim to align their CRC risk with that of the general population. Recognizing the need for efficient use of medical resources and patient-specific approaches, current surveillance guidelines from authoritative bodies such as the US-MSTF and ESGE recommend personalized, risk-guided surveillance intervals. These guidelines emphasize considering adenoma characteristics for risk stratification to determine the intensity of surveillance. The recent identification of fecal hemoglobin concentration (fHbC) as a crucial biomarker for colorectal neoplasms has demonstrated the potential to tailor surveillance intensity according to individual risk. Stemming from this risk-tailored approach, we aim to devise individualized risk projections by utilizing information with high granularity in conjunction with machine learning (ML) algorithms.

This study was embedded within the Taiwan National Colorectal Cancer Screening Program, launched in 2004. It targeted individuals aged 50 to 74, free from colorectal cancer, for biennial FIT screening from 2004 to 2009, with a follow-up period extending to 2020. Participants with high fHbC levels underwent colonoscopies, and if indicated, polypectomy. Information on fHbC levels at adenoma detection and adenoma risk classification were collected in the national screening program. Additionally, high granularity information including demographic characteristics, anthropometric measurements, laboratory biomarkers, behavioral factors, surrogates of socioeconomic status, and quality indicators of confirmatory colonoscopy were collected from the integrated community screening programs (CIS).

A trend of increasing CRC risk with higher fHbC levels was identified, with an average CRC risk of 5.9 per 1000 in 3 years and 12.5 per 1000 in 5 years. Surveillance intervals were then determined based on fHbC levels and lesion advancement. For non-advanced lesions, intervals ranged from 6.9 to 4.1 years for fHbC levels of 20-49 to ≥450, respectively, while for advanced lesions, they varied between 5.0 and 1.9 years. We further utilized collected multidisciplinary personal information to refine CRC risk profiles using ML algorithms. This approach allowed for the determination of personalized surveillance intervals, aligning individual risks with expected CRC risk. This integrated method provides tailored surveillance schedules for individuals with polyps detected in the nationwide FIT screening program, thereby optimizing CRC management, enhancing screening efficiency, and ultimately improving patient outcomes.

# Panel Discussion

**Prof. Takahisa Matsuda**
*Toho University*

**Prof. Han-Mo Chiu**
*National Taiwan University Hospital*

**Prof. Hsiu-Hsi Chen**
*National Taiwan University*

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**International Asian Cancer and Chronic Disease Screening Network, IACCS 2023**

# Poster Award & Closing Remarks

**Congress Chair, IACCS 2023**
**Prof. Takahisa Matsuda**
*Toho University*

**Congress Co-Chair, IACCS 2023**
**Prof. Han-Mo Chiu**
*National Taiwan University Hospital*

**IACCS President**
**Prof. Hsiu-Hsi Chen**
*National Taiwan University*

**Congress Chair, IACCS 2024**
**Prof. Yeol Kim**
*National Cancer Center*

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## Precision Cancer Screening with AI Perspectives

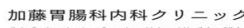International Asian Cancer and Chronic Disease Screening Network
https://www.iaccs.asia/

American Cancer Society®

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