Purpose

At an international and national level, staging is a cohesive approach to the classification of cancer and provides a method of clearly conveying clinical experience to others without ambiguity.
Principles of Cancer Staging

- The *extent* or *stage* of cancer at the time of diagnosis is the key factor that defines prognosis and is a critical element in determining appropriate treatment based on the experience and outcomes of groups of previous patients with similar stage.

- Accurate staging is necessary to:
  - evaluate the results of treatments and clinical trials,
  - facilitate the exchange and comparison of information across treatment centers and within and between cancer specific registries
  - serve as a basis for clinical and translational cancer research

Common Language

- AJCC TNM staging is the common language of cancer
- Allows for worldwide consistency
- Essential for accurate communication
American Joint Committee on Cancer

• AJCC established in 1959
• Formulate and publish systems of classification of cancer, including staging and end-results reporting
• Goal: Create acceptable tools to be used by the medical profession for selecting—
  – the most effective treatment
  – determining prognosis
  – continuing evaluation of cancer control measures.

American Joint Committee on Cancer

• The AJCC is composed of 18 member organizations, and its activities are administered by the American College of Surgeons.
• Mandatory requirement that the American College of Surgeons accredited hospitals use AJCC TNM as major language for cancer reporting

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“Philosophy of staging by the TNM system”:

“It is intended to provide a way by which designation the state of a cancer at various points in time can be readily communicated to others to assist in decisions regarding treatment and to be a factor in judgment as to prognosis. Ultimately, it provides a mechanism for comparing like or unlike groups of cases, particularly in regard to the results of different therapeutic procedures”

### Reasons for Assigning Stage

- Discuss case with multidisciplinary cancer care team
- Choose appropriate diagnostic workup and treatment – Guidelines include T, N, M, and stage group criteria
- Analyze treatment results for recurrence and survival
- Data analysis of various factors stratified by stage
Classifications

- Stage may be defined at several time points in the care of the cancer patient.
- Time points are termed classifications and are based on the continuum of evaluation
  - Clinical (cTNM)
  - Pathological (pTNM)
  - Post therapy (ycTNM or ypTNM)
  - Recurrence (rTNM)
  - Autopsy (aTNM)
- The staging classifications have a different purpose and therefore can be different. Do not go back and change the clinical staging based on pathologic staging information.

Stage Group Tables

- Patients with similar prognosis TNM are grouped into prognostic stage groups, commonly referred to as stage groups. Stage groups are defined for each classification (clinical and pathological)
- Subcategories: T1a, T1b
- Specific notations: TX (no information, unknown or can’t be assessed) This term should be minimized
- No MX. There is no pM0. Should be labelled cM0.
- Stage 0 is used to denote carcinoma in situ
Structure

• AJCC and Union of International Cancer Control (UICC) periodically modify the system in response to newly acquired clinical and pathological data and improved understanding of cancer biology and other factors affecting prognosis.

• Revision cycles are historically every 5-7 years

• Content Harmonization Core was developed for the 8th edition. Goal was to standardize terms and concepts and overall rules

AJCC 8th Edition

• Evidence-based medicine approach
  – 18 expert panels
  – 420 contributors
  – 181 institutions, 22 countries, 6 continents
  – Expanded editorial board supported by 7 AJCC core committees
    • Content harmonization, precision medicine, statistics, imaging, data collection, professional organization and corporate relationships

• Collaborative authorship
AJCC 8th Edition

- Published October 6, 2016
- Effective for all cases diagnosed on or after January 1, 2018

AJCC 8th Edition

- Bridge from a Population Based to a More Personalized Approach
  - Require integration of a wide variety of information based on patient history and physical examination findings supplemented by imaging, intraoperative findings, and pathologic data
- What’s New?
  - Data Element Review Form and Levels of Evidence
  - Precision Medicine Core with relevant genomic markers
  - Chapter Templates
  - New Chapter Headings
  - Tabular format for TNM Definitions and Stage Groups

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Chapter Outline Templates

- Chapter Summary- (ICD-0-3 Topography codes and WHO Histology codes)
- Introduction- general information
- Anatomy
- Rules for Classification (Clinical and Pathologic)
- Prognostic Factors
- Risk Assessment Models
- Recommendations for clinical trial stratification

AJCC 8th Edition Prostate-Chapter 58

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Prostate Cancer- Chapter 58-Summary of Changes

• Definition of Primary Tumor (T): Pathological organ-confined disease (after radical prostatectomy) is now all pT2 and not subdivided into pT2a, pT2b, or pT2c

• Histologic Grade (G): The Gleason score (2014 criteria) and the Grade Group (1-5) should both be reported.

• AJCC Prognostic Stage Groups: Stage III includes select organ-confined disease tumors based on prostate-specific antigen (PSA) and Gleason/Grade Group status.

Prostate Cancer- Chapter 58-Pathological Stage

• Pathological Stage is defined after a radical prostatectomy

• The old 7th Edition AJCC divided pathologic stage T2 into three groups: pT2a, pT2b, and pT2c.

• The new 8th Edition AJCC has all organ-confined post surgical cases as pT2

• Tumor detected in apex/distal margin is pT2

• There is no pT1 category

• Clinical staging, however, retains the three tier system (cT2a, cT2b, cT2c)

• pT3a: unilateral or bilateral extraprostatic extension

• pT3b: tumor invading the seminal vesicle(s)

• Margin status is technically NOT part of current AJCC staging
AJCC Prostate 8th Edition Pathologic Staging

<table>
<thead>
<tr>
<th>T Category</th>
<th>T Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2</td>
<td>Organ confined</td>
</tr>
<tr>
<td>T3</td>
<td>Extraprostatic extension</td>
</tr>
<tr>
<td>T3a</td>
<td>Extraprostatic extension (unilateral or bilateral) or microscopic invasion of bladder neck</td>
</tr>
<tr>
<td>T3b</td>
<td>Tumor invades seminal vesicle(s)</td>
</tr>
<tr>
<td>T4</td>
<td>Tumor is fixed or invades adjacent structures other than seminal vesicles such as external sphincter, rectum, bladder, levator muscles, and/or pelvic wall</td>
</tr>
</tbody>
</table>

Note: There is no pathological T1 classification.
Note: Positive surgical margin should be indicated by an R1 descriptor, indicating residual microscopic disease.

AJCC 8th Edition Prostate: Clinical T2 Category

T2a

T2b

T2c

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Prostate Cancer- Chapter 58-Histological Grade Group

- Group 1: Gleason <=6
- Group 2: Gleason 3+4=7
- Group 3: Gleason 4+3=7
- Group 4: Gleason 8
- Group 5: Gleason 9 or 10
- Grade group is prognostic for PSA recurrence and prostate cancer mortality (AJCC Level of Evidence: I)
Prostate Cancer - Chapter 58 - AJCC Prognostic Group III

- Organ-confined primary tumor and/or
- Gleason Grade Group 5 (Gleason 4+5 or 5+4 or 5+5)
- PSA >20
AJCC 8th Edition Prostate: Prognostic Stage Groups

Prostate Cancer - Chapter 58 - Clinical T Category

- In the 8th Edition, clinical T-category should still be based only on the digital rectal examination (DRE) findings.

- Neither imaging information or tumor laterally information from the prostate biopsy should be used for clinical T category.

- A tumor that is found in one or both sides by needle biopsy, but is not palpable is classified as T1c.

- Clinical T category should always reflect DRE findings only.

- Although imaging, particularly multi-parametric prostate MRI, has improved, imaging should NOT be used for T-category assessment.
Imaging one day could potentially improve clinical staging accuracy of the prostate.

However, inter-observer reproducibility, issues with patient selection, and contradictory results have limited the utility of imaging in clinical T staging.

Imaging can not replace the DRE as clinical T category standard

For local T category assignment, no imaging test is required

Transrectal ultrasound (TRUS)- not accurate for T-staging

Magnetic resonance imaging (MRI)- not consistently accurate in staging the primary tumor.
Prostate Cancer- Chapter 58-PSA

- Prostate-specific Antigen (PSA) blood test
- Protein produced by cells of the prostate gland
- The KEY tumor marker for screening and management
- The higher the PSA, the greater the risk of diagnosis and mortality of prostate cancer
- PSA< 10: “low” or “low risk”
- PSA 10-20: “intermediate” or “Intermediate risk”
- PSA>20: “High” or “High Risk”
- PSA>100: without clinical metastases is associated with much poorer survival (AJCC Level of Evidence: I)
Definition of Prostate-Specific Antigen (PSA)
PSA values are used to assign this category.

<table>
<thead>
<tr>
<th>PSA values</th>
<th>&lt;10</th>
<th>&gt;10&lt;20</th>
<th>&gt;20</th>
<th>Any value</th>
</tr>
</thead>
</table>

Prostate Cancer- Chapter 58-Risk Assessment Models

- AJCC Precision Medicine Core (PMC) developed and published criteria for eval of prognostic tool quality (Chapter 4)
- PMC eval of prostate canc er prog models/tools Jan2011-Dec2015; N=15 tools identified and evaluated; full list @ www.cancerstaging.org
  - 13/15 were rejected.
  - Only 1/7 models in localized disease met 11 of 14 criteria (Eggener et al J. Urol 185: 869, 2011; RP 15 yr mortality)
  - 2/6 models for metastatic disease met all criteria: Halabi/Duke Nomogram 1st and 2nd editions

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Prognostic Tools for Prostate Cancer

TABLE 58.1. Prognostic tools for prostate cancer that met all AJCC quality criteria.

<table>
<thead>
<tr>
<th>Approved Prognostic Tool</th>
<th>Web Address</th>
<th>Factors Included in the Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metastatic castration-resistant prostate cancer</td>
<td><a href="https://www.cancer.duke.edu/Nomogram/firstlinechemotherapy.html">https://www.cancer.duke.edu/Nomogram/firstlinechemotherapy.html</a></td>
<td>ECOG performance status, site of metastases, PSA, hemoglobin, albumin, alkaline phosphatase, LDH &gt; 1 ULN, opioid analgesic use</td>
</tr>
<tr>
<td>Metastatic castration-resistant prostate cancer treated with second-line chemotherapy</td>
<td><a href="https://www.cancer.duke.edu/Nomogram/secondlinechemotherapy.html">https://www.cancer.duke.edu/Nomogram/secondlinechemotherapy.html</a></td>
<td>ECOG performance status, visceral disease, progression on docetaxel, duration on hormone, measurable disease, pain, PSA, hemoglobin, alkaline phosphatase</td>
</tr>
</tbody>
</table>

Prostate Cancer- Chapter 58-Clinical Trial Stratification

- Primary Tumor: T-category, Serum PSA, Grade Group (1-5) with Gleason score, Number and percentage of positive biopsy regions (i.e. biopsy “cores”)
- Regional Lymph Nodes/Distant Metastases: performance status, M0 versus M1 category; Extranodal extension of cancer, M1b (bone) versus M1c (lung, liver, brain, with or without bone)

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Definition of Regional Lymph Node (N)

<table>
<thead>
<tr>
<th>N Category</th>
<th>N Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX</td>
<td>Regional lymph nodes cannot be assessed</td>
</tr>
<tr>
<td>NO</td>
<td>No positive regional nodes</td>
</tr>
<tr>
<td>N1</td>
<td>Metastases in regional node(s)</td>
</tr>
</tbody>
</table>

Shaded area in the dotted line rectangular area is considered M1a and NOT N+ disease.
Assigning Stage: The Role of the Managing Physician

- Staging requires the collaborative effort of many professionals, including the managing physician, pathologist, radiologist, cancer registrar and others
- While the pathologist and the radiologist provide important staging information, and may provide important T-, N-, and/or M-related information, stage is defined ultimately from the synthesis of an array of patient history and physical examination findings supplemented by imaging and pathology data
- Only the managing physician can assign the patient’s stage, since only (s) he routinely has access to all of the pertinent information from the physical exam, imaging studies, biopsies, diagnostic procedures, surgical findings, and pathology reports
Information and Questions on AJCC Staging

AJCC Web site

• https://cancerstaging.org

• Ordering information
  – Cancerstaging.net

• General information
  – Education
  – Articles
  – Updates

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CAnswer Forum

• Submit questions to AJCC Forum
  – NEW 8th Edition Forum COMING SOON
  – 7th Edition Forum will remain
  – Located within CAnswer Forum
  – Provides information for all
  – Allows tracking for educational purposes

• http://cancerbulletin.facs.org/forums/

Thank you-Questions?
Judd.moul@duke.edu

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