“I know not anything more pleasant, or more instructive than to compare experience with expectation or to register from time to time the difference between idea and reality.”

—DR. SAMUEL JOHNSON

Introduction
Prostate cancer is the most common cancer in men and the second leading cause of cancer deaths in men. It affects middle-aged and older men and usually has an indolent but progressive clinical course. Patients are often diagnosed when, because of age or other illnesses, they are less able to withstand disease-related morbidity. Further, for both localized and advanced disease they face a range of therapeutic options associated with troublesome side effects and functional impairments. These facts, coupled with recent intense media coverage, have raised public awareness of prostate cancer in general and focused much-needed attention on quality-of-life issues facing prostate cancer patients.

The quality of life of men with prostate cancer has been studied less than that of patients with other neoplasms. As yet no comprehensive understanding exists of the physical, vocational, psychological, social, and sexual functioning in men with prostate cancer over the natural course of the disease.

This report reviews current quality-of-life concepts in early and advanced prostate cancer, suggests how they may be integrated into patient care, and proposes relevant questions for research.

General Considerations
The priority in cancer treatment must be given to tumor control. Effective treatment best ensures longevity and allays anxiety over the uncertainties of living with cancer. A patient’s overall quality of life may be improved by vigorous attempts to cure or palliate disease; inadequate or inappropriate therapy may do more harm than good. Cancer treatment often intrudes upon an individual’s physical, emotional, and social life, however. Current management of both localized and metastatic prostate cancer ranges from the extreme of unnecessary treatment of some incidental carcinomas in elderly men to the opposite extreme of lack of aggressive measures when a serious threat to quality of life exists (such as pain, impending fracture, or cord compression from bone metastases).

Prostate cancer poses unique quality-of-life issues. First, patients may be relatively healthy for years, even without treatment, but if they live long enough, the disease can be severely disabling and may prove fatal. Second, current therapeutic options for both localized and advanced prostate cancers are similarly successful (at least for a period of 10 years) in providing local and distant control of the cancer and survival. Third, prostate cancer and its treatment commonly affect
two areas of major concern to men’s physical, mental, and social health, namely, urinary and sexual function. Lastly, prostate cancer produces a tumor marker (prostate-specific antigen, PSA) used to track the activity of disease before, during, and after treatment. PSA testing has created an increasing number of men, the so-called “walking worried,” who focus regularly on their PSA levels even though they do not have overt disease. For example, the anxiety caused by detection of a fluctuating or slowly rising PSA level after curative local therapy is becoming an important health problem. Patients look and feel physically well, but they are not well emotionally.

How does one address such anxiety? Treating the PSA level alone provides only short-term relief because in the patient’s mind, if the PSA went up once, it is only a matter of time before it does so again. The impact of PSA levels on degree of distress in prostate cancer survivors has received little attention but is a much needed, and potentially fruitful, area for research.

**Conceptualizing Quality of Life**

The terms *quality of life* and, more specifically, *health-related quality of life* refer to the physical, psychological, and social domains of health, seen as distinct areas influenced by a person’s experience, beliefs, expectations, and perceptions. Each of these domains can be measured in two dimensions, namely, objective assessments of health status and subjective perceptions of health. Although the objective dimension is important in defining a patient’s degree of health, the patient’s subjective perceptions translate that objective assessment into the actual quality of life experienced. Because expectations regarding health and the ability to cope with limitations and disability can greatly affect a person’s perceptions of health and satisfaction with life, two people with the same health status may

### Table 1

| Quality-of-Life Instruments Used in Prostate Cancer |
|---------------------------------------------------|
| European Organization for Research into Treatment of Cancer prostate cancer questionnaire (quality-of-life questionnaire C30 plus a 13-item prostate cancer module) |
| Functional living index: cancer (FLIC) |
| Linear analogue self-assessment scales (LASA) |
| Psychosocial adjustment to illness scale (PAIS) |
| Selby’s quality of life uniscale |
| Medical outcomes study (short forms 36 and 20) |
| Symptom distress scale |
| UCLA/RAND quality-of-life questionnaire |
| Cancer rehabilitation system (CARES) |
| Prospective quality-of-life index questionnaire |
| Memorial Sloan-Kettering Cancer Center prostate cancer questionnaire |

*LASA scales for symptoms, function, and overall well-being; a pain intensity scale; and index of analgesic use.*
have very different qualities of life. For example, two men who are “cured” of prostate cancer may experience disparate levels of satisfaction if one is incontinent and the other is not.

Another important variable influencing a patient’s perception of health is time. Quality of life is often assessed at only one point or over short intervals in time. Prostate cancer is a chronic disease, and a patient’s quality of life after 5 or even 10 years of living with or without his disease (and his PSA level) has not been adequately studied. An individual’s satisfaction with the quality of his life early after treatment might differ from that perceived years later, especially if side effects become more troublesome or the cancer recurs.

### Measuring Quality of Life

Quality-of-life assessment measures physical, functional, mental, and social health resulting from disease and its treatment. Until recently, health status in prostate cancer relied solely on physicians’ objective reports of symptoms and the consequences of treatment, omitting such relevant factors as a person’s threshold for the tolerance of discomfort and satisfaction with his current health. Quality of life is ascertained preferably from self-report data. Initial and follow-up interviews (in person or by telephone) conducted by an individual not directly responsible for implementing medical care offer valuable information that supplements the patient’s self-assessment. Table 1 lists quality-of-life questionnaires currently used in prostate cancer. Several of these instruments are combined or modified to cover all domains of health important to prostate cancer patients. These questionnaires have been reliable (yield consistent values), valid (target what they claim to measure), responsive (detect changes over time), and sensitive (reflect true changes in individual patients).

### Localized Prostate Cancer

Assessment of quality of life in patients with early prostate cancer has been restricted largely to evaluation of the degree of urinary incontinence and sexual impotence after treatment and, to a lesser degree, patients’ satisfaction with their outcomes.

Table 2 shows the results of recent patient-reported outcome surveys at least 1 year after radical prostatectomy or radiation therapy. Not surprisingly, incontinence and impotence occur at higher rates than those typically reported in the literature. For example, incontinence after radical surgery has been reported by physicians to vary between 5% and 10%; however, patient reports of incontinence requiring pads are much more common. The same is true after radiotherapy, although less so than after surgery.

Potency rates after treatment also appear to be lower than those of highly selected (younger) patients. Over time, erectile function improves slightly after surgery, but it declines after radiation. Two years after surgery or radiation, the proportion of men engaging in satisfactory sexual activity is similar.

Despite the adverse effects of therapy, patients express overall satisfaction with their outcomes, although there are wide variations in individual responses. Braslis et al reported significant deterioration in sexual function, incontinence, and hardship scores among patients immediately after radical prostatectomy. Anxiety levels improved, however, and 90% would choose surgery again when assessed years later after surgery.

Quality-of-life scales retrospectively assess perceived health quality. Another approach is to assess patients’ preferences for potential health states beforehand using utility measures. Different attributes of health (such as pain, mood, sexual function, bladder function, and fatigue) are assigned a utility value from high (normal) to low (poor) health. Patients are interviewed using a time trade-

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off method that identifies the number of years of perfect health a patient is willing to take in exchange for 5 or 10 years in each health state. Responses elicit individual differences. Some patients are unwilling to live for any time in an adverse state in exchange for return to perfect health (cancer free), but others choose worse health states (such as incontinence) for better anticipated long-term survival. Consequently, using time trade-off judgments to individualize treatment for early prostate cancer may be possible.

Recent decision analyses in patients selecting surgery or radiation suggest that although bodily dysfunction is a common event, overall health-related quality of life among patients selecting different management approaches does not differ.\textsuperscript{11,22,23} Further, watchful waiting (no

| Study         | Year | No. Pts. | Incontinence* | Potency\textsuperscript{†} | Satisfaction\textsuperscript{‡} |
|---------------|------|----------|---------------|------------------|-------------------------------|
| Fowler\textsuperscript{a} | 1993 | 1,070    | 31            | 11               | 75                            |
| Jonler\textsuperscript{b}   | 1994 | 86       | 47            | 16               | 49                            |
| Geary\textsuperscript{c}     | 1994 | 459      | 20            | 12               | —                             |
| Murphy\textsuperscript{d}     | 1994 | 2,122    | 18            | 27               | —                             |
| Fowler\textsuperscript{e}     | 1995 | 1,072    | 30            | 19               | 89                            |
| Chodak\textsuperscript{f}     | 1995 | 492      | 37            | 19               | 86                            |
| Skinner\textsuperscript{g}     | 1995 | 247      | 40            | 22               | 79                            |
| Litwin\textsuperscript{h}      | 1995 | 98       | 40            | 21               | 71                            |
| McCammon\textsuperscript{i}    | 1996 | 136      | 50            | 9                | 92                            |
| Thrasher\textsuperscript{j}    | 1996 | 554      | 38            | 12               | 72                            |
| Talcott\textsuperscript{k}     | 1996 | 125      | 35            | 13               | —                             |
| Widmark\textsuperscript{l}     | 1994 | 200      | 19            | —                | —                             |
| Jonler\textsuperscript{m}        | 1994 | 133      | 26            | 63               | 81                            |
| Chinn\textsuperscript{n}        | 1995 | 124      | —             | 62               | —                             |
| Litwin\textsuperscript{o}       | 1995 | 56       | 23            | 36               | 67                            |
| McCammon\textsuperscript{p}     | 1996 | 163      | 19            | 12               | 93                            |
| Talcott\textsuperscript{q}      | 1996 | 135      | 5             | 60               | —                             |

*Wears one or more pads per day.
†Erection sufficient for intercourse.
‡Patient would choose same treatment again.
immediate therapy) does not always equal “normal” health because of patients’ negative perception of prostate cancer, even if it is unlikely to be the ultimate cause of death.23

Such studies emphasize results in groups of patients rather than in the individual patient. Considerable differences exist in each person’s perception of his current health that may be obscured or diminished by the results observed in the population as a whole. For example, would a patient select surgery and risk some degree of incontinence if he knew that there was a 30% chance he would need additional therapy within 5 years?24 He might, if he believed that he would still be better off than he would be after radiation or observation, but he might not! Because most patients having surgery are expected to do well, this would be reflected in overall favorable satisfaction scores, even though an individual patient relapses, requires additional therapy, and has regrets about his initial treatment.

A common thread in all of the studies discussed earlier was that patients viewed incontinence as significantly more disabling to their quality of life than impotence. A recent study in 50 incontinent men after surgery showed that 26% reported limitations in their usual physical activity and more than half expressed moderate to severe emotional distress.25 No correlation was found between the level of incontinence (mild to severe) and the degree of distress. The Figure shows that patient satisfaction decreased over time. Of those evaluated between 1 and 3 years, 83% would still prefer surgery despite incontinence compared with 53% of men evaluated after 5 years. This suggests that with longer follow-up persistent incontinence may dampen the earlier enthusiasm over having a successful operation.

For some, the price of cure may be perceived later as too high. However, the fact that 82% of the men believed that continued education and participa-

![Fig. 1. The percentage of patients responding negatively when asked whether they would choose surgery again despite incontinence increased over time.](image)
much more creative work is needed in this area.

**Advanced Prostate Cancer**

Because cure of locally advanced or metastatic prostate cancer is currently not possible, palliation and maintaining quality existence assume primary importance. Quality-of-life issues differ among hormone-naive and hormone-refractory patients.

**Hormone-Naive Prostate Cancer**

Because of the dearth of comprehensive quality-of-life information in patients with advanced prostate cancer, we established a database with 172 patients and 83 spouses. The aim was to examine the nature and the extent of problems in patients’ and spouses’ adaptation and their interrelationships and to determine the effect of disease and its treatment regimen on patients’ quality of life. Data were collected by self-assessment questionnaires and interviews on physical symptoms, physical functioning, fatigue/malaise, sexual activity and interest, psychological distress, social interaction, impact of prostate cancer on the family, marital communication, intrusive thoughts regarding cancer, and global quality of life.

Table 3 shows that pain, fatigue, and urinary dysfunction had the greatest impact on quality of life. Patients who received either hormone therapy or local therapy alone had significantly more sexual problems than did those not placed on any treatment. Patients with greater pain and more physical symptoms (without pain) experienced greater emotional stress and fatigue. In patients without pain, fatigue, psychological distress, and urinary problems adversely affected quality of life. Of the medical treatments, only patients on hormone therapy had a much worse quality of life.

Table 4 compares patients’ assessments of quality of life with those of their spouses. Spouses of patients reported significantly greater psychological distress than did their partners. This was an important finding, and a recent report confirmed the concordance of spousal feelings in response to deteriorating quality of life experienced by their husbands.

What practical application do these
findings have? Based on the results, it appears that a brief quality-of-life assessment would have clinical use in identifying patients with problems adapting to their illness and its treatment. In some cases, evaluation by a mental health professional may be desired. With a broadened two-stage evaluation to include the full range of quality-of-life dimensions, patients with prostate cancer who are in need of psychosocial treatment, sexual counseling, behavior modification, and coping mechanisms may be identified and treated at the onset of their problems.

Because spouses experience greater distress than patients do, their quality of life needs to be addressed, not only to identify and help those in severe distress but also to enhance our understanding of patients’ adaptation to their illness.

Addressing quality-of-life issues is a continuing process that involves many approaches. These include educational material, self-help support groups, and individual and group psychosocial counseling/therapy sessions. We find that regular education seminars (on PSA testing, options for local and systemic therapy, new treatments and research, and coping with incontinence and impotence) help patients and spouses adjust more favorably to living with the uncertainty of prostate cancer and the side effects of treatment.

We studied further the impact of endocrine therapy on the quality of life of patients with stable and largely asymptomatic metastatic prostate cancer.29,30 Patients opted for no hormone therapy, total androgen deprivation consisting of leuprolide plus flutamide, a luteinizing hormone-releasing hormone analogue, orchiectomy, estrogen (diethylstilbestrol), or an antiandrogen (flutamide).

Table 5 shows the results in 173 patients after 6 months. Overall quality of life was better in patients on no hormone therapy and significantly worse in those receiving medical hormone therapy. Total androgen deprivation was associated with greater fatigue and emotional distress than were other forms of hormone therapy. The reasons for this are unclear, but it may be related not only to the lack of energy associated with testosterone depletion but also to the fact that taking pills is a daily reminder of disease. Responses in orchiectomy patients corrob-
rate this view because they achieve the benefits of antitestosterone therapy (on their disease and on their PSA levels) but are not tied to the doctor for monthly injections and do not require daily oral medication.

The fact that aggressive hormone therapy has not proved conclusively to increase survival in all patients with advanced prostate cancer but has a salutary effect in reducing pain, anxiety, and PSA levels has renewed interest in intermittent hormone therapy. Cyclical or intermittent androgen withdrawal therapy appears to enhance quality of life without adversely affecting tumor behavior. Sexual function returns in men taken off hormones, and their energy levels, outward appearance, and sense of well-being improve. More quality-of-life data are needed in patients currently enrolled in longitudinal studies using this unique hormone therapy strategy.

HORMONE-REFRACTORY PROSTATE CANCER

When prostate cancer escapes hormonal control and progresses, pain and deteriorating physical function ensue. Pain relief is paramount to maintaining a patient’s quality of life.

In addition to analgesics given liberally, chemotherapy has been used to palliate disease. Fossa et al studied 67 men who received chemotherapy with estra-

### Table 5

| Treatment             | No. Pts. | Fatigue | Psychological Distress | Physical Function | Sexual Problems | Overall QL |
|-----------------------|----------|---------|------------------------|-------------------|----------------|------------|
| None                  | 78       | 1.5     | 1.3                    | 1.1               | 2.1            | 8.6        |
| Total androgen deprivation | 28   | 2.7     | 2.5                    | 2.6               | 3.4            | 6.3        |
| LHRH analogue         | 29       | 2.5     | 1.9                    | 1.9               | 3.8            | 6.5        |
| Orchiectomy           | 17       | 1.7     | 1.6                    | 1.2               | 3.7            | 8.2        |
| Estrogen              | 10       | 2.6     | 1.5                    | 1.8               | 3.4            | 7.1        |
| Flutamide             | 11       | 2.4     | 2.1                    | 1.0               | 2.2            | 7.7        |

*Except for overall quality of life, higher scores reflect worse quality of life.
LHRH = luteinizing hormone-releasing hormone; QL = quality of life.
mustine or mitomycin C. Neither drug had an advantage over the other, and all aspects of quality of life deteriorated during therapy.

These results show that any survival benefit resulting from chemotherapy must be significant to offset the considerable impact on the quality of a patient’s remaining life. Although the study did not show benefits of treatment, it suggested useful intervention goals for hormone-relapsed patients. These are to relieve pain, reduce fatigue, and strengthen relations with family and friends.

Tannock et al evaluated quality of life in 37 hormone-refractory patients receiving prednisone for symptomatic bone metastases. He used a pain intensity score and linear analogue self-assessment scales to assess pain, physical activity, fatigue, appetite, urinary and bowel function, sexual activity, family relationships, mood, and well-being. One-third of the patients had improved pain scores and a decreased or unchanged requirement for analgesics after starting prednisone; in some cases these effects lasted for up to 30 months. Good correlation was observed between pain relief and other aspects of quality of life, especially better physical functioning, mood, and sense of well-being.

Tannock et al and others have extended this observation in randomized trials to compare the impact of steroids with or without chemotherapy (mitoxantrone) on survival and quality of life. Both studies showed that chemotherapy conferred no survival advantage, but prednisone plus mitoxantrone was associated with improved pain control and quality of life. Such studies in hormone-refractory patients emphasize the need to incorporate quality-of-life measures because chemotherapy is anticipated to have an incrementally small benefit on survival and may even shorten survival time.

Assessment of PSA level has led to earlier detection of metastatic prostate cancer and to more aggressive specific and supportive therapy. As a result, more patients experience subsequent disability from local prostate cancer growth. Before PSA testing, local control was less of a problem because patients died rapidly of metastatic disease. Currently, with patients living longer, the primary cancer itself demands more attention.

Frequent invasive procedures are needed to control or alleviate urinary obstruction or bleeding from prostate cancer, and placement of ureteral stents or percutaneous nephrostomy is necessary to relieve deteriorating renal function caused by ureteral obstruction. None of these measures is entirely satisfactory, and all are temporary. Such observations emphasize the importance of adequate control of the primary cancer. After bone pain, urinary dysfunction poses the greatest continued threat to a patient’s quality of life.

Survival and Quality of Life

Can health-related quality-of-life information influence or predict survival? Quality-of-life research to answer this question is breaking new ground. Because traditional outcome measures are unreliable surrogates for patient benefit in advanced prostate cancer, assessment of quality of life seems essential. One study showed that self-assessed baseline values of global quality of life (but not PSA level) were significant predictors of survival time. By inference, if we improve the quality of life of patients, will that result not only in better quality-adjusted survival but also in longer actual survival? No convincing studies exist showing that psychosocial intervention increases patient survival, and no study has targeted prostate cancer.

Nonetheless, it is intriguing to speculate that rigorous assessment and appropriate interventions to enhance a patient’s quality of life before, during, and after treatment not only may improve the
quality of life but also may lengthen survival time. Patients who do or do not participate in educational seminars, post-treatment resource programs, or support groups are being compared for differences in their quality of life and survival.

Conclusions

Systematic quality-of-life studies are just beginning in prostate cancer, and expanded research is urgently needed. Prostate cancer is an unpredictable, chronic disease occurring largely in elderly men. New and existing treatments may have incrementally smaller effects on life expectancy because the population as a whole is approaching the upper limits of its biologic life span. However, increasing longevity, earlier diagnosis of both localized and metastatic prostate cancer, and the fatal outcome for many patients emphasize the need to balance quality with quantity of survival among patients who are destined to live longer with their disease.

Prostate cancer patients and their spouses who participate in short-term psychosocial and educational group programs report less depression, anxiety, and social isolation; feel in better control over their lives; and deal more effectively with the illness and treatment-related problems.
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