

Mathematical formulas tell physician about cancer



COMPUTING THE ODDS — Dr. Edwin B. Cox uses some old formulas and some new calculations of his own to predict when some cancer patients will be cured. (Photo by William Erwin)

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through a blood vessel, causing internal bleeding.

Like tumor growth, the action of many anticancer drugs is also predictable, Cox said. So called "alkylating agents" such as nitrogen mustard kill the same percentage of cancer cells per dose.

"If we treat a myeloma patient with a typical dose of Alkeran (a drug) for four days," he said, "we would kill about 50 per cent of his cancer cells."

Each subsequent four-dose treatment would likewise kill half the cancer cells left, he added.

The hardest part

The hardest part of predicting time until cure, Cox said, is measuring the extent of cancer in a patient.

Doctors can measure a tumor's size directly. Calipers can be used to measure surface tumors. For deeper-lying tumors, size can be judged on conventional X-ray pictures, on ultrasound pictures made by bouncing sound waves off body structures, or on "CAT" scans producing cross-sectional X-rays of the body.

Many tumors, however, don't look regular on such pictures. A doctor often has trouble seeing where the tumor ends and normal tissue begins.

Looking for 'markers'

A more accurate measurement technique looks for cancer "markers" in the patient's body fluids, such as blood and urine. These markers are substances

secreted by cancer cells. The more markers a person has, the more cancer.

"The development of new tumor markers will be the keystone for this formula," Cox said. Such markers already exist for medullary cancer of the thyroid, choriocarcinoma (a cancer beginning in the uterus) and recurrent breast cancer.

The marker for recurrent breast cancer was reported only last year by another Duke cancer researcher, Dr. Darrow E. Haagensen Jr. and colleagues.

One quirk of cancer could limit the method's usefulness, Cox said. A type of cancer cell that initially succumbs to treatment can change into a more aggressive form that resists the same type of treatment. If this happens, it would throw off a doctor's predictions based on the formulas.

Thompson named service chief

Dr. Ervin M. Thompson, an associate in the Department of Psychiatry, has been named chief of the hospital's Psychiatric Inpatient Service, effective July 1.

His appointment was announced by Dr. H. Keith H. Brodie, chairman of the Department of Psychiatry, and Dr. Frederick R. Hine, head of the Division of Inpatient Psychiatry.

Thompson, 32, will have overall responsibility for operation of the service and for developing new programs.

He is a native of Mobile, Ala., and a graduate of Yale University and Vanderbilt Medical School. He completed an internship at Presbyterian-St. Luke's Hospital in Chicago in 1973 and his residency in psychiatry at Duke in 1977.

Before being named to the Duke faculty last year, he was chief resident in psychiatry.

Radiologists gather to improve diagnoses

Sixty radiologists from throughout the United States and Canada came to Durham this week to improve their ability to diagnose cancer.

They have been participating in an intensive five-day tutorial course sponsored by the Department of Radiology, being held at the downtown Ramada Inn and ending today.

Dr. Robert McLelland, associate professor of radiology, said 12 members of the department and three guest faculty have offered individualized instruction that goes far beyond the traditional lecture format.

Two new tools

In addition to conventional X ray diagnosis, the course has covered computerized tomography (CT) and ultrasound scanning, two of the newest tools in the radiologist's arsenal, McLelland said.

"The two techniques are complementary methods of locating tumors," the physician said. "It's important to know the advantages and disadvantages of each, and when they should be used."

Computerized tomography scanners are devices that take multiple X rays of the head or the body and then

electronically feed the information received into a computer, he explained. The computer converts the information into clear, composite pictures that show the size and location of certain tumors.

Sound waves produce images

McLelland said ultrasound scanning works on the same basic principle as sonar, the apparatus that allows ships to find submarines under water.

"High frequency sound waves pass through the body, and the patterns of sound form images of organs and tumors," he said.

CT scanners can be operated by technicians, but they cost over a half million dollars each, and hospitals have to charge significantly more for these tests.

Ultrasound machines cost only about a tenth as much as CT scanners and are believed to have none of the harmful effects of repeated exposure to X rays.

Compared with CT, however, ultrasound requires more technical expertise to obtain diagnostic images.

Course faculty

McLelland said Dr. Charles E. Putman, professor and chairman of radiology at Duke, is heading the course. Guest faculty are Drs. Gerald D. Dodd, director of diagnostic radiology at M.D. Anderson Hospital in Houston; Kenneth R. Maraville, chief of computerized tomography at Southwestern Medical School in Dallas; and Guy D. Potter, professor of radiology at Columbia University in New York.

Medical center faculty, in addition to Putman and McLelland, are Drs. John A. Gehweiler, Richard Daffner, Salvario Martinez, Herman Grossman, Frederick M. Kelvin, Reed P. Rice, Terrence A. Oddson, William Thompson, Robert A. Older and James C. Reed.

On tour today

Eighteen high school seniors from Person County High School in Roxboro are touring the medical center today. The students are members of a health occupations class and are accompanied by their teacher, Brenda Long.

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Joe Sigler
Director

John Becton
Editor

Primary contributors: William Erwin, Comprehensive Cancer Center medical writer; Ina Fried, staff writer; Parker Herring, public relations assistant; Edith Roberts, staff writer; David Williamson, medical writer.

Circulation: Ann Kittrell.

Med show has \$acred theme

The event which is reputed in some circles to be "the highlight of the medical center social calendar" has been scheduled for April 22.

The house lights will be dimmed and the stage lights will come up at 8 p.m., as the annual Medical Student-Faculty Show fills Card Gym with the sounds of music and the taste of cold beverages. The doors will open about an hour before show time.

This year's production is entitled "What We Hold Most \$acred."

Tickets, good for admission and unlimited quantities of beer (and possibly Coca Cola, too), will be on sale starting next week outside the hospital cafeteria and in the House Staff Office.

It has been announced that inside knowledge of the internal structure of the medical center is not a prerequisite to enjoying the show.



LAST YEAR'S Medical Student-Faculty Show was a knock-out. This year's production will be presented April 22 in Card Gym. (Photo by John Becton)