General Information

- Also known as bowel cancer
- Most commonly occurring cancer globally, with some 1.8 million incident cases in 2018 (Retrieved from World Cancer Research Fund)
- Most common cancer in Singapore
    - Most common cancer among men & the 2nd most common cancer among women in the period of 2007 - 2011 (Retrieved from: National Registry of Diseases Office Singapore)
    - Median age at diagnosis of colorectal cancer was 67 years (Retrieved from: National Registry of Diseases Office Singapore)
    - Top cancer with 9807 incident cases diagnosed from 2011 to 2015
- Top killer in Singapore, affecting more than 1865 cases each year (Retrieved from: National Cancer Institute Singapore)
- According to the Singapore Cancer Registry, about 650 deaths are caused by Colorectal Cancer each year
- 3rd leading cause of death among female cancer patients in Singapore in the period of 2007 - 2011 (Retrieved from: National Registry of Diseases Office Singapore)
- Over 1000 new cases of colorectal cancer are diagnosed in Singapore every year
- The lifetime probability of an individual developing colorectal cancer is approximately 1 in 20, and is among the highest in the world (Retrieved from: Colorectal Centre SG)
- The average population risk for developing colorectal cancer in Singapore is among the highest in the world
- Although it can occur at any age, it is more common after the age of 50 years
- Among the races in Singapore, the Chinese have a higher risk of colorectal cancer (Retrieved from: Singapore Cancer Society)
- Most cases are curable if they are diagnosed early. The cure rate for localised colon cancer can be as high as 90%

Common symptoms of colorectal cancer

Retrieved from: Icon Cancer Centre

- Sudden changes in bowel motions (e.g diarrhoea, having narrower stools, stools that contains mucus)
- Rectal bleeding: bright red or dark stool
- Lump or pain around anus
- Persistent abdominal discomfort such as cramps or pain
- Incomplete emptying of the bowel
- Anaemia (low blood count)
- Unexplained weight loss
- Persistent fatigue
- Nausea or vomiting
- Note: the above list is non-exhaustive & one should discuss with their doctor if unsure

Who is at risk?

- Average-risk individuals
    - The lifetime probability of an individual developing colorectal cancer is approximately 5%
    - The risk rises with age, occurring sporadically among younger individuals and rising sharply after the age of 50 years
    - This would include asymptomatic individuals and individuals who do not have a family history of colorectal cancer, as well as those with family history confined to non-first degree relatives or relatives older than 60 years old.
- Increased-risk individuals
    - Patients at high risk for colorectal cancer include those who have one or more first-degree relatives with colorectal cancer or a personal history of colorectal neoplasia.
    - Patients with prior endometrial, ovarian or breast cancer and those who have had pelvic radiation may have a slightly higher than average risk of colorectal cancer.
- High-risk individuals
    - Patients at very high risk for developing colorectal cancer are those with a hereditary or genetic predisposition for colorectal cancer, that is, a family history of familial adenomatous polyposis, other hereditary gastrointestinal polyposis syndromes or hereditary nonpolyposis colorectal cancer.
        - Some inherited conditions have been associated with a higher risk of colorectal cancer. These include: Familial adenomatous polyposis (FAP), hereditary non-polyposis colorectal cancer (HNPCC), Lynch Syndrome, Turcot Syndrome and Peutz-Jeghers Syndrome. (Retrieved from: gutcare)
    - Also at high-risk are patients with a long history of extensive inflammatory bowel disease (Ulcerative Colitis)
- Note: the above list is non-exhaustive & one should discuss with their doctor if unsure
- Current users of HRT (hormone replacement therapy) are at a lower risk of colorectal cancer, although this protection disappears within 5 years of stopping HRT. Aspirin and NSAID (a strong painkiller drug) are known to reduce the risk of colorectal cancer. However, it is premature to recommend the routine use of these drugs for this purpose.
- Overweight or obese persons have an estimated 30% higher risk of contracting colorectal cancer than a person of healthy weight. A variety of factors may cause this, such as the tendency of obese persons to have chronic low-level inflammation, or the increased production of adipokines, which are the hormones responsible for cell growth.

What is special about rectal cancer?
(Retrieved from: National University Hospital)

- The special thing about the rectum is that it is located within the pelvis, which is a limited space roughly the volume of a jam jar. For men, the rectum, the bladder and the prostate are all within that area and for women, the rectum, uterus and bladder. This plays a role because of the limited space; it is easy for the cancer to grow from the rectum into the prostate or bladder, or for women, the uterus and bladder.
- The rectum is near the anus (the end of the gastrointestinal tract). The anal muscles are the structures responsible for faecal continence; the anus is closed when a person is moving around so that stool doesn't leak out and it is also able to relax and open to let stool out during a bowel movement.
- For rectal cancers which are very close to the anal sphincter (anal muscles), there is a possibility that cancer cells have invaded the anal sphincter and have to be removed as well. The implication of that is after surgery, the patient would have to 'wear a bag' and have his bowel movements through an ostomy. Not all rectal tumours would need such surgery; it is only those that are very close to the anal sphincter.

How does colorectal cancer spread?

Colorectal cancer cells can grow deep into the wall of the colon or rectum and into the fatty tissue around the colon and rectum. Colorectal cancer can also spread through the lymphatic channels to the neighbouring lymph glands. In some cases, the cancer cells spread via the blood vessels to other parts of the body such as the liver or the lungs.

Why is colorectal cancer screening so important?

- Screening for colorectal cancer has been proven to save lives
    - Mathematical modelling using Singapore data has shown that screening can increase the life expectancy of the Singapore population between the ages of 50 years and 70 years.
- Any form of screening for colorectal cancer has been demonstrated to be cost-effective compared to no screening. However, the best method of screening has remained controversial. Issues of effectiveness, risks, costs, compliance and patient choice have been debated.
- The majority of colorectal cancers arise from adenomatous polyps. Malignant transformation of adenomatous polyps (adenoma-carcinoma sequence) takes 5 - 10 years via multiple gene mutations. Adenomatous polyps are relatively asymptomatic. They are present in up to 25% of individuals at age 50 and the prevalence increases with age. Most polyps (90%) can be removed at colonoscopy, thereby precluding the need for surgery.
    - Colorectal cancer usually starts with the growth of a non-cancerous tissue (polyp) on the inner lining of the colon on rectum
    - This polyp may develop into cancer over time
    - Cancer screening is important as the polyp can be detected and removed before it becomes cancerous
    - Regular screening can often detect colorectal cancer early, which is when it is most likely to be curable

- Thus, colorectal cancer has a detectable premalignant phase (adenoma) and a relatively long duration of malignant transformation. Mortality from colorectal cancer can be reduced by screening asymptomatic individuals for the presence of adenomas and early cancers. Adenomatous polyps are largely asymptomatic. The process of malignant transformation takes a relatively long time.

Types of Colorectal Cancer Screening

1. Colonoscopy
    - A procedure that enables your doctor to examine the lining of your colon for abnormal growth
    - A soft & flexible tube, about the thickness of a finger, is gently inserted into the anus & advanced in
    - The tube has a built-in camera that allows your doctor to see your colon, taking about 15-30 minutes to complete
    - Colonoscopy is the gold standard for large bowel evaluation. The screening interval for colonoscopy is 10 years. Bowel preparation with low-volume oral fleets is feasible in the absence of contraindications.
    - Things to NOTE prior to colorectal cancers screening:
        i. To be stopped before colonoscopy: Iron oral supplements (one week prior) and anticoagulation medications e.g Aspirin, Ticlid, Warfarin (5 days prior)
        ii. Should go on low fibre diet 3 days before colonoscopy and AVOID (fruits, vegetables, fruit & vegetable juices, vegetable soup, red meat, milk products, cereals & grains e.g oats, bran, wheat, muesli, barley, nuts, beans)
        iii. Foods allowed: simple carbohydrates (white rice, bread, mee sua, bee hoon, kway teow, potatoes), fish, plain coffee, tea, glucose, honey or clear soup)

2. Faecal occult blood test (FOBT)

Stool blood tests are known as faecal occult blood tests (FOBT) and are designed to test for the presence of minute amounts of blood in the stool. There are 2 types of FOBT kits:

- The guaiac FOBT (gFOBT)
    i. The earlier studies which demonstrated that annual or biennial FOBT reduced colorectal cancer mortality were performed with the gFOBT, while FIT is a newer test using the more specific immunological detection of human haemoglobin which gives superior sensitivity and specificity
- Faecal Immunochemical Test (FIT)
    i. The **free** FIT kit is distributed by Singapore Cancer Society (SCS) to eligible Singaporeans & PRs
    ii. Note: Singapore Cancer Society provides Faecal Immunochemical Test (FIT) at SCS Clinic (Bishan) free of charge throughout the year

iii. The test kit can be easily carried out in the comfort of your own home
iv. For an effective screening test, the FIT test needs to be done annually
v. The FIT test checks for hidden blood in the stool, which can be early signs of colorectal cancer
vi. The present evidence indicates that FIT is a more sensitive screening tool than gFOBT
    1. FIT detects human globin and is thus more specific for human blood than guaiac based tests, which rely on detection of peroxidase in human blood and also react to the peroxidase that is present in dietary constituents such as red meat, vegetables and some fruits
    2. Unlike gFOBT, FIT is not subject to false-negative results in the presence of high-dose vitamin C supplements, which block the peroxidase reaction

3. Physical Exam
    - Your doctor checks general signs of health, including checking for signs of disease, such as lumps or anything else that seems unusual.

4. Digital Rectal Exam
    - The doctor inserts a lubricated gloved finger into the rectum to feel for lumps or anything that seems unusual
    - This detects cancer only in the last 5 to 8 centimetres of the rectum

5. Computed Tomographic Colonography
    - Also known as virtual colonoscopy
    - A minimally invasive imaging examination of the colon and rectum, using CT scan to acquire images and computer software to process the images for interpretation
    - There have been rapid advancements in this technology, including multi-detector CT, thin slices, software improvements and techniques such as stool tagging with barium or contrast agents
    - It is the best available imaging test if optical colonoscopy is contraindicated or incomplete, and in this regard is superior to barium enema
    - The main concern over CTC is the risk of cumulative radiation, if used repetitively for surveillance

6. Barium Enema
    - An x-ray test using barium sulphate (a chalky liquid) to outline the inner part of the colon and rectum to look for abnormal areas on x-rays
    - If suspicious areas are seen, a sigmoidoscopy or colonoscopy will be done to further explore

7. Double contrast barium enema (DCBE)

- A radiographic procedure which evaluates the colon by instillation of barium and then distending the colon with air introduced through a flexible catheter inserted into the rectum
- Prior colon preparation with a dietary and laxative regimen is necessary for an optimal examination
- There have been no randomised trials or case-control studies evaluating the efficacy of double contrast barium enema as a primary screening test in average-risk people

8. Flexible Sigmoidoscopy
    - This procedure examines the rectum and the lower colon for polyps, abnormal areas or cancer.
    - A flexible, thin, tube-like instrument with a light and a lens for viewing is inserted through the rectum into the sigmoid colon

When should I refer to a specialist?

(Retrieved from: Singapore Medical Journal)

Specialist referral is indicated if patients have a positive faecal occult blood test or prefer other screening modalities such as colonoscopy or CT colonography. In addition, primary care providers can refer individuals found to have increased or high risk of CRC to specialist care. In such cases, colonoscopy is the preferred screening or surveillance modality.

What happens after the diagnosis of colorectal cancer?

- When colorectal cancer is seen on colonoscopy, a piece of the cancer is removed for examination under a microscope (biopsy) to confirm the diagnosis of the cancer
- Further testing with blood and X-ray tests may give a clue to the stage (extent of spread) of the cancer.
- You will then be referred to a surgeon experienced in the treatment of colorectal cancer for further management.

What are the treatment options available?

Surgery is the most common kind of treatment for all stages of colorectal cancer.

Forms of surgery:

1. **Local excision**
    - If the cancer is found at a very early stage, the doctor may not need to cut through the abdominal wall & remove it with colonoscopy
    - A tube will be put through the rectum into the colon to remove the cancer.
    - Standard open surgery requires a long incision on the abdomen. Surgery involves the removal of a segment of the colon and/or part of the rectum, together with its blood supply and lymph nodes. The healthy ends are then joined together to form an anastomosis thereby restoring continuity of the

digestive tract. The average hospital stay is about 1 week depending on the patient's recovery. (Retrieved from: Colorectal Centre SG)

2. **Resection**
    - If the cancer is larger, the doctor will remove the part of the colon containing the cancer and lymph node (**colectomy)**. The ends of the colon are then reconnected (**anastomosis)**
    - If the two ends of the colon are unable to be connected, a stoma is made on the outside of the body for waste to pass through. A bag is placed around the stoma to collect the waste.
    - Most surgeries can be performed using minimally invasive surgical techniques (key-hole surgery). This method can help with faster recovery and lead to ess postoperative pain
    - Laparoscopic (Keyhole) surgery uses small keyhole incisions on the abdominal wall and the operation is performed using specialised long instruments and a surgical camera. The exact same procedure as in standard open surgery is done internally with the use of keyhole instruments to remove the affected segment of large bowel together with its blood supply and lymph nodes. The healthy ends are then joined together to restore continuity of the digestive tract. The operative steps are similar to open surgery with the advantage of having smaller wounds, shorter hospital stay and quicker recovery period. (Retrieved from: Colorectal Centre SG)

Common types of colorectal cancer surgery include:
(Retrieved from: the surgeons.sg)

- Partial Colectomy - Only the cancerous portion of the colon and some surrounding healthy tissues are removed, while the remaining parts of the colon are reattached.
- Total Colectomy - This procedure involves the removal of the entire large intestine while the small intestine remains attached to the rectum.
- Ileocolectomy - The affected ileum segment will be removed, while the remaining parts of the small intestine will be sutured together.
- Abdominoperineal Resection - This procedure removes the rectum, anus, and parts of the sigmoid colon.
- Proctosigmoidectomy - This involves the partial or complete removal of the sigmoid colon and rectum.
- Total Proctocolectomy - This form of colon cancer surgery removes the entire large intestine and rectum.

Other treatments include:

1. Radiation Therapy
    - Uses high-energy x-rays or other types of radiation to kill cancer cells or keep them from growing

- Usually used after surgical removal of the cancer to kill any residual cancer cells around the original tumour site
- Can also be used together with chemotherapy to shrink a large colorectal cancer before surgery
- Types of Radiation therapy (Retrieved from: oncocare cancer centre)
    - External Beam Radiation Therapy: This involves using a machine called a linear accelerator to deliver high-energy X-rays to the tumour from outside the body. The radiation beams are carefully targeted to the bladder, aiming to kill cancer cells while minimising damage to surrounding healthy tissues.
    - Internal Radiation Therapy (Brachytherapy): Radioactive material, such as seeds or wires, is temporarily placed inside the bladder. These radioactive sources emit radiation directly to the tumour, delivering a concentrated dose of radiation while sparing healthy tissues.
    - Combination Therapy: Radiation therapy can be combined with other treatments, such as surgery or chemotherapy, to increase effectiveness. It may be used before surgery (neoadjuvant therapy) to shrink tumours or after surgery (adjuvant therapy) to target any remaining cancer cells.
    - Palliative Radiation Therapy: In advanced cases or when bladder cancer has spread, radiation therapy can be used to alleviate symptoms, such as pain, bleeding, or urinary obstruction, and improve quality of life.

2. Chemotherapy
    - The use of drugs to stop the growth of cancer
    - Can be administered by injecting drugs into the vein or taken by mouth as pills
    - Depending on the stage of the cancer, chemotherapy may be required after surgery to prevent recurrence and improve a person's chance of survival
    - Commonly used for patients with *advanced* colorectal cancer which cannot be cured by surgery or have spread to other parts of the body

Treatment for advanced colorectal cancer is now personalized whereby genetic information from the cancer is used to guide the selection of medications such as targeted therapy and immunotherapy

3. Targeted Therapy
    - Uses drugs to help stop cancer from growing and spreading by targeting specific genes or proteins found in cancer cells or in cells related to cancer growth, like blood vessel cells

- Enables advanced colorectal cancer patients to live longer despite having an incurable cancer

4. Immunotherapy
    - newest form of cancer treatment
    - A type of cancer treatment designed to allow the immune system itself to destroy the cancer cell

Visit a colon cancer clinic or talk to a colon cancer specialist who is also an expert in gastroenterology about your options and the costs involved, and discuss which tests or treatment methods are more appropriate for your needs.

Recommended stages of treatment for colorectal cancer

(Retrieved from: oncocare cancer centre)

The treatment options for colorectal cancer depend on the stage of the cancer. Early cancers require less treatment and result in higher cure rates. Treatment options are:

- Pre-Cancer (Stage 0) : Removal of the polyps by colonoscopy. Surgery is rarely required.
- Stage I-II:Surgery, usually minimally invasive (keyhole), may be needed. Chemotherapy and radiation may also be necessary for some Stage II colorectal patients.
- Stage III: Surgery, usually minimally invasive (keyhole), may be needed. This is followed by chemotherapy (for colon cancer) or chemotherapy and radiation (for rectal cancers). Radiation with low dose chemotherapy is now usually performed before the surgery for rectal cancers.
- Stage IV: Surgery, chemotherapy, targeted therapies, immunotherapy, and radiation tailored to each individual's needs.

Side effects from Colon & Colorectal Cancer Treatments

(Retrieved from: oncocare cancer centre)

Side effects of treatment are dependent on the type of treatment and are largely well managed. Discussion with your treating doctor will help you understand these issues better.

Though the exact cause of colorectal cancer remains unclear, lifestyle changes can help to reduce the risk of getting colon cancer. These include

- A well balanced diet including a variety of fruits and vegetables. Cutting down processed meats, for example, bacon, sausages, ham is also advisable.
- Drink alcohol in moderation
- Stop smoking
- Exercise regularly. Remember that if you have been inactive for a while, start slow and build up along the way.

- Maintain a healthy weight

Post-surgery care for colorectal cancer

(Retrieved from: the surgeons.sg)

Diet

- A comprehensive guide will be provided for patients and their caregivers during the recovery phase after colorectal cancer surgery. As an overall guide, patients are advised to consume small and frequent meals, monitor their weight closely, and avoid taking too many supplements at this stage. Do check with your doctor and nurse care coordinator.

Exercise & Activity

- You will be provided with adequate medical leave to rest from surgery. While resting is important, this should be balanced with some daily walks to improve muscle tone, digestion as well as improving mental well-being. Activity is also important to prevent problems such as blood clots in the legs (deep vein thrombosis) and physical deconditioning especially for the elderly which can lead to further complications.
- We also advise not to commence high intensity activity too early after colorectal cancer surgery as these may lead to wound problems such as hernias. A good guide is to wait at least 4-6 weeks before commencing such exercises and do check with your doctor and nurse care coordinator.

Wound Care

- Wound care advice will be provided upon discharge. There may also be a date provided to remove wound sutures or staples with your family physician or by our medical team. In the event of increasing wound pain, redness or some discharge that is unusual, please contact our team for a review.

Stoma Care

- A stoma is needed in some circumstances after surgery and will be advised. Stomas are usually temporary and are created to divert stools to allow healing of the anastomosis after removal of typically a rectal cancer. This stoma will be closed in a 2nd operation usually after a few months once you have fully recovered. If chemotherapy is required, the stoma is closed only after chemotherapy is completed in order to avoid any delays in your curative treatment.
- If the cancer is a very low rectal cancer or involves the anus or anal canal muscles, surgery will require the removal of the anus, making the stoma a permanent one.
- Stoma care will be advised and provided by our care teams along with supporting expert vendors. Stoma care will involve ensuring correct appliances are sized and the type advised based on each individual, and also guides on stoma skin care products.
- There will be counselling on overall nutrition and hydration. It is important to regain normal activities of daily living as best even with a stoma and we can provide guidance on how to cope at studying or at work, and also with intimate moments for couples. We will also provide advise on activities such as sports, diving and travel.

What is the outlook for colorectal cancer?

- Between 80%-95% of colorectal cancer patients are cured if the cancer is detected and treated in the early stages. The cure rate drops to 50% or less when diagnosed in the later stages. Screening is the detection of colorectal cancer in its early stage or polyps (which have not transformed into cancers) when there are no symptoms. By the time symptoms develop, some patients diagnosed with cancer are already in the later stages.
- The earlier the person receives treatment, the greater the chance of cure. Improvement in surgical techniques and better nursing care mean that surgeons can now operate on people with low complication rates as well as people who were once considered too old for operation or when the cancer was thought to be too advanced.

What can you do to prevent Colorectal Cancer?

- There is no guaranteed formula to prevent colorectal cancer. But certain general measures can be helpful, such as exercise, taking fibre, having moderate caloric intake, eating lean meat and fish, moderate carbohydrate intake and reducing refined sugars and starches.
- There is no evidence that 'antioxidants', colonic irrigation or herbal remedies help lower the risk of colorectal cancer.
- Practising a healthy lifestyle, such as:
    - Maintaining a healthy weight
    - Have low-fat diet
    - Have a high in fibres diet (fruits & vegetables)
    - Avoid Processed & red meat, or meat cooked at high temperatures
    - Ensure sufficient calcium intake in your diet
    - Exercise regularly; Increase your level of physical activity
    - Avoid alcohol intake
    - Stop smoking
- Regularly get cancer screening

Screen for Life - National Health Screening Program

What is Screen for Life?

Screen for Life is the national screening programme by the Health Promotion Board (HPB) that encourages Singapore Citizens and Permanent Residents to go for regular health screening and follow-ups.

What subsidies can I receive under Screen for Life?

- If you are a Singapore Citizen, you can access subsidised screening for cardiovascular disease, cervical cancer, and colorectal cancer at at $5^ or lower as long as you are eligible (please see Question 5 for eligibility criteria). This fixed fee also covers one follow-up consultation (if needed). These screening services are only available at Community Health Assist Scheme (CHAS) General Practitioner (GP) clinics.

- For Healthier SG (HSG)-enrolled Singapore Citizens, nationally-recommended screenings under Screen for Life will be fully subsidised at their enrolled HSG clinic. You can check with your enrolled HSG clinic when your recommended screenings are due.

- This subsidised fee covers the screening test(s) done within the same visit, and the first post-screening consultation, if assessed that a consultation is required. Individuals who undergo their screening test(s) on a separate visit will be charged a separate fixed fee.

- For Permanent Residents, please check with your preferred CHAS GP clinic on the screening test rates offered under the Screen for Life programme. The prevailing doctor's consultation will be charged accordingly by the respective CHAS GP clinics.

What does the Screen for Life subsidy cover?

- It covers the screening visit, including the cost of the recommended screening tests done within the same visit and the doctor's consultation fee, as well as the first follow-up consultation fee for individuals who have been assessed to require one. Individuals who undergo screening test(s) on a separate visit will be charged a separate fixed fee.

What do the Screen for Life subsidies aim to achieve and why should I go for screening?

- The subsidies aim to encourage more Singapore Citizens to go for the recommended screening and receive the necessary follow-up
- Treatment is more effective when conditions are detected and treated early. Going for regular screening and follow-ups with your regular GP helps to develop a meaningful patient-doctor relationship, enabling your GP to better manage your condition(s) in the long term.

How do I know if I am eligible for Screen for Life subsidies?

Your eligibility depends on:

1. Your age and sex as below
    - breast cancer screening - women aged 50 years and above
    - cardiovascular risk screening - men and women aged 40 years and above
    - cervical cancer screening - women aged 25 years and above
    - colorectal cancer screening - men and women aged 50 years and above
2. The date of your last screening
    - breast cancer screening - every two years since last mammogram
    - cardiovascular risk screening - three years since your last screening
    - cervical cancer screening - three years since your last Pap test or five years since your last HPV test
    - colorectal cancer screening - one year since your last screening with FIT

3. Whether you have been diagnosed with chronic diseases or selected cancers (cervical or colorectal)

You are strongly encouraged to make an appointment with your preferred CHAS GP clinic. On the appointment date, please present the relevant documents, your NRIC, and CHAS/MG/PG/PA card, to qualify for the subsidised rate.

Cost of treatment and/or screening

- The cost of a colonoscopy in Singapore ranges from $800 to $2600, and you should find out the specific breakdown from your doctor (Retrieved from: Advanced COlorectal and General Surgery)
- The price of colorectal cancer surgery may depend on the type of hospital
    - Private hospital: $42612
    - Public hospital but subsidised: $4177
    - Public hospital unsubsidised: $23041
    - The above prices serve only as a guideline

National University Hospital: Colorectal Cancer

In Singapore, colorectal cancer is the second most common cancer in men and in women. Combined it would be the most common cancer.

In Singapore, the risk of a person getting colorectal cancer during his or her lifetime is 5.6% — about 1 in 20. There are about 1500 new colorectal cancers cases diagnosed every year. If diagnosed early, there is a chance for a cure.

Rectal cancers account for around 30% of the total number of colorectal cancers seen here.

What is colorectal cancer?
It is cancer arising from the colon or rectum. Usually it arises from the epithelium (inner lining) of the gut wall.

Who can get colorectal cancer?
Colorectal cancer can affect any age, any race and both sexes. It is more common after the age of 50 years, more common among the Chinese. For colon cancer, the incidence is the same between males and females, whereas rectal cancer is more common among males.

How do we know we have colorectal cancer?
These are the warning symptoms that would alert us to look out for colorectal cancer.

Blood in the stools
Change in bowel habits
Unexplained Anaemia
Unexplained abdominal pain
Abdominal mass

However, bear in mind that especially in the early stages, colorectal cancer can be a 'silent' disease with no symptoms at all.

How do you make the diagnosis?
Usually the doctor will be suspicious if you have some of the warning symptoms, or if she or he feels a mass in your belly or rectum during examination. Oftentimes the diagnosis is confirmed during the colonoscopy (when the tumour is visualized) and when a biopsy is taken. Sometimes the diagnosis can be made via barium enema, CT colonography or CT scan findings as well.

What is the cause of colorectal cancer?
No one really knows what causes colorectal cancer; it is a combination of genetic causes and environmental causes. About 15% of colorectal cancers have a strong genetic basis. There are been certain well-defined genetic syndromes, namely, the Familial Adenomatous Polyposis (FAP) and Hereditary Non-Polyposis Colorectal Cancer (HNPCC). Dietary causes account for about 90% of environmental causes. There is some link between colorectal cancer and certain factors — obesity, high caloric intake, alcohol intake and tobacco smoking, just to name a few.

What can I do to prevent colorectal cancer?
The best known way to decrease the likelihood of colorectal cancer at this point in time is via colorectal screening. There is no guaranteed formula to prevent colorectal cancer. But certain general measures can be helpful, such as exercise, taking fibre, having moderate caloric intake, eating lean meat and fish, moderate carbohydrate intake and reducing refined sugars and starches. There is no evidence that 'antioxidants', colonic irrigation or herbal remedies help lower the risk of colorectal cancer.

What is special about colorectal cancer?
The special thing about the rectum is that it is located within the pelvis, which is a limited space roughly the volume of a jam jar. For men, the rectum, the bladder and the prostate are all within that area and for women, the rectum, uterus and bladder. This plays a role because of the limited space; it is easy for the cancer to grow from the rectum into the prostate or bladder, or for women, the uterus and bladder. The rectum is near the anus (the end of the gastrointestinal tract). The anal muscles are the structures responsible for faecal continence; the anus is closed when a person is moving around so that stool doesn't leak out and it is also able to relax and open to let stool out during a bowel movement. For rectal cancers which are very close to the anal sphincter (anal muscles), there is a possibility that cancer cells have invaded the anal sphincter and have to be removed as well. The implication of that is after surgery, the patient would have to 'wear a bag' and have his bowel movements through an ostomy. Not all rectal tumours would need such surgery; it is only those that are very close to the anal sphincter.

Why is colorectal cancer screening important?

The majority of colorectal cancers arise from adenomatous polyps. Malignant transformation of adenomatous polyps (adenoma-carcinoma sequence) takes 5 - 10 years via multiple gene mutations. Adenomatous polyps are relatively asymptomatic. They are present in up to 25% of individuals at age 50 and the prevalence increases with age. Most polyps (90%) can be removed at colonoscopy, thereby precluding the need for surgery. Thus, colorectal cancer has a detectable premalignant phase (adenoma) and a relatively long duration of malignant transformation. Mortality from colorectal cancer can be reduced by screening asymptomatic individuals for the presence of adenomas and early cancers. Adenomatous polyps are largely asymptomatic. The process of malignant transformation takes a relatively long time.
Screening for colorectal cancer: prevents cancer by removing polyps during colonoscopy, detects early cancers with a good chance of a cure.

Who should be screened for colorectal cancer?
Screening should begin at age 50 years for individuals without any risk factors. In individuals with an increased risk, screening should begin earlier, before the age of 50, depending on the risk factor(s) present.

How is colorectal cancer screening performed?
For a screening test to be widely applicable, it must be inexpensive, reliable and acceptable. Various screening tests for colorectal cancer have been reported. Faecal occult blood testing (FOBT) is the only screening modality that has been shown in three large randomised trials to show a 33% reduction in colorectal cancer mortality. In light of this, it would be almost medically negligent not to offer FOBT screening for average-risk individuals age 50 and above. The other commonly employed screening test is colonoscopy.

Other screening alternatives include barium enema, sigmoidoscopy and CT colonography (virtual colonoscopy). However, current evidence suggests that these alternatives may not be as effective and reliable as FOBT or colonoscopy in large-scale population screening.

Faecal Occult Blood Tests (FOBT)
Immunochemical FOBTs detect human haemoglobin from partially digested blood in the stool. They are more sensitive and more specific than guaiac-based tests that were used in the past. Another advantage is that dietary restriction is not required in immunochemical testing.

Further evaluation will be recommended if any of the two stool samples provided by the patient is positive. In a large UK study, 12% and 23% of FOBT-positive individuals had cancer and adenomatous polyps respectively on colonoscopy. Cancers detected at screening were of an earlier stage than symptomatic ones (Duke's A: 26% screened vs 11% in controls).

Immunochemical FOBT
The main disadvantage of FOBT screening is its low sensitivity. An estimated 50% of cancers will be missed on each screening round. To enhance the pick-up rate, FOBT must be done annually.

How to collect a stool sample for FOBT:
Lay toilet paper in toilet bowl as shown on the right.
Reverse sitting position as shown below need be adopted to allow for stool to collect on the toilet paper to simplify collection of the stool sample for the FOBT test.

Immunochemical FOBTs do not need dietary restriction. Individuals with positive FOBT require colonoscopy. Individuals with negative FOBT are tested annually.

Colonoscopy
Colonoscopy is the gold standard for complete large bowel evaluation. The main disadvantages are its higher cost, the need for full bowel preparation and sedation. There is also a small risk of bowel preparation. For high-risk patients e.g., individuals at risk of hereditary non-polyposis colorectal cancer, colonoscopy is the screening investigation of choice.

The main advantages are its high sensitivity and specificity and the long recommended screening interval of 10 years. The protective effect of colonoscopy is attributed to the ability to remove asymptomatic polyps before malignant transformation occurs.

Usually, bowel preparation takes 1 of 2 forms: high-volume (3-4 litres) polyethene glycol (PEG) or low-volume (90 ml) oral fleet. Oral fleet is contraindicated in patients with renal impairment due to its high phosphate content. For suitable patients, it is a more palatable option as it can be mixed with sweetened fluids. Patients taking oral fleet must be encouraged to drink plenty of water to decrease the likelihood of phosphate toxicity.

General advice to patients on bowel preparation for patients undergoing colonoscopy

Oral medications which need to be stopped before colonoscopy: Iron supplements (one week before appointment), Anticoagulation medications e.g. Aspirin, Ticlid or warfarin (five days before the appointment), Patients should go on a low fibre diet 3 days before colonoscopy, and avoid: Fruits and vegetables including fresh fruit and vegetable juices, Vegetable soup, Red meat, Milk products, Cereals and grains e.g. oats, bran, wheat, muesli, barley, nuts and beans

Foods allowed include: Simple carbohydrates (white rice, white bread, mee sua, bee hoon, kway teow, potatoes), Fish, Plain coffee, tea, glucose, honey or clear soup, Colonoscopy is the gold standard for large bowel evaluation. The screening interval for colonoscopy is 10 years. Bowel preparation with low-volume oral fleet is feasible in the absence of contraindications.

Barium enema
A barium enema is an alternative to colonoscopy for large bowel evaluation. However, bowel preparation is still needed and in some studies, the false negative rate is as high as 50%.

Furthermore, colonoscopy may still be needed to rule out suspicious lesions on the enema. There are currently no population screening studies using barium enemas.

CT Colonography/Virtual Colonoscopy
Virtual colonoscopy is a new radiologic technique used to generate images of the colon and rectal wall. Bowel preparation is still needed and like barium enema, colonoscopy may be needed for ruling out suspicious lesions and for therapeutic polypectomy.

A recent meta-analysis suggests that overall polyp detection rate is woefully inadequate, making this new technique unsuitable for population screening.