# Donald F. Gleason, 88, Dies; Devised Prostate Test

By LAWRENCE K. ALTMAN

Dr. Donald F. Gleason, who devised the Gleason score, which has been used to help determine the aggressiveness of prostate cancer in millions of men, died on Dec. 28 in Edina, Minn. He was 88.

The cause was a heart attack, according to the University of Minnesota, where he taught. He was also former chief of pathology at the Minneapolis VA Medical Center, which was affiliated with the university and where he did most of the research that led to the score.

Dr. Gleason devised his scoring system in the 1960s through his observations of the cellular architecture of the prostate, the gland that produces seminal fluid. The score is considered the most reliable indicator of the potential for prostate cancer to grow and spread. It helps provide a prognosis and guide treatment, and it is a reference standard in clinical trials testing new therapies.

"Every prostate cancer patient knows his Gleason score," said Dr. Bruce Roth, a professor of medicine and urological surgery at Vanderbilt University and an official of the American Society of Cancer Oncology. "It is remarkable that the Gleason score remains the standard test despite the millions of dollars spent on trying to develop molecular tests to displace it."

The score is based on a pathologist's microscopic examination of prostate tissue that has been chemically stained after a biopsy. Under a standard microscope, the cells can show in various patterns.

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Donald F. Gleason

***Using a score to predict a cancer's aggressiveness.***

To determine a Gleason score, a pathologist assigns a separate numerical grade to the two most predominant architectural patterns of the cancer cells. The grade depends on how far the cells deviate from normal appearance. The numbers range from 1 (the cells look nearly normal) to 5 (the cells have the most cancerous appearance).

The sum of the two grades is the Gleason score. The lowest possible score is 2, which rarely occurs; the highest is 10. Scores of 2 to 4 are considered low grade; 5 through 7, intermediate grade; and 8 through 10, high grade.

High scores tend to suggest a worse prognosis than lower scores because the more deranged, high-scoring cells usually grow faster than the more normal-appearing ones.

Prognosis also depends on further refinements. In one example, a score of 7 can come in two ways: 4 plus 3 or 3 plus 4. With 4 plus 3, cancer cells in the most predominant category appear more aggressive than those in the second, suggesting a more serious threat than a 3-plus-4 score, in which cells in the most predominant group appear only moderately aggressive.

Donald Floyd Gleason was born on Nov. 20, 1920, in Spencer, Iowa, and grew up in Litchfield, Minn., where his father, Fred, ran a hardware store and his mother, Ethel, was a teacher.

Dr. Gleason earned his undergraduate, medical and Ph.D. degrees from the University of Minnesota. After an internship at the University of Maryland, Baltimore, as a lieutenant in the Army Medical Corps, he trained as a pathologist at the Minneapolis VA hospital. He became the hospital's chief of anatomic pathology and laboratories and retired in 1986.

Dr. Gleason is survived by his wife, Nancy; three daughters, Donna O'Neill of Annandale, Va., Sue Anderson of Burnsville, Minn., and Ginger Venable of Eden Prairie, Minn.; a sister, Barbara Jarl of St. Paul; and nine grandchildren.

In 1962, Dr. George Mellinger, the hospital's chief of urology, who also led a cooperative urological research project involving 14 hospitals, asked Dr. Gleason to develop a standardized pathological testing system for prostate cancer.

Dr. Gleason wrote in a personal narrative that he was well aware of the wide variation that existed in the speed with which prostate cancer spreads, as well as in the architectural patterns seen under a microscope. Many microscopic classifications existed at the time, but pathologists had difficulty applying them and often devised their own, thereby creating confusion in treatment and the evaluation of new therapies.

To sharpen comparisons, Dr. Gleason based his classification on a small number of changes seen in the architectural arrangement of cancer cells.

The patterns were strongly related to survival rates in the first 270 patients, he reported in 1966 in the journal Cancer Chemotherapy Reports. Extending the study to include 4,000 patients strengthened the findings.

Doctors adopted the Gleason score slowly until 1987, when seven leading experts in urology and pathology recommended that it be used uniformly in all scientific publications on prostate cancer.

The Gleason score became even more widely applied with the surge in the number of prostate cancers detected from a different test, the PSA (or prostate specific antigen) test, a blood test used for screening. As more cancers are detected, there is more reason to apply the score.

Last year, 186,320 people in the United States developed prostate cancer and 28,660 died from it, according to the American Cancer Society.