

COLORECTAL CANCER

**Diagnosis and
Clinical Management**

Edited by
John H. Scholefield
Cathy Eng

Colorectal Cancer

Diagnosis and Clinical Management

EDITED BY

John H. Scholefield FRCS, ChM

Head, Division of GI Surgery
Professor of Surgery
University Hospital
Nottingham, UK

Cathy Eng MD, FACP

Associate Professor
Associate Medical Director, Colorectal Center
The University of Texas M.D. Anderson Cancer Center
Houston, TX, USA

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111 River Street, Hoboken, NJ 07030-5774, USA

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Contributors

Carmen Allegra MD

Professor
Department of Medicine Chief
Division of Hematology/Oncology
University of Florida
Gainesville, FL, USA

Thomas A. Aloia, MD, FACS

Associate Professor
Department of Surgical Oncology
The University of Texas MD Anderson Cancer Center
Houston, TX, USA

Simon P. Bach MBBS, MD, FRCS

Senior Lecturer
Academic Department of Surgery
University Hospital Birmingham NHS Trust
Birmingham, UK

Sarah Bannon, MS, CGC

Genetic Counselor
Department of Surgical Oncology
The University of Texas MD Anderson Cancer Center
Houston, Texas, USA

Tanios Bekaii-Saab MD

Section Chief, Gastrointestinal Oncology
Chair, CCC Gastrointestinal Disease Research Group
Associate Professor of Medicine and Pharmacology
The Ohio State University Comprehensive Cancer Center
Columbus, OH, USA

Amanda B. Cooper, MD

Clinical Fellow in Hepato-pancreato-biliary Surgery
Department of Surgical Oncology
The University of Texas MD Anderson Cancer Center
Houston, TX, USA

Steven A. Curley MD, FACS

Professor
Department of Surgical Oncology
The University of Texas MD Anderson Cancer Center
Houston, TX, USA

Brian G. Czito MD

Gary Hock and Lynn Proctor Associate Professor
Department of Radiation Oncology
Duke University Medical Center
Durham, NC, USA

Karen C. Daily DO

Assistant Professor
Department of Medicine
Division of Hematology/Oncology
University of Florida
Gainesville, FL, USA

Egidio Del Fabbro MD

Director, Palliative Care
Division of Hematology/Oncology and Palliative Care;
Associate Professor
Virginia Commonwealth University
Richmond, VA, USA

Sunil Dolwani MBBS MD

Consultant Gastroenterologist & Hon Senior Lecturer
Institute of Cancer and Genetics
Cardiff University School of Medicine
Cardiff, Wales

Marsha L. Frazier PhD

Professor
Department of Epidemiology
The University of Texas MD Anderson Cancer Center
Houston, TX, USA

David Jayne

Professor of Surgery
Translational Anaesthesia & Surgery
St. James's University Hospital
Leeds, UK

Daedong Kim MD, PhD

Assistant Professor of Surgery
Department of GI Medical Oncology
The University of Texas MD Anderson Cancer Center
Houston, TX, USA;
Department of Surgery
Catholic University of Daegu
Daegu, Korea

Yusuke Kinugasa MD

Chief
Division of Colon and Rectal Surgery
Shizuoka Cancer Center Hospital
Shizuoka, Japan

Paula McDonald

Screening Laboratory Team Leader
Scottish Bowel Screening Centre
King's Cross Hospital
Dundee, UK

Ludmila Katherine Martin MD

Fellow, Oncology/Hematology
The Ohio State University Comprehensive
Cancer Center
Columbus, OH, USA

Dipen Maru, MD

Associate Professor
Department of Pathology and Translational Molecular Pathology
The University of Texas MD Anderson Cancer Center
Houston, TX, USA

Timothy J. Moore, BM, FRCS

Consultant Colorectal Surgeon
Hampshire Hospitals NHS Foundation Trust
Royal Hampshire County Hospital
Winchester, UK

Brendan J. Moran MB, Bchir, FRCSI

Senior Lecturer, Cancer Sciences Division
Southampton University;
Consultant Colorectal Surgeon
Hampshire Hospitals NHS Foundation Trust
Basingstoke and North Hampshire Hospital
Basingstoke, UK

Maureen E. Mork, MS, CGC

Genetic Counselor

Department of Gastroenterology, Hepatology & Nutrition

The University of Texas MD Anderson Cancer Center

Houston, Texas, USA

Manisha Palta, MD

Assistant Professor

Department of Radiation Oncology

Duke University Medical Center

Durham, NC, USA

Mala Pande PhD, MPH, MBBS

Assistant Professor

Department of Gastroenterology, Hepatology and Nutrition

The University of Texas MD Anderson Cancer Center

Houston, TX, USA

Thomas D. Pinkney, MBChB, MMedEd, FRCS

Senior Lecturer and Honorary Consultant Colorectal Surgeon

Academic Department of Surgery

University Hospital Birmingham NHS Trust

Birmingham, UK

Maura Polansky MS, MHPE, PA-C

Program Director, Physician Assistant

Educational Programs

The University of Texas MD Anderson Cancer Center

Houston, TX, USA

Krish Raguath MD DNB MPhil FRCP(Edin) FRCP(Lond)

Head of Endoscopy & Consultant Gastroenterologist

Nottingham Digestive Diseases Centre, NIHR Biomedical Research Unit

Queens Medical Centre Campus, Nottingham University Hospitals NHS Trust

Nottingham, UK

Miguel A. Rodriguez-Bigas, MD

Professor of Surgery

Department of Surgical Oncology

The University of Texas MD Anderson Cancer Center

Houston, TX, USA

John H. Scholefield FRCS, ChM

Head, Division of GI Surgery
Professor of Surgery
University Hospital
Nottingham
UK

Rajvinder Singh MBBS MPhil FRACP AM FRCP

Clinical Associate Professor & Consultant Gastroenterologist
Lyell McEwin Hospital
University of Adelaide
Adelaide
Australia

Stephen Staal MD

Professor, Department of Medicine
Division of Hematology / Oncology
University of Florida
Gainesville, FL, USA

Robert JC Steele MD, FRCS

Professor of Surgery
Head of Academic Surgery
Centre for Academic Clinical Practice
Centre for Research into Cancer Prevention and Screening
Ninewells Hospital & Medical School
Dundee, UK

Kenichi Sugihara MD, DMSc

Professor,
Department of Surgical Oncology, Graduate School
Tokyo Medical and Dental University
Tokyo, Japan

Gregory Taylor

Clinical Lecturer in Surgery
Translational Anaesthesia and Surgery
St James's University Hospital
Leeds, UK

Shunsuke Tsukamoto

Chief
Division of Colon and Rectal Surgery
National Cancer Center Hospital
Shizuoka, Japan

Noriya Uedo MD

Vice-director
Department of Gastrointestinal Oncology
Osaka Medical Center for Cancer and Cardiovascular Diseases
Osaka, Japan

Jean-Nicolas Vauthey, MD, FACS

Professor
Department of Surgical Oncology
The University of Texas MD Anderson Cancer Center
Houston, TX, USA

Jenny Wei MD

Fellow, Department of Palliative Care and Rehabilitation Medicine
University of Texas, MD Anderson Cancer Center
Houston, TX, USA

Christopher G. Willett, MD

Professor and Chair
Department of Radiation Oncology
Duke University Medical Center
Durham, NC, USA

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PART 1

Diagnosis

CHAPTER 1

Epidemiology

Mala Pande & Marsha L. Frazier

The University of Texas MD Anderson Cancer Center, Houston, TX, USA

KEY POINTS

Descriptive epidemiology: assessment of the distribution of colorectal cancer

- Ecological studies of populations are used to determine variation in rates. Incidence, mortality rate, time trends, and prevalence are some key measures.
- The burden of colorectal cancer varies globally: the incidence rate is 10 times higher and the mortality rate 5 times higher in countries with the highest rates than in countries with the lowest rates.
- Worldwide, colorectal cancer is the third most common cancer in men, the second most common cancer in women, and the fourth leading cause of cancer deaths.
- In the United States, colorectal cancer is the third most common cancer in both men and women (9% of the estimated incident cancer cases in both men and women in 2012) and the third leading cause of cancer deaths (9% of estimated cancer deaths in both men and women in 2012).
- There are geographic variations in incidence and mortality, with higher incidence but lower mortality rates in developed countries than in developing countries.
- Colorectal cancer incidence rates have been declining in the United States, and have been stable or declining in most developed countries but are rising in developing countries.
- The increasing risk of colorectal cancer in developing countries may be attributable to increased longevity, and adverse lifestyle changes including smoking, lack of physical activity, and adoption of a westernized diet.
- Colorectal cancer incidence and mortality rate vary by geographic location, age, sex, race/ethnicity, and over time.
- The prevalence of colorectal cancer is high because it has a relatively good prognosis. As a result, there are over 1 million colorectal cancer survivors in the United States.

Analytic epidemiology: assessment of determinants of colorectal cancer:

- Cross-sectional, case-control, and cohort study designs can be used to determine the association of suspected environmental, lifestyle, and other exposures with colorectal cancer risk. Randomized controlled trials are the gold standard for determining cause and effect.

- Factors that increase the risk of colorectal cancer include older age, African-American race/ethnicity, inherited predisposition syndromes, family history of colorectal cancer or colorectal polyps, inflammatory bowel disease, personal history of colorectal cancer or polyps, diabetes, obesity, physical inactivity, smoking, and alcohol.
- Many other probable risk factors are under investigation.

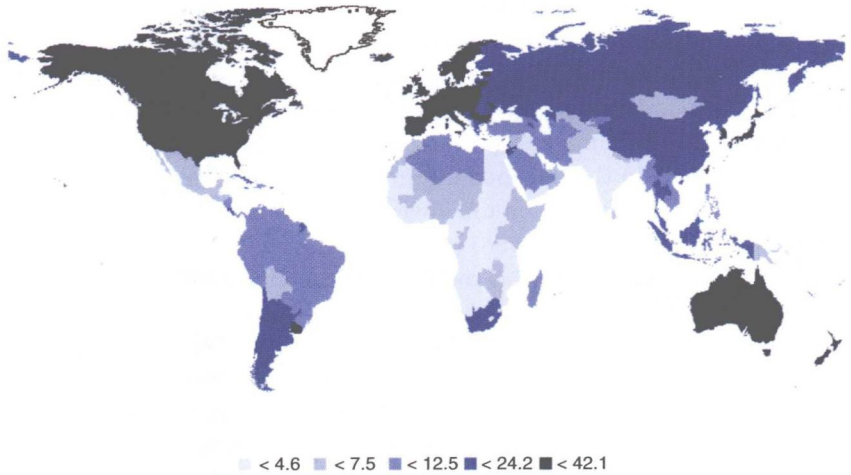
Introduction

In the last decade, cancer has become the leading cause of death in economically developed countries and the second leading cause of death in developing countries. Globally, colorectal cancer (CRC) is the third most common cancer in men, the second most common cancer in women, and the fourth leading cause of cancer deaths. In 2008, an estimated 665,000 men and 570,000 women were diagnosed with CRC, and 668,000 deaths were attributable to CRC, accounting for 8% of all cancer deaths [1].

Colorectal cancer incidence worldwide

There is almost a 10-fold variation in CRC incidence rates (proportion of newly diagnosed cases per year) worldwide for both sexes. CRC incidence rates are highest in Australia/New Zealand and Western Europe and lowest in Middle Africa and South-Central Asia [1] (Figure 1.1).

Although developed countries account for almost two-thirds of CRC cases (with the exception of a few countries in Eastern Europe, Eastern Asia, and Spain), the rates in developed countries have mostly remained stable or declined over time, whereas rates in developing countries are rising [1;2]. These differences may be attributable to changes in lifestyle and environmental factors as well as underlying genetic susceptibility. The rapid increase in the cancer burden in developing countries is possibly due to population growth and aging, and adverse lifestyle changes such as increased smoking, physical inactivity, and westernized diets [3]. Worldwide, the age-standardized rate (ASR) for CRC incidence is 17.3 per 100,000 population and the cumulative risk for CRC from birth to age 74 years is 0.9% [1]. The incidence of CRC is higher in men than in women (overall male:female ratio of age-standardized rates is 1.4:1). Country-specific rates for CRC incidence and mortality are available from the GLOBCAN database from the World Health Organization's International Agency for Research on Cancer (<http://globocan.iarc.fr/>).



GLOBOCAN 2008 (IARC) - 27.3.2012

Figure 1.1 Estimated age-standardized incidence rate per 100,000 colorectum: both sexes, all ages [1].

Colorectal cancer incidence, time trends, and lifetime risk in the United States (US)

It is estimated that 143,460 men and women (73,420 men and 70,040 women) will be diagnosed with CRC in the US in 2012 [4]. Of all CRCs diagnosed, about 72% affect the colon and the remaining 28% affect the rectum. Incidence rates for CRC in the US have declined roughly by 2–3% every year over the last 15–20 years [5], largely attributable to the advent of CRC screening, which allows for early detection and removal of precancerous polyps [6]. The lifetime incidence of CRC in the US is 5%, or 1 in 20 people are predicted to get CRC over their lifetime. The incidence of CRC is 25% higher in men than in women, and most (>90%) cases occur in men and women older than 50 years. Rates vary significantly by race/ethnicity; the incidence of CRC in African-American men is 20% higher than in white men [3].

Colorectal cancer mortality worldwide

CRC is the fourth most common cause of death from cancer, accounting for 8% of all cancer deaths worldwide. Globally, mortality rates continue to increase for deaths due to CRC (the ASR is 8.2/100,000). Cancer survival

tends to be poorer in developing countries, possibly because cancer is diagnosed at later stages and patients have limited access to timely and standard care [3]. There is less variability in mortality rates worldwide (6 times higher in men and 5 times higher in women, in countries with the highest rates than in countries with the lowest rates), with the highest estimated mortality rates in both sexes in Central and Eastern Europe (20.1/100,000 for men and 12.2/100,000 for women), and the lowest in Middle Africa (3.5/100,000 for men and 2.7/100,000 for women) [1].

The mortality rate for CRC is roughly half the incidence rate, so its prognosis is relatively good. Thus, CRC has a high 5-year prevalence (number of cases in the population at a given time), with an estimated 3.26 million people alive with CRC diagnosed within the past 5 years [1;7]. The decrease in mortality may be due to changes in incidence, progress in therapy, improved early detection due to widespread screening, diagnosis at earlier stages (when the cancer is more amenable to treatment), and many other factors [8].

Colorectal cancer mortality in the US

An estimated 51,690 people will die of CRC in 2012 [4]. CRC-related deaths in the US have been declining steadily from 1975 to 2009, with an annual percentage change of 0.5–4% [4]. The US mortality rate for CRC from 2005 to 2009 was 16.7 per 100,000 patients per year. However, mortality rates varied significantly by both sex and race/ethnicity. Mortality rates are highest for African-American men (29.8/100,000) and lowest for Asian-Pacific Islander women (9.6/100,000). The largest proportion (29%) of CRC deaths occurred in patients aged 75–84 years, and the median age at death was 74 years [4]. The mortality rate for CRC is roughly one-third the incidence rate, resulting in a high prevalence of patients diagnosed with CRC. On January 1, 2009, over 1.14 million people with a history of CRC were alive in the US [4]. The 5-year survival rate for CRC is related to the stage at diagnosis; CRC diagnosed at the local stage has a 5-year survival rate of 90%, but the rate drops to only 12% if CRC is diagnosed after it has metastasized [9]. Overall, the US has one of the highest 5-year survival rates for CRC in the world: 61% for patients diagnosed at any stage.

Colorectal cancer risk factors

Epidemiologic studies have identified many factors that may increase or decrease risk of CRC. Some of these factors, such as a personal or family