During a routine physical examination, Frank Renner, age 74, learns he has mild anemia. His doctor orders a colonoscopy to identify a source for the possible GI bleeding. But when Mr. Renner calls to schedule a conventional (endoscopic or optical) colonoscopy, he learns he'll have to wait about 6 months because of a local shortage of physicians who perform this procedure. He's advised to undergo virtual colonoscopy instead.

Overview
Colorectal cancer is second only to lung cancer as a cause of cancer deaths in the United States. Most colorectal cancers begin as polyps, which grow slowly over many years. The American Cancer Society recommends examination of the entire colon for all adults starting at age 50, and every 5 years after that. (Other organizations may recommend longer testing intervals.)

Colonoscopy is the best procedure for viewing the entire colon. However, because of the declining number of physicians who perform endoscopic procedures and the increasing numbers of Americans reaching age 50, some areas have long waiting lists for conventional colonoscopy.

Fortunately, many patients can undergo a noninvasive alternative called virtual colonoscopy, or computed tomography (CT) colonography. Far less physician-intensive, this noninvasive procedure can be done when conventional colonoscopy is contraindicated or when the waiting lists are long. It uses a CT scanner and computer virtual-reality software to look inside the colon without the need for colonoscope insertion. Data obtained from the CT scans are used to create three-dimensional images of the colon similar to those obtained with conventional colonoscopy.

Test preparation and procedure
Before the test, the patient must prepare the bowel—typically with a 24-hour clear liquid diet and an over-the-counter bowel cleansing agent, such as Fleet Phospho-soda. (New bowel-cleansing regimens are being investigated to minimize bowel preparation and thus improve patient compliance.)

The procedure requires no I.V. sedation. Performed in the radiology department, it starts with insertion of a small, flexible rubber tube into the patient’s rectum. Air or carbon dioxide is inserted through the rubber tube to inflate the colon for better visualization; the air distends the bowel and acts as a contrast medium. During air insertion, some patients may experience slight, transient abdominal cramping.

After several minutes, the patient is placed in a CT scanner and CT scans are taken—first with the patient in a supine position and then in a prone position. The entire test takes 10 to 20 minutes.

Indications
Virtual colonoscopy may be performed for these reasons:

- **Screening for polyp detection.** Virtual colonoscopy is an accurate screening method for asymptomatic, average-risk adults and compares well with conventional colonoscopy in detecting clinically relevant lesions.
- **Preoperative assessment of the colon proximal to an occlusive cancer.** In some patients, conventional colonoscopy can’t be done because the tumor makes it impossible for the endoscope to transverse the colon.
- **Incomplete conventional colonoscopy.** If the cecum can’t be visualized during conventional colonoscopy, the patient may undergo virtual colonoscopy the same day (the colon is already prepared and partially distended with air). Typically, the patient is transferred to the CT suite for the virtual procedure immediately after sedation wears off.
- **Patients who can’t tolerate an invasive procedure or anesthesia.** Because it’s noninvasive and doesn’t require sedation, virtual colonoscopy may be ideal for patients too frail to tolerate conventional colonoscopy or who have chronic obstructive pulmonary disease.
• Patients with bleeding disorders and those on warfarin therapy. Unlike conventional colonoscopy, virtual colonoscopy doesn’t require warfarin withdrawal.
• Patients who need antibiotic prophylaxis for invasive procedures. Virtual colonoscopy doesn’t require antibiotic prophylaxis because it’s noninvasive.
• Patients resistant to undergoing conventional colonoscopy. Virtual colonoscopy offers a noninvasive alternative that doesn’t require sedation or necessitate missing a day of work.

Contraindications
Conventional rather than virtual colonoscopy should be performed if the patient:
• has a history of polyps, because of the likelihood of finding new polyps that will require excision
• has ulcerative colitis and may need a biopsy
• has a history of colon cancer, because a new tumor could be found and would require excision
• weighs more than 300 lb, because the CT table can’t support extreme weights.
• is pregnant, because the procedure may expose the fetus to radiation.

Benefits and drawbacks
Virtual colonoscopy uses only disposable tubing and supplies, so cross-contamination and infection between patients aren’t a concern. Also, patients don’t require sedation so they can leave the CT suite without the need for observation, anesthesia recovery, or an escort to drive them home. In addition, they can resume normal activities immediately. (See Comparing virtual and conventional colonoscopy.)

However, polypectomy and biopsy can’t be performed during virtual colonoscopy. If abnormalities are found, the patient may need to undergo conventional colonoscopy. Also, although virtual colonoscopy is much cheaper than conventional colonoscopy, not all insurance carriers may cover it because it’s relatively new. Patients should verify insurance coverage before making an appointment.

Happy ending for Mr. Renner
Mr. Renner’s virtual colonoscopy reveals a large pedunculated polyp in the cecum, with no other colon tumors. Within a week, he undergoes surgery to remove the polyp, which contained early-stage cancer cells. If he’d waited 6 months for conventional colonoscopy, the polyp could have grown into a large tumor. Thanks to prompt removal, he requires no further treatment.

Like Mr. Renner, the future of virtual colonoscopy looks bright. At more and more medical centers, clinicians are developing expertise in performing this procedure and interpreting the results.

Selected references

Kathleen D. Pagana, PhD, RN, is Professor Emeritus at Lycoming College in Williamsport, Pa., and President of Pagana Seminars & Presentations. She is the coauthor of 18 books on diagnostic and laboratory testing, including Mosby’s Diagnostic and Laboratory Test Reference and Mosby’s Manual of Diagnostic and Laboratory Tests. Ms. Pagana’s website is www.kathleenpagana.com.