CHAPTER SIX
DIAGNOSIS AND STAGING

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You may have arrived at the urologist's office because of several different events. Your general practitioner doc may have felt something a bit out of the ordinary when he or she did a digital rectal exam (DRE) for the annual checkup. You may have come because you participated in one of the screening efforts such as those promoted by the Prostate Cancer Awareness Week (PCAW). (Please see article in Chapter 22 on PCAW). Or you may have come because you were having some bone pain. We sincerely hope that it was not for the latter reason.

Symptoms

One reason so many men die from prostate cancer is that there may be no symptoms at all, or they may be very minor. Quite often the man may ignore the minor symptoms as just a part of the process of growing old. This could be a mistake that could cost years of his life. Often, by the time there are any symptoms, the cancer has already escaped the prostate gland and metastasized. That is why it is necessary to have regular checkups, even though you may feel fine. We have said it several times before, if it is found in time, it can be cured. **The Answer to Cancer is Early Detection.**

Many of the signs and symptoms of prostate cancer are the same as those listed for BPH in Chapter Five. You may have some or all of these symptoms without having prostate cancer. If you did not read that chapter, please turn back and read about the symptoms. Here is a brief list of them:

Diuria-The need to urinate frequently during the day
Nocturia-Getting up two or more times at night
Urgency, feeling that you cannot wait
Hesitancy or difficulty in starting the urine
Straining dribbling and difficulty in stopping
Decreased size or caliber of the stream
Decreased strength and force of the stream
Feeling as though you still have to go
Dysuria-Pain or burning during urination

If you have two or more of these symptoms, and if you haven't had a checkup recently, you should see your urologist.

Diagnostic Tools

No matter what brought you to the urologist, he or she will try to determine whether you actually have prostate cancer and, if you do, what is the stage. Doctors have several diagnostic tools to help in the diagnosis and staging of prostate cancer. Some prostate cancers may be rather difficult to detect. Separately, none of the tests are 100 percent accurate.

Prostate cancer cells go through several stages of development somewhat similar to the progression from being a baby to an old man. The cancer may start out as a single cell with a slight mutation. As it reproduces, the mutation becomes more and more pronounced as shown by Dr. Gleason's chart as it goes from grade 1 to 5. See fig. 6-4.

Once the cancer is discovered, the doctor will perform several tests to gather as much information as possible. Once all the information is gathered, a clinical stage (CS) will be assigned such as T2b or B1. The stage describes the cancer and helps to make a decision as to what might be the best treatment.

The clinical stage (CS) of the cancer is only an estimate of the stage of the disease based on the tests, observations and best information available to the physician. It is not possible to determine absolutely what the clinical stage might be without removing the prostate and examining it under a microscope. If the prostate has been removed, a pathologist will examine it and assign a pathological stage, which would be indicated by a small p such as pT2b. In many cases, the clinical stage and pathological stage will be different. The man may be under staged or over staged clinically.

When you see your doctor, one of the first things that will probably be done, after you have filled out all the endless forms and paperwork, is to have blood drawn for a prostate specific antigen (PSA) test. The doctor may also ask that a prostate acid phosphatase (PAP) test be done from the same blood draw. This test was the first blood test used to detect prostate cancer and follow the course of the disease. Unfortunately it is not utilized that much anymore. It does supply some important information in some patients. Doctors may do a DRE first, then draw blood. Some believe that any rough manipulation or palpation of the prostate may cause a rise in the PSA. We have studied the effect of a routine screening exam on serum PSA levels and found that it did not result in a spurious rise in the PSA.

Digital Rectal Exam

Up until the middle of the 1980s, the digital rectal exam (DRE) was the most common way to diagnose prostate cancer. In those days when prostate cancer was first diagnosed, in up to 70 percent of the patients the cancer had already metastasized. Early prostate cancer usually does not cause any pain or have any symptoms. Before we had the PSA test and more publicity, many men never bothered to have checkups until it got to the point where they experienced pain due to the cancer. At that time, usually the cancer had already metastasized. Even today despite lots of publicity and health warnings, many men still do not have regular checkups.

An experienced urologist can determine a lot from feeling the prostate through the rectal wall. See fig. 6-1. The urologist can determine the size of the prostate and if there are any unusual bumps or nodules. In his book, Prostate Disease, Dr. W. Scott McDougal says that the prostate should feel... "smooth, firm and a bit rubbery to the touch, much like the tip of the nose. So physicians let their fingers look for any irregularities like a bump or hard

patch on the prostate. Not finding one is a good sign, but it's no guarantee that the gland is cancer free. Tumors can live deep inside the gland and not raise a lump on the surface."

Another problem is that many cancers are multifocal. There may be as many as seven or more small colonies in various parts of the prostate. A small colony may not be palpable. Before we had the PSA blood test many prostate cancers were not detected by DRE. A DRE requires a lot of skill, practice and a very sensitive finger. At a presentation to a UCLA support group, a doctor used a copy of Michelangelo's famous Sistine Chapel painting where God is reaching forth with his finger and touching Adam's finger. Not many urologists have a finger that's been touched by God, but many of them are very good. Most men get their annual checkup from a family physician who may not have the skill and sensitive finger of a good urologist. Usually, if the family physician finds anything that is a bit suspicious, the patient will be referred to a urologist.

Only the rear portion of the prostate, the peripheral zone, can be accessed and felt through the rectum. However the good news is, (if anything about cancer can be called good news), that about 70 percent of the cancers arise in this area.

Another problem is that not all men are the same. The rear portion of the prostate in some men is right against the rectal wall and is easily felt. In other men there may be up to a half inch of tissue between the rectal wall and the prostate. Another factor is that a DRE is a subjective test. If a patient with a small tumor is examined by several different doctors, each one may come to a different conclusion.

PSA Test

Today we have an increased awareness and doctors have several methods in their armamentarium to detect and discover cancer. One of the most beneficial of the tests is the prostate specific antigen test (PSA). PSA is a protein enzyme that is normally produced by prostate cells. When semen is ejaculated, it is in a viscous or gelatinous form. The primary purpose of PSA is to help liquefy the semen after it has been ejaculated. This liquefaction makes it easier for the sperm to swim in their search for an ovum.

PSA was first used in 1979 to try to identify rapists. Besides being found in the semen, PSA is also found in the blood stream. In the mid 1980s it was found that prostate cancer cells also manufacture PSA. Often, the amount of PSA in the blood correlates very closely with the amount of prostate cancer. The PSA level can be used to monitor the progress of the cancer. If the amount of PSA in the blood stream goes up, then usually the cancer is actively spreading and growing.

But remember that the first rule about cancer is that there are no rules. Some prostate cancers become so poorly differentiated that they forget how to make PSA. Some men can have metastatic cancer with a very low PSA. But as a general rule, if the PSA doubles, then we can be fairly certain that the number of cancer cells have doubled. In some cases, the doubling time of the PSA may be just a few months or even just a few weeks. The faster the PSA doubling time, usually the faster the cancer is growing. It is

very important that you have a PSA test done that can be used as a baseline. Then have several subsequent PSA tests and make a chart to plot the cancer activity.

There are several companies who do PSA testing. Your doctor will probably have one that he or she uses.

Normal PSA

When PSA was first discovered, no one knew what was normal. By checking the PSA of several thousand men, it was arbitrarily determined that the normal PSA should be between 0 and 4 nanograms per milliliter (ng/ml) of blood. (A nanogram is a billionth of a gram. It takes 28 grams to make one ounce, so a nanogram is a very small amount). We now know that several other factors are involved in what is normal and abnormal. First and foremost, all of us are different. What is normal for one man may not be for another. Some men may have significant cancer with a very low PSA. Conversely, a man may have a PSA as high as 12 ng/ml or more simply because of BPH or a prostatic infection.

Studies have also shown that PSA can be age specific and even race specific. The 4 ng/ml is not necessarily a good cutoff point for every one. If 4 ng/ml is considered normal for some younger patients, many significant cancers may be overlooked. In older men if 4 ng/ml is considered to indicate cancer, then many of them may undergo unnecessary biopsies or even have an unnecessary radical prostatectomy.

The table below is from over 200,000 men screened during Prostate Cancer Awareness Weeks (PCAWs). (The PCAW is the third week in each September. We are hoping that the whole month of September will eventually be designated for Prostate Awareness). Any PSA greater than that listed for the age should be considered suspicious. African Americans are at a much higher risk for prostate cancer and it is usually more aggressive when detected.

Table 1 Age specific PSA reference ranges by race

Age	White	African American	Latino	Asian
40-49	0-2.3	0-2.7	0-2.1	0-2.0
50-59	0-3.8	0-4.4	0-4.3	0-4.5
60-69	0-5.6	0-6.7	0-6.0	0-4.5
70-79	0-6.9	0-7.7	0-6.6	0-6.8

False Positive and False Negative PSA

PSA is one of the best biomarkers that has ever been discovered for any kind of cancer, but it is not perfect. There are several things that may cause the PSA to be elevated which might give a false indication of cancer. There are also several things that might mask the PSA and make it appear to be normal even though cancer might be present. There may be times and situations where a high level of PSA is found but there is no cancer.

Many older men have BPH which can cause a higher PSA. There are many more prostate cells if the person has enlargement due to BPH. These extra cells may cause the PSA to be as high 10 to 15 ng/ml or more. However these high levels are the exception rather than the rule. Over 60% of men with PSA this high have prostate cancer. But the cancer cells are packed closer and tighter together and, gram for gram, a prostate cancer tumor produces 10 times more PSA than BPH tumors. In some prostate tumors there is a fairly close correlation between the volume of the cancerous tumor and the PSA. But remember, there are no rules when it comes to cancer. A man may have a small tumor, but a rather high PSA, or a large tumor and a fairly low PSA.

There are diseases such as prostatitis that can also cause a rise in PSA output. There are some prostatic disorders that are treated by prostatic massage. This can cause a temporary change in the PSA. A doctor will sometimes use a cystoscope to examine the prostate or bladder. This, and other irritations, can cause a change in the PSA output. Because of this, it is sometimes best to wait a few days after one of these procedures in order to get a more accurate PSA reading.

There are several hormones and drugs that can affect the PSA. The prostate cells utilize testosterone, but usually after it has been converted to dihydrotestosterone (DHT) by the enzyme, 5 alpha-reductase. Proscar is a drug that is being used for BPH and prostate cancer. Proscar works by counteracting and inhibiting the 5 alpha-reductase. Proscar may cause the PSA to be reduced by as much as 50%. This reduction in PSA does not mean that it is curative for prostate cancer. However, some doctors believe that it can help and are using it along with hormone treatments.

A nationwide test of 18,000 men is being conducted to try to determine if Proscar can help prevent prostate cancer. The test is designed to last for ten years so we don't have any definitive data as yet.

PSA and Sex

Normally, the little sperm would have great difficulty trying to swim in the sticky, gooey ejaculate. The PSA helps to convert the viscous ejaculate into a more liquid form a short time after ejaculation. Some studies indicate that the PSA level may go up shortly after ejaculation and remain elevated for as long as 48 hours. Other studies have failed to find an association between ejaculation and PSA elevation.

Free PSA and Bound PSA

There are usually two different forms of PSA in the blood stream, the free PSA and PSA that is bound by a proteinase inhibitor. The usual PSA test measures the total PSA. Hybritech, and some other laboratories, can measure the free and bound PSA. Studies done by Dr. W.J. Catalona and others seems to indicate that if the free PSA is elevated in respect to the bound PSA, then the PSA is probably being produced by BPH. If there is a high level of bound PSA, then it is likely being manufactured by prostate cancer cells.

The free-to-bound PSA test seems to be more accurate if the PSA is BETWEEN 3- 10 ng/ml. Dr. E. David Crawford, a co-author of this book, helped do a study of Free PSA (%fPSA) to Predict Prostate Cancer Probabilities.
The study was to try to determine if the percentage of free PSA to Total could held reduce unnecessary biopsies.

Cancer probabilities for %fPSA ranges were:

% Free PSA	Prostate Cancer Probability (95% Confidence Interval)
9%	(60%-80%)
>9-11%	(50%-68%)
>11-15%	(40%-54%)
>15-20%	(29%-40%)
>20-24%	(19%-30%)
>24-26%	(11%-22%)
>26%	(6%-16%)

PSA Velocity
PSA velocity is the rate of change in PSA after several tests. If you have a PSA level that remains constant after several tests, even though it may be a bit high, then there is not much happening. But if the PSA is higher with each successive test, then you know that the cancer is growing. You should make a chart and carefully follow any change that takes place. Even if the PSA number is fairly low, if it goes up then you should become concerned. If the PSA should double, then you should become very concerned, especially, if it doubles in a fairly short time.

Prostate Density
Quite often a man will have an enlarged prostate due to BPH along with prostate cancer. Both BPH and prostate cancer produces PSA, but prostate cancer produces about 10 times more PSA than an equivalent mass of BPH. Normally cells have spaces around them, but the cancer cells are very tightly packed up against each other. When the urologist does a DRE, he can feel the hard lumps of a tightly packed tumor. The tightly packed cells of a tumor may also show up on an ultrasound image. A urologist can determine the height, width and thickness of the prostate by using DRE and ultrasound. They can then divide the PSA number by the cubic cc of the prostate and get a fairly good idea how much of the prostate is due to BPH and how much is cancer.

Other Tests
If the DRE is suspicious and the PSA test result is above normal, then the doctor may do a biopsy of the prostate. If these tests are inconclusive, or if the doctor just wants more information, there are several other tests that he may want done. Any or all of the following tests may be ordered: a bone scan, a magnetic resonance imaging (MRI) test, a computerized tomography (CT) scan, a transrectal ultrasound test (TRUS), a ploidy test, a laparoscopic test of lymph nodes, a ProstaScint test, reverse transcriptase polymerase chain reaction (RT-PCR) test and several others.

Based on the information provided by the tests, the doctor will assign a clinical stage. It is called a clinical stage because diagnosis is made in a clinical setting. The stage assigned will usually determine the treatment decision.

Post Treatment PSA
If a man has had surgery to remove the prostate, then his PSA should be undetectable. If the man has had radiation or cryosurgery treatment, he will probably still have some viable prostate tissue left. So it may be normal for these men to have a small amount of PSA in the blood. Recent evidence would suggest that the optimal PSA after any type of successful radiation therapy should be less than .5ng/ml or lower. The PSA should be stable from test to test. If a man has a high PSA reading after radiation or cryosurgery, and it remains high or increases in subsequent tests, then we know that all of the cancer was not killed, or that it had metastasized before treatment.

Ultra-sensitive PSA Test
After a prostatectomy there should be no PSA at all because the entire prostate has been removed. If a test shows PSA, then we know that the cancer had metastasized. Metastatic cells are still prostate cancer cells, no matter whether they have set up a colony in the vertebra or lungs or wherever. These cells will continue to pour PSA into the blood stream. If a test shows that the PSA is rising after a prostatectomy, then we know that there are cancer cells still in the body somewhere.

For standard PSA tests, 0.1 to 0.2 is usually considered undetectable. The ultrasensitive tests can detect as low as 0.02 ng/ml. These tests will detect recurring PCa much sooner than a standard PSA test. If there is recurrence, early detection and treatment can help control it. At the present time there are two labs who are doing ultrasensitive testing, Quest Diagnostics at 1-800-642-4657 and Diagnostic Products at 800-678-6699.

The normal PSA test can only detect down to about 0.2 ng/ml. This level of accuracy is fine for pre-treatment PSA tests since there can be a wide variation due to several causes. But after treatment, especially a radical prostatectomy, there should be no PSA. Dr. Stamey et al at Stanford University devised an ultra-sensitive test that may be ten times more sensitive than the normal Hybritech test. This test can show that the PSA is rising several months before it becomes high enough to be detected by the normal PSA test. If the ultra-sensitive PSA test shows PSA activity, then treatments can be immediately instituted before the cancer has a chance to gain a foothold.

Below is a post from the Internet by Charles Clausen about the ultrasensitive PSA tests:

Subj: Re: Ultra-Sensitive PSA
From: cclausen@magick.net (Charles Clausen)

ULTRASENSITIVE PSA ASSAYS
Early PSA assays were able to reliably detect PSA levels at a detection limit only as low as about 0.4 ng./ml. In the early 90¹s when improved assays were being developed, Dr.

Thomas Stamey and his associates at the Stanford University School of Medicine conducted studies of the most finely sensitive of them to determine their value in the early detection of recurrence after prostatectomy:

It was concluded that ultrasensitive assays that can reliably read values in the range well below 0.1 ng./ml will detect recurrence several months and even a couple of years before the older standard assays which had a detection limit of 0.3 ng./ml. The advantage of this early detection of recurrence after prostatectomy is that further therapeutic measures such as radiation or hormone therapy may be undertaken earlier.

The ultrasensitive assays are so sensitive that they will frequently detect extremely minute amounts of PSA that may be secreted by tissue cells other than prostate or prostate cancer cells, such as the urethra or the bulbo-urethral gland. Therefore an indication of very low levels of PSA detectable by these assays is not considered to be an indicator of recurrence. In some cases, even some post-RP men who are being tested with conventional assays may show a stable PSA of about 0.1 or 0.2. These men are not considered to have had recurrence unless there is an observable rise of the PSA level with three testings over a period of a few months. This criteria of three testings is applied also with the ultrasensitive assays, but the advantage is that these assays can start defining a rising PSA at lower levels, and with greater accuracy.

The ultrasensitive assays that have been most commonly available commercially are those manufactured by Tosoh, Quest Diagnostics, and Diagnostic Products. The Diagnostic Products assay is known as the Immulite 3rd Generation, with a detection limit of 0.003 ng./ml. In 1998 Dr. Stamey said that it was the most sensitive of the assays on the market. Of interest is a DP Winter 1998 newsletter article about the assay at:

http://www.dpcweb.com/medical/cancer/articles/98_winter_psarelease.html

The Quest Diagnostics web site is: http://www.questdiagnostics.com
The Diagnostic Products web site is: http://www.dpcweb.com
The Tosoh PSA web page is : http://www.tosohm.com/html/tosoh_psa.html

These web sites may be helpful in locating local labs which offer the assays.

A Simple PSA Test
The Biosafe Company has developed a very simple PSA test that uses just a couple drops of blood from a pin prick of a finger. It is somewhat similar to the diabetes tests. The Biosafe company provides a home kit with all that is needed to collect the blood then send it to their lab. It could be a very good tool for prostate screening. A lot of people would submit to a finger stick at home rather than having to draw a vial of blood with a large needle.

At this time, they can only detect PSA between 0.6 and 10. This would be good enough for men who have not been treated. They are developing a more sensitive test.

You can order the kit from their web site at http://www.psa4.com or write to them at Biosafe Laboratories, 8600 W. Catalpa Ave., Chicago, IL 60656-9907 Tel. 1-888-700-8378

Fig. 6-2 shows a Biosafe kit.

The Qualisys Diagnostics Company has a simple PSA test device called the FastPack System. It is a small device that sits on the desk. The machine is 13 inches wide, 9 inches high and 12 inches deep. A blood sample is placed in the machine and within fifteen minutes you have the results. It uses the chemiluminescence assay and performs a broad range of tests.

The company is located in Carlsbad California- Phone 760-918-9165. They have a website at www.qualisysdiagnostics.com

Fig. 6-3 shows a FastPack System.

PSA Graph

The PSA correlates fairly closely with the prostate cancer activity. It would be wise to have three or more PSA tests and track the trend before you have a major treatment. If it begins to go up, then you should be concerned.

John Fistere is a computer programming whiz. He has written a program called MultiGraph that will construct a graph for you showing the trends of your disease. All you have to do is send him a digest of your history by email. It's a free service of the Prostate Cancer Research and Education Foundation (PCREF). Send a message to John at JFistere@email.msn.com for instructions. John has contributed a whole lot to the fight against prostate cancer.

Transrectal Ultrasound

Many prostate cancers can be seen with ultrasound using a special rectal probe that is inserted into the rectum. This is called transrectal ultrasound or TRUS. Cancer tumors are usually much more dense than normal tissue. There are many different types of cancers. Rather than being a lump, the tumor may have an irregular surface and exhibit extensions of the cancer into nearby tissues.

Of course, a DRE should be done to see if there are any abnormalities that can be felt. Using DRE, PSA and TRUS, almost all prostate cancers can be detected. There are ultrasound machines that use a color Doppler effect that can be very effective in seeing cancers. One of the features of cancer is that they are usually highly vascular. The Doppler systems can see the blood vessels in color. One of the disadvantages is that these machines are very expensive.

Artificial Neural Network Analysis (ANNA)

Drs. Crawford, Loch and others have evaluated the use of artificial intelligence to aid in the interpretation of ultrasound images and have found that this technique may be useful in determining the presence of cancer.
A portion of the 1994 PCAW database was used to train an artificial neural network. The database consisted of 39 clinical and demographic variables gathered on patients throughout the United States. The neural network was designed to diagnose the presence or absence of CaP. The portion of the database used by the neural network consisted of 1500 men all of whom had either an elevated PSA level or a suspicious digital rectal examination. These men all underwent a biopsy to confirm the presence of prostate cancer. Seventy-five percent of this group had a negative biopsy. An artificial neural network was trained and tested using 90% of this database. The remaining 10% was used in a prospective sense to validate the predictive ability of the network.

ANNA blindly classified 378 (99%) of the 381 confirmed benign pathology-confirmed samples correctly as true negatives. The false positive rate was 1% (n = 3). Of the 119 pathology-confirmed malignant samples, 94 (79%) were classified correctly; 25 (21%) were falsely classified as negatives. 0f all 119 cancers, ANNA classified 60 (71%) of the hypoechoic cancers as cancers and 24 (29%) as false negatives. Surprisingly, 34 (97%) of the isoechoic cancers were correctly classified by the ANNA, missing only 1 sample. Pathologic tumor stage was correctly determined preoperative by TRUS in 52% and by 3D-ANNA in 82%. TRUS underestimated tumor stage in 40%, 3D-ANNA in 18% of the cases.

The introduction of 3D-ANNA significantly increases the accuracy of prostate cancer detection and staging. The ability to differentiate among non visible isoechoic cancerous lesions appears to be promising, and is an improvement over conventional TRUS.

Biopsy
A biopsy is one of the better ways to determine if cancer is present. It is a very important test. A hollow needle is usually inserted into the prostate with the intent of penetrating the cancer. The needle picks up a small core of the prostate which is then examined under a microscope by a pathologist for cancerous cells. We have devoted the entire next chapter to biopsies and pathology.

Many cancers are multifocal, that is there may be several small colonies in the prostate. Remember also that the word cancer means crab, so it may have several extensions or "legs". It is possible that some or all of the cancer will be missed. The biopsy may be a hit or miss procedure. Some doctors, such as Dr. Fred Lee at Crittendon Hospital, use a color Doppler Transurethral Ultrasound (TRUS) to find the cancer. He has had great success.

Gleason Score
Prostate cancer cells may not all be the same. A colony may be much like a family, with some very young cells that are just starting to become cancerous, some that are in the intermediate stage, and some that are old. The younger ones may look very much like a normal cell, or well differentiated. (The term differentiated is derived from the embryo which develops from the original egg and sperm. All subsequent growth is due to cells

that become different or differentiate into arms, legs, muscles and all of the other tissues of our body). The intermediate cancer cells may be somewhat changed and moderately differentiated, while the older ones may be very much changed and poorly differentiated. Those that are poorly differentiated are usually more aggressive and subject to metastasis.

Dr. D.F. Gleason was a pathologist who specialized in prostate cancer. He determined that there could be five different types of prostate cancer cells. Depending on the differentiation of the cells, he graded them from I to V. If he looked in the microscope and saw a large number of cells that were well differentiated, he might call them a grade 1. If there was another group that was less differentiated, he might call it a grade 2. If they were moderately differentiated, he might give them a grade of 3. If some of the cells were poorly differentiated, he might call them a grade 4. The really bad ones were assigned a grade 5. The grades of the two types of cells that were most prevalent were then added to give a final score. In the instance above, the 3 and 4 would be added for a score of seven. The first figure indicates the greatest number of that type so the example above would indicate more type 3 than type 4. If the figures were 4 plus 3, it would mean that there was more grade 4 than 3. This would indicate a worse prognosis. Figure 6-4 shows a copy of Dr. Gleason's drawing. **&&&NOTE: Use fig. 5-1 from original for fig. 6-4 &&&&**

A low-grade tumor might be one that has a Gleason score of 2, 3, or 4. A medium grade would have a Gleason score of 5, 6 or 7. A high-grade tumor would be one that has a Gleason score of 8, 9, or 10. Ordinarily, if the Gleason score is 5 or less, the cancer may not need treatment except to watch and wait. A Gleason score of 6 or 7 should be cause for concern. If either one of the individual scores is 4 or more there is cause for concern. A score of 8, 9, or 10 usually indicates a very aggressive cancer. These cancers have probably metastasized, are usually systemic and may have a poor prognosis.

Since the Gleason score is subjective to some extent, usually two or more pathologists will examine the sample.

Ploidy Tests

A ploidy test is another test that tries to determine the aggressiveness of the cancer. All of our normal cells are diploid, that is they have two identical sets, or 23 pairs, of chromosomes in the nucleus. A cancer cell may be aneuploid which means that it may have an uneven number of chromosomes. The cell may also be tetraploid, with four sets or polyploid with a large number of sets.

The ploidy test measures the amount of DNA in the cells. If there is an abnormal amount, then the cells are more likely to be aggressive. The test can be done from tissue removed during biopsy. The ploidy test is rather expensive. Some doctors do not believe that it is worthwhile.

Here is a post on the internet about ploidy by John Fistere:

> "I went to a lecture at our support group titled "Understanding the DNA Ploidy Test", given by Perrin McDaniel, General Manager, Cytometry Associates. Surprisingly, I now

understand the DNA ploidy test :-) (an Internet grin). The test simply measures the amount of DNA in cells as they flow past a certain point. The cells have been stained with a dye that fluoresces only when bound to DNA. The results are displayed on a chart that effectively has a percentage of cells on the vertical scale, and brightness, or amount of DNA, on the horizontal scale. If all the cells were normal, and "at rest" (diploid) then there would be one peak on the chart, corresponding to the amount of DNA in a normal cell.

However not all cells are at rest. Some are "ready" to divide. These cells will show as a second peak at about twice the brightness, because they have synthesized a second set of chromosomes in preparation for mitosis, or cell division. These cells are tetraploid, but normal. Typically that peak will be no more that 15% of the cell population (or maybe it was 15% of the main peak). Some cells are in the process of synthesizing DNA to get ready for division, so they will show up somewhere in between the diploid and tetraploid, and will not have a peak. So, for a population of normal cells you have two peaks, with a level in between.

What can happen is that abnormal cells will develop with different chromosome complements, usually more than diploid, and they will continue to multiply with that abnormal amount of DNA, and produce a peak on the chart at some other location. The population of cells that produce that peak is sometimes called a "cell line". Also, if the tetraploid peak is too high, above the arbitrary 15% limit, it indicates that there are abnormal tetraploid cells in the population. Although I have not studied ploidy reports, the speaker indicated that the report would state whether or not there was an aneuploid population, and report the percentage of cells 1) at rest, 2) synthesizing DNA and 3) ready to divide. He did not say so, but I would think the report would include the percentage of aneuploid cells in the sample."

Dr. Jonathan Oppenheimer, (author of the next chapter on Pathology), says that he, and many other pathologists, can make a fairly good estimation of the ploidy by just looking at the slides from a biopsy to determine the Gleason. He says his estimations correlate rather well with the laboratory flow cytometry tests. (And his estimations are a lot less expensive than the lab tests). You might ask if your pathologist can do the same. At the present time, the value of the ploidy testing is controversial. One of the problems relates to sampling errors from the biopsy.

Bone Scan

If the prostate cancer has metastasized, it often sets up colonies in the bones. Without a good blood supply, a tumor is severely limited in how large it can grow. The bone marrow is very rich in blood so the cells can readily establish colonies. These colonies can be seen with an Xray bone scan.

To do a bone scan, a radionuclide substance is injected into the patient. The radioactive substance will seek out bone cancer and will show up on an x-ray as a "hot spot". Some doctors do a bone scan routinely, but in many cases it is not needed. Several studies have shown that if the PSA is less than 10 ng/ml and the Gleason score is less than seven the

bone scan will be negative in all but a very few cases. Because of HMO and insurance restrictions, the doctors are now more selective in recommending a bone scan.

Reverse Transcriptase Polymerase Chain Reaction
Reverse Transcriptase Polymerase Chain Reaction, (RT-PCR), is a very sensitive DNA test that can detect just a few prostate cancer cells in the blood stream. Finding a cancer cell in the blood stream before treatment might indicate that the cancer has escaped the prostate and has already metastasized. If the cancer has already metastasized, then it won't help much to remove the prostate. But it is rather difficult for a cancer cell to establish a new colony. It must find a good site and establish new blood vessel. While doing this, the cancer cell must avoid being recognized and destroyed by the body's defenses.

Dr. Michael Sokoloff et al at UCLA did a study that was reported in the November 1996 issue of the Journal of Urology. This study found... "Circulating PSA producing cells were present in 29 of 33 patients (88%) with metastatic prostate cancer. Two of 19 patients (11%) with no known prostate cancer exhibited positive signals (1 later had PCa), Positive PSA polymerase chain reactions were detected in 30 of 51 patients (59%) with stages pT1 and pT2 disease and in 13 of 18 (72%) with stage pT3 cancer. No significant relationship of a positive PSA PCR signal to pathologic stage, tumor grade, apical involvement or positive surgical margins was found...
Conclusions: in patients with pathologically determined localized disease, in our experience PCR based assays offer no immediate benefit for preoperative staging...".

Of course if the patient has had a prostatectomy and a RT-PCR test finds prostate cancer cells in the blood stream, then the patient has metastatic cancer.

ProstaScint
ProstaScint is approved as a diagnostic imaging agent in newly diagnosed patients with biopsy proven prostate cancer who may be at high risk for pelvic lymph node metastases. ProstaScint is also indicated as a diagnostic imaging agent in post-prostatectomy patients with a rising PSA and a negative or equivocal standard metastatic evaluation in whom there is a high clinical suspicion of occult metastatic disease.

The ProstaScint test uses monoclonal antibodies that are specific to prostate cancer. The antibodies are designed specifically to detect cancer in soft tissues. The antibody is combined with a radioactive tracer, Indium 111, to create a substance that is injected into the patient's system. The antibody then attaches itself to the walls of prostate cancer cells and, with the aid of a radioactive tracer, a scan reveals the location of the cancer.

The antibodies have an affinity for prostate cells, so most will search out those cells and settle there. The body is then scanned with a gamma ray camera which can locate the radioactive antibodies and metastatic areas. A gamma ray camera is similar to a geiger counter which can detect radioactive rays.

In post-prostatectomy patients who have a rising PSA, ProstaScint scans can distinguish between cancer which has recurred at the previous site of surgery and cancer which has spread either regionally or distantly. This additional staging information may be helpful in selecting the most appropriate therapy for you.

Sometimes cancer will spread to bone. A radionuclide bone scan is able to detect metastases. However, a bone scan will not detect metastases in soft tissue (e.g. the lymph nodes). In contrast, a ProstaScint scan can detect cancer that has spread to the lymph nodes, and, although it may sometimes identify bony metastases, it is much less sensitive than a bone scan. Consequently both tests may sometimes be needed

A disadvantage of the ProstaScint test is that it is rather expensive. It may also be difficult to interpret the test results. There may be false positives and false negatives. Only about 70% of the tests are accurate.

The ProstaScint imaging study provides prognostic information which complements other diagnostic indicators in cases of prostate cancer where there is a high clinical suspicion of metastasis. Because it requires specific training for optimal administration and interpretation, CYTOGEN has established a growing network of non-affilitated imaging centers where personnel have undertaken this specific training.

For more information visit http://www.prostascint.com or www.cytogen.com

Cytogen provides a list of several centers, by state, where one can get a ProstaScint test. Go to: http://www.prostascint.com/pie_dir_mstr.jsp

You may also contact them at:
Medical Imaging Sciences
CYTOGEN Corporation
600 College Road East
Princeton, NJ 08540-5308
Tel: 609-987-8200
Fax: 609-987-6450
Email: imaging@cytogen.com

Micrometastases
Despite all the tests that may be performed, there is still the possibility that some of the cells may have escaped the prostate and formed a micrometastatic colony somewhere in the body. It would be impossible to detect a small colony of just a few cells. If it is a fairly large colony, the ProstaScint test will probably detect it. And of course, if it is a fairly large colony that has set up in the bones, a bone scan will detect it.

Lymphadenectomy
When the cancer escapes the prostate, it will often be found in the pelvic lymph nodes. When a radical prostatectomy is performed, usually one of the first things done after opening the man is to check the lymph nodes. They send them out to be quick frozen and

checked for cancer cells. If cancer is present in the lymph nodes, the operation is usually halted. It wouldn't do much good to remove the prostate if the cancer is systemic.

If the man is going to have brachytherapy or seed implants, or other forms of radiation, proton beam therapy or cryosurgery, there will be no opportunity to check the lymph nodes. Some doctors have advised that if any of the patients considering these therapies have a PSA greater than 20 ng/ml or a Gleason Score of 7 or more, then it might be worthwhile to have a pelvic laparoscopic lymphadenectomy. The laparoscope is a small tubular instrument with lenses and several attachments. It can be inserted into the abdomen or pelvic area to harvest lymph nodes. If a harvested lymph node proves to be positive for cancer cells, then more appropriate treatments should be considered.

Dr. Crawford and others have set up an artificial Intelligence System that can be used to predict lymph node involvement and save a lot of unnecessary lymphadenectomies. Approximately 125,000 radical prostatectomies are performed annually as treatment for prostate cancer in the US. Only 5 to10% of patients that have lymphadenectomy with radical prostatectomy have pathology proven lymph node disease. Therefore, approximately 90-95% of these lymphadenectomies are unnecessary.

A database of 4,133 patient records was used to train and validate the AI system. Using this technology, we can identify patients at low risk for lymph node involvement with an accuracy of 98-99% and thereby avoid performing unnecessary lymphadenectomies on these patients.

Staging Systems

Once all the tests have been done and as much information as possible has been gathered, the doctor will then assign a clinical stage (CS). Of course the clinical stage may not be completely accurate. The only way to be absolutely sure of a stage is to remove the prostate and have a pathologist examine it. Even then, it is possible that the man may have micrometastases somewhere that would not show up on any test that we have.

For several years, urologists have used the Whitmore-Jewett staging system of A, B, C and D. Each of these main stages had sub-stages that helped to better describe the tumor. But there are some instances where this system does not give enough information about the disease. Many doctors and publications are now switching to a Tumor-Node-Metastases (TNM) system.

The Whitmore-Jewett system (stages A through D) was described in 1975 and has since been modified. In 1997, the American Joint Committee on Cancer (AJCC) and the International Union Against Cancer, adopted a revised TNM system which employs the same broad T stage categories as the Whitmore-Jewett system. But it includes subcategories of T stage, including a stage to describe patients diagnosed through PSA screening. This revised TNM system is clinically useful and more precisely stratifies newly diagnosed patients. Both staging systems are shown below.

TNM definitions
Primary tumor (T)
TX: Primary tumor cannot be assessed
T0: No evidence of primary tumor
T1a: Tumor incidental histologic finding in 5% or less of tissue resected in TURP
T1b: Tumor incidental histologic finding in more than 5% of tissue resected in TURP
T1c: Tumor identified by needle biopsy (e.g., because of elevated PSA)
T2a: Tumor involves 1 lobe
T2b: Tumor involves both lobes
T3a: Extracapsular extension (unilateral or bilateral)
T3b: Tumor invades seminal vesicle(s)
T3c: Cancer that has invaded the seminal vesicles
T4a: Tumor that involves the bladder neck and/or external sphincter and/or rectum
T4b: Cancer that involves other pelvic areas near the prostate
N0: No cancer detected in the lymph nodes
N1 (N+): Cancer spread to one or more lymph nodes (2 cm of cancer or less)
N2 (N+): Cancer spread to one or more lymph nodes (2cm to 5 cm of cancer)
N3 (N+): Cancer spread to one or more lymph nodes (5cm of cancer or more)
M0: No distant metastasis
M1 (M+) Distant metastases

Histopathologic grade (G)
GX: Grade cannot be assessed
G1: Well differentiated (slight anaplasia)
G2: Moderately differentiated (moderate anaplasia)
G3-4: Poorly differentiated or undifferentiated (marked anaplasia)

AJCC stage groupings
Stage I
T1a, N0, M0, G1

Stage II
T1a, N0, M0, G2, 3-4
T1b, N0, M0, Any G
T1c, N0, M0, Any G
T1, N0, M0, Any G
T2, N0, M0, Any G

Stage III
T3, N0, M0, Any G

Stage IV
T4, N0, M0, Any G
Any T, N1, M0, Any G
Any T, Any N, M1, Any G

The Whitmore-Jewett staging system is as described below:
A1: Clinically undetectable tumor confined to the prostate gland and is an incidental finding at prostatic surgery such as a TURP. Same as T1a, less than 5% of prostate.
A2: Unsuspected tumor found during a TURP, same as T1b, occupies more than 5%
B1: Cancer that is felt- may occupy 50% or more of one side, same as T2a
B2: Cancer that is felt and occupies both sides of prostate, Same as T2b
C1: Cancer that is growing outside the prostate, one or both sides, same as T3a
C2: Cancer that has invaded the seminal vesicles and/or the bladder neck, same as T3c, rectum and other nearby pelvic areas, same as T4a
D1: Cancer that has spread to one or more lymph nodes, same as T4b
D2: Cancer that has spread and set up distant metastases
D3: D2 prostate cancer patients who relapsed after adequate endocrine therapy

Figure 6-5 shows a drawing of a normal prostate. Fig. 6-6 shows a stage T 1 or A, fig. 6-7 shows a stage T2 or B, fig. 6-8 shows a stage T3 or C and fig. 6-9 shows a stage D. (These drawings are courtesy of the Schering Company).

One of the co-authors of this book, Dr. E. David Crawford, has suggested that the D stage should have further categories. It is important to classify patients with advanced prostate cancer by evaluating the actual behavior of the disease. Not all patients with advancing disease are stage D1 or D2. There are an increasing number of patients with stage D1.5 disease. This subset of patients are identified as having a small tumor burden and a rising PSA after failing local therapy.

Another important subset of patients are those who successfully received hormonal manipulation and later had a rising PSA. These patients should be classified as stage D2.5, which is becoming the most frequent presentation of advanced disease. The benefit of further separating the hormone sensitive from the hormone insensitive patient is that it selects cohorts that may benefit from earlier chemotherapeutic efforts.

Grade vs. Stage
A Gleason Grade (GG) is used to designate each of the individual components that make up the Gleason Score (GS). For instance a biopsy might contain Gleason Grade 3 as the primary component and a Gleason Grade 4 as the secondary component. This would give a Gleason Score of 7.

Grade and stage are sometimes confused. Prostate cancer has been arbitrarily divided into three grades of disease. A man with a Gleason score of 2, 3 and 4 would be considered have a Grade 1 disease; a Gleason score of 5, 6 and 7 would be Grade 2 disease; and a Gleason score of 8, 9 and 10 would be Grade 3 disease. They are also designated as low grade, medium grade and high grade.

Dr. Jonathan Oppenheimer is a pathologist. He doesn't like these designations. Many doctors consider any Gleason grade that has a 4 component such as 4+3 or even 2+4 should be considered to be high grade or at least Grade 2. (Grade 2+4 is unusual, but my

friend Ralph Valle had this score). Dr. Oppenheimer said that the person who decided this grading system should be given a DRE with a hot jalapeno pepper.

Knowing the PSA, the Gleason Score and the clinical stage and the Partin/Narayan Tables predictions, can help the doctor and you to choose the best form of treatment.

Magnetic Resonance Imaging and Magnetic Resonance Spectrographic Imaging (MRI/MRSI)

Fig. 6-10 shows a MRI machine and a diagram. Here is a bit of information about Magnetic Resonance Imaging (MRI) and Magnetic Resonance Spectrographic Imaging (MRSI):

MR imaging emerged in 1980 as an outgrowth of the use of nuclear magnetic resonance to study the structure of chemical compounds. MR imaging has several advantages over conventional radiography:

• It does not use ionizing radiation, so it is safer than conventional radiography or CT.
• It can obtain images in sagittal, coronal, transverse, and/or oblique planes.
• The endorectal/pelvic phased coil MRI is highly accurate in detecting seminal vesicle invasion and extracapsular extension of prostate cancer (96% and 81%, respectively).
• Within the same exam, MRI can also be used to assess cancer that has spread to the pelvic lymph nodes or bone.

However, even with all of these advantages, the MRI has limitations:
• Localization of cancer within the prostate is subject to error because of factors such as post-biopsy hemorrhage, chronic prostatitis, BPH, intraglandular dysplasia, trauma, and therapy. This can lead to an overestimation of the spatial extent of cancer and extracapsular extension.
• MRI alone has demonstrated a high sensitivity but low specificity in determining tumor location within the gland due to a large number of false positives. But the combined MRI/MRSI study provides high resolution anatomic imaging and nuclear magnetic resonance spectroscopy data. The result is that one can observe specific resonances (peaks) for citrate, choline and creatine from 0.24cc volumes throughout the gland. The area under these peaks is related to the concentration of these metabolites and changes in these concentrations can be used to identify cancer.

Dr. Joseph P. Hornak has an excellent web site called the Basics of MRI at
http://www.cis.rit.edu/htbooks/mri/inside.htm

It is a complete book that you can read on line. It is a bit technical and may tell you more about MRI than you want to know.

Here is a short article on MRI by Bernie Beskind, e-mail bernieb@CITYWORLD.COM:

I just returned from getting my MRI/MRSI at UCSF, and thought I would document the test, the content of my report, and my experiences with the staff, facility and area.

THE MRI/MRSI TEST (Condensed from the UCSF Patient Manual)
While both tests are FDA approved, the accuracy of the combined magnetic resonance imaging (MRI) and magnetic resonance spectroscopic imaging (MRSI) for assessing the presence and spatial extent of prostate cancer is still undergoing clinical investigation. MRI uses a strong magnetic field and radio frequency waves to non-invasively obtain anatomic pictures based on tissue water.

MRSI creates a metabolic picture based on the relative concentrations of the cellular metabolites citrate, creatine and choline. The area under the peak returns from these substances is related to the concentrations of these metabolites, and changes in these concentrations can be used to identify cancer. To date, over 2000 prostate cancer patients have been studied using this combined exam. In a study of 62 patients who had the exam prior to an RP followed by step-section histopathology, it was demonstrated the prostate cancer could be localized to a sextant of the prostate with a specificity of up to 91% when both were positive for cancer, and a sensitivity of up to 95% when either were positive for cancer. (My note: I think this means that when both are positive, it is 91% correct that cancer is present, and when both are negative, it is 95% correct that cancer is absent.) The test is especially appropriate for determining extracapsular extension and seminal vesicle invasion. It is less accurate for assessing lymph node invasion. It can help guide treatment decisions and assess a post treatment rising PSA.

The test takes about an hour. The patient is on a light diet the day before and the day of the treatment, and takes a Fleet enema 1-3 hours prior. I did not see the probe, but was told it is slightly larger than an ultrasound probe. Depending on your trunk length (pelvis to head), you may not be completely engulfed by the MRI machine (my eyes could see the edge of the apparatus.) Your body is strapped down to limit movement, and a heavy flat plate is placed on your pelvis and abdomen. I assumed that must contain some recording film.

Inserting the probe was very uncomfortable, but the (male) nurse was very gentle, took his time, and told me at the outset what to expect and emphasized that I was in charge. He would stop whenever I gave the word. I did not have to do so. Once the probe was in place, I had no discomfort or even awareness of it being there. They offered ear phones with music, but with the risk of going asleep which would invalidate the results. I wore soft ear plugs instead, and kept time to the jack hammers. :-)

MY TEST REPORT: Gave my prostate volume and PSA density. Noted a mildly thickened bladder wall, suggesting a degree of outlet obstruction. Showed no post-biopsy hemorrhage. Stated that "areas of reduced T2 signal in the peripheral zone of the (RIGHT mid gland to apex) may represent tumor." Stated that "MRSI demonstrates several voxels (in RIGHT mid gland to apex) of positive and possible malignant metabolism." The two images indicate a moderate volume of tumor dominant in the RIGHT mid gland to apex. Noted minimal capsular irregularity on a single image at the right apex is of questionable significance, and not considered ... to indicate extra-capular extension. (NOTE - one

surgeon noted a "hardness" on the right side during a DRE.) Stated that no other sites of ECE, nor any SVI, lymphadenopathy or suspicious bone lesion seen.

This information was a major element in my treatment decision. The test was well worth the trip, money and inconvenience.

Editorial Note: Based on the above tests and other investigations, Bernie decided to have the High Dose Rate (HDR) temporary seed implants. It was done at the Long Beach Memorial Hospital by Dr. Nisar Syed. Bernie is doing fine.

To contact the Magnetic Resonance Science Center, University of California San Francisco Medical Center, telephone (415) 476-9023.

Other web sites for MRI/MRSI
Many of the MRI machines are the tunnel type, or "doggie house" type. There are some people who are claustrophobic and cannot stand to be enclosed in the tunnel for any length of time. There are also some who may have a disability that would prevent them being enclosed in the tunnel type. Some MRI centers have an open MRI system that is similar to the machines that are used for 3D Conformal Radiation. The S.W. FL Regional Advanced MRI Center, 2852 Tamiami Trail, Port Charlotte FL 33952, 1-800-338-9146. They have an excellent web site that explains their machines and procedures at www.openmr.com

Here is some information from http://www.viennaopenmri.com/index.htm
Diagnostic Imaging Associates P.C. in our Vienna Office, can offer you the first OPEN MRI in Northern Virginia. Without an OPEN MRI, neither large nor claustrophobic patients could have an MRI examination. They have provided cutting edge diagnostic imaging services in the Washington, DC metropolitan area for over 20 years.

Another open MRI site is the Dove Open MRI , East Manhattan Diagnostic Imaging,Radiologists affiliated with Beth Israel Medical Center, 604 Second Avenue, New York, NY 10016, 212-683-6200, Fax: 212-683-2992 http://www.doveopenmri.com/

Here is another site that has a complete book on line called:
ELEMENTARY FUNCTIONAL MRI DATA ANALYSIS: A USER'S MANUAL
http://www.nmr.mgh.harvard.edu/fmrianalysis/index.html

There is a web site for Clinical Magnetic Resonance Society at
http://www.cmrs.com/benefits.html

You can find a directory of MRI sites at http://www.healthimaging.com
There are several other MRI sites in this country and in foreign countries. Search the Internet for more locations.

Ultrasound Color Doppler

Ultrasound Color Doppler can be a very good diagnostic tool. Prostate cancer has increased vascularity. Blood flow is detected by Doppler frequency shifts, and displayed as a color overlay on the image.

Dr. Fred Lee at Crittendon Hospital in Grand Rapids Michigan is one of the experts at using ultrasound color Doppler. Read more about him at:
http://www.prostatepointers.org/prostate/lee/small/lee1.html

There is some excellent information and beautiful color Doppler photos at:
http://prostate.tju.edu/ultrasound/color.html

Recurrence
Even when caught early and with the best treatment, there is no guarantee that prostate cancer will not recur. About 20% of the men who undergo radical prostatectomies, brachytherapy, radiation and other definitive treatments have a recurrence within 5 years. In some cases, a small micrometastasis colony had already been established somewhere in the body before treatment.

Dr. E. David Crawford and others have been investigating the use of artificial neural network analysis (ANNA) for the prediction of prostate cancer recurrence. Overall accuracy was 85%. A pattern exists in our data which allows the neural network to give predictive values for pathological staging between 75% and 80%. The variables in order of importance were Gleason primary score, biopsy stage, Gleason sum, DRE, original PSA, prostate volume, prior therapy whether radiation or hormonal manipulation.

Treatments for Recurrence
There are several treatments that can be used if the cancer recurs. External beam radiation can be used if it is determined that the recurrence is local. If it is a distant metastasis, then hormone therapy or possibly chemotherapy may be the treatment of choice.

PSA, Stage & Gleason Score
The PSA and Gleason score may be different for different stages. It is possible to have a low PSA with a stage T2b tumor but have a Gleason score of 8 or 9. It is also possible to have a high PSA with a stage T2b tumor and a Gleason score of 5 or 6. Ordinarily, a high Gleason score is more important than the PSA and the stage. Having a low stage such as T1b is no guarantee that the cancer will not metastasize. One study done at the Long Beach Memorial Hospital by Drs. Nisar Syed and Ajmel Puthawala showed that out of 32 patients diagnosed with T1b disease, four of them progressed to metastasis within five years, or 12 percent of the patients. In the same group of patients, 85 had T2b disease. Only seven, or 8 percent of these T2b patients progressed to metastasis within five years. Again, the first rule in cancer is that there are no rules. What may seem like an indolent or insignificant disease may very well become incurable.

The Partin/Narayan Tables

Before a treatment decision is made, there are a couple more tools that should be utilized. They are the Partin and Narayan Tables. The Partin Tables, see Table 6-1, were developed by Dr. Alan Partin, and several other urologists at Johns Hopkins University and are based on data from over 500 radical prostatectomies that had been done. Dr. Alan Partin of Johns Hopkins did a retrospective study of the men who had undergone a radical prostatectomy. Using the data in the case histories, he constructed the Partin Tables. Once a stage has been assigned, your PSA established, and you know your Gleason score from the biopsy, you can look at these tables and get a good idea of what the odds are that you have an organ confined disease (OCD), Extra Capsular Extension (ECE), seminal vesicle invasion (SVI), or positive lymph nodes. Later Dr. Partin looked at case histories of over 5000 men. This much larger group of men gives the Tables a lot more confidence.

Dr.Narayan devised a slightly different table than Dr. Partin's. Dr. Stephen Strum combined the two to give a more accurate prediction. Dr. Glenn Tisman, who worked with Dr. Strum, created a computer program that can automatically calculate your risks after you key in your PSA, stage and Gleason. You can find these tables and several other papers by Dr. Stephen Strum at www.prostatepointers.org/80/strum/.

Using your assigned stage, your PSA, and Gleason score, you can predict the percentage of the probability of localized organ confinement, capsular penetration, seminal vesicle involvement, and lymph node involvement.
Knowing the odds of the various involvements should greatly influence your treatment decision.

General Prognosis
No one can say for sure how long you will live, no matter what stage of cancer you have. If a doctor tells you that you have only so long to live, you may give up and live just that long. Studies have shown that a person who takes an active interest in his health and well-being will live much longer.

Several studies have also shown that it is important to have a social life. Men who are married live longer than those who live alone. Even if you are not married, you should join and become active in groups such as senior citizens clubs, Toastmasters, Elks, Veterans organizations or even in political organizations. Better yet is to become active in a prostate cancer support group. If there are no support groups near you, then start one. Contact US TOO at 708- 323-1002 and they will tell you if there is a support group in your area. Or if you would like to start a group, they will send you a start-up kit.

We desperately need more money for prostate cancer research. We have organized a National Prostate Cancer Coalition (NPCC). We need all the help we can get. If you would like to help, contact the NPCC at 1300 19th St. N.W., #400, Washington, D.C. 20036.

Urologists love statistics. Sometimes I think they forget that patients are humans, not just a bunch of numbers. On the other hand you must be realistic and realize that if you have a high Gleason score and a high PSA, then you should be concerned. You may see some

very low survival numbers for high-grade tumors that can truly frighten one. But remember that the numbers represent the average taken from a very large number of men. Just hang in there- Don't ever give up.