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ACR–ASTRO PRACTICE PARAMETER FOR RADIATION ONCOLOGY

PREAMBLE

This document is an educational tool designed to assist practitioners in providing appropriate radiation oncology care for patients. Practice Parameters and Technical Standards are not inflexible rules or requirements of practice and are not intended, nor should they be used, to establish a legal standard of care [1]. For these reasons and those set forth below, the American College of Radiology and our collaborating medical specialty societies caution against the use of these documents in litigation in which the clinical decisions of a practitioner are called into question.

The ultimate judgment regarding the propriety of any specific procedure or course of action must be made by the practitioner in light of all the circumstances presented. Thus, an approach that differs from the guidance in this document, standing alone, does not necessarily imply that the approach was below the standard of care. To the contrary, a conscientious practitioner may responsibly adopt a course of action different from that set forth in this document when, in the reasonable judgment of the practitioner, such course of action is indicated by the condition of the patient, limitations of available resources, or advances in knowledge or technology subsequent to publication of this document. However, a practitioner who employs an approach substantially different from the guidance in this document is advised to document in the patient record information sufficient to explain the approach taken.

The practice of medicine involves not only the science, but also the art of dealing with the prevention, diagnosis, alleviation, and treatment of disease. The variety and complexity of human conditions make it impossible to always reach the most appropriate diagnosis or to predict with certainty a particular response to treatment. Therefore, it should be recognized that adherence to the guidance in this document will not assure an accurate diagnosis or a successful outcome. All that should be expected is that the practitioner will follow a reasonable course of action based on current knowledge, available resources, and the needs of the patient to deliver effective and safe medical care. The sole purpose of this document is to assist practitioners in achieving this objective.

[1] Iowa Medical Society and Iowa Society of Anesthesiologists v. Iowa Board of Nursing, ___ N.W.2d ___ (Iowa 2013) Iowa Supreme Court refuses to find that the *ACR Technical Standard for Management of the Use of Radiation in Fluoroscopic Procedures* (Revised 2008) sets a national standard for who may perform fluoroscopic procedures in light of the standard's stated purpose that ACR standards are educational tools and not intended to establish a legal standard of care. See also, Stanley v. McCarver, 63 P.3d 1076 (Ariz. App. 2003) where in a concurring opinion the Court stated that "published standards or guidelines of specialty medical organizations are useful in determining the duty owed or the standard of care applicable in a given situation" even though ACR standards themselves do not establish the standard of care.

I. INTRODUCTION

This practice parameter was revised collaboratively by the American College of Radiology (ACR) and the American Society for Radiation Oncology (ASTRO).

Radiation oncology, together with surgical and medical oncology, is one of the primary disciplines involved in cancer treatment. Radiation therapy with either curative or palliative intent is used to treat up to 60% of all patients with cancer [1]. Radiation therapy is the use of ionizing radiation, delivered with either external beam therapy or brachytherapy to destroy or inhibit the growth of malignant tissues. It is also used in selected clinical situations to inhibit the growth or modulate the function of tissues in certain benign diseases.

Separate practice parameters and standards define the appropriate use of external beam therapy, brachytherapy and other therapies using radionuclides. This practice parameter addresses the overall role of the radiation oncologist, medical physicist and other specialized personnel involved in the delivery of radiation therapy.

The use of radiation therapy requires detailed attention to personnel, equipment, patient and personnel safety and continuing staff education. Because the practice of radiation oncology occurs in a variety of clinical environments, the judgment of a qualified radiation oncologist should be used to apply these practice parameters to individual practices.

Radiation oncologists are specifically trained to weigh the benefits with the potential risks associated with exposure to ionizing radiation. Radiation oncologists will consider these risks in all aspects of patient care from the initial diagnostic work-up through simulation, treatment and follow-up. Radiation oncologists should follow the guiding principle of limiting radiation exposure to patients while accomplishing the therapeutic goals.

II. PROCESS OF RADIATION THERAPY

The clinical use of ionizing radiation is a complex process involving trained personnel who carry out a variety of interrelated activities.

A. Clinical Evaluation

The initial evaluation of the patient includes obtaining a history, performing a physical examination with close attention to the site(s) relevant to the diagnosis, reviewing pertinent diagnostic studies and reports, and communicating with the referring physician and other appropriate physicians involved in the patient's care. The extent of the tumor must be determined and recorded for staging; this will facilitate treatment decisions, determine prognosis and allow a comparison of treatment results. Pain assessments or needs assessments should be performed when clinically appropriate.

B. Establishing Treatment Goals

The goal(s) of treatment options, with their relative merits and risks, should be discussed with the patient. If the treatment plan requires combining radiation therapy with surgery, chemotherapy, or other systemic therapies, the anticipated interactions and optimum sequencing between the modalities should be discussed with the patient. A summary of the consultation should be communicated to the referring physician and to other physicians involved in the care of the patient [2].

C. Informed Consent

Prior to simulation and treatment, there should be documentation of the informed consent process, specific to that patient and diagnosis, that includes anticipated side effects, potential complications, availability of alternative treatment options and the benefits of having the treatment or not. The patient's signature should be on the informed consent document [3]. Any informed consent process should be consistent with appropriate state governing law(s).

D. Patient Education

To help patients retain the information that the radiation oncologist imparts to them at the time of the consultation visit, reinforcement of patient education may be considered, such as subsequent visits between the patient and the radiation oncologist, nurse, nurse practitioner, or physician assistant, and/or the use of printed materials or electronic presentations.

E. Simulation of Treatment

Simulation is the process of establishing and documenting the treatment position, the appropriate volume to be treated, and the normal structures within or adjacent to this volume. The radiation oncologist should provide patient-specific written orders for the simulation staff to include detail such as:

1. Treatment site
2. Optimal patient position
3. Patient positioning devices to be used and/or fabricated to aid optimal positioning reproducibility
4. Planned reference points for image-guidance such as the tumor itself, bone anatomy or implanted fiducial markers
5. Method of obtaining anatomical data such as computed tomography (CT), magnetic resonance imaging (MRI), conventional simulation, positron emission tomography (PET)/CT, multimodality image fusion, etc or use of oral and/or intravenous contrast agents
6. Need for obtaining anatomical and/or imaging data which takes into account tumor or organ motion
7. Appropriate screening for risks associated with the use of contrast agents must be done prior to their administration.

Beam entry sites and other points helpful in patient positioning and field localization are identified on the patient. All field setups should be documented by description of the patient position, properly labeled photographs and/or diagrams and radiologic images.

After treatment planning is completed, a simulation-per-plan procedure may be appropriate. This procedure involves duplicating the intended treatment setup either on a conventional simulator or on the treatment unit itself. Images of each intended treatment portal and of associated treatment parameters are obtained and are compared to planning images generated from the treatment planning system, to confirm accuracy and reproducibility of treatment setup and delivery.

F. Treatment Planning

The cognitive process of radiation treatment planning requires the radiation oncologist to have knowledge of the natural history of the disease to be treated, and to determine the target site, its extent and its relationship with adjacent normal tissues. This process is based on consideration of the history, physical examination, endoscopy, diagnostic imaging, findings at surgery, pathological findings and response to previous therapies.

When ionizing radiation is to be used, the radiation oncologist must select beam characteristics and/or radionuclide sources, method of delivery, doses and coordination with other treatments. Multimodality treatment should be coordinated in collaboration with medical and surgical oncologists and other specialists. The radiation oncologist determines the dose to be delivered to the target volume, the limiting (constraint) doses to organs at risk and the fractionation desired. Using these parameters, the radiation oncologist directs the medical physicist and/or dosimetrist in the design of potential treatment programs, or develops them personally. Contouring of organs at risk may be performed by the dosimetrist and/or the medical physicist with review and approval by the radiation oncologist. It is the responsibility of the radiation oncologist to determine and contour the gross tumor volume (GTV), clinical target volume (CTV), review and approval of the planning target volume (PTV), and define or review of the internal target volume (ITV), when applicable. This process uses the patient data obtained during the initial simulation procedure. Beam-specific physical data are used, with source data and other physical characteristics measured by the medical

physicist, to calculate the dose to a specific point within the patient or to calculate the dose distribution within a region of interest.

The radiation oncologist, in consultation with the medical physicist and dosimetrist, selects the treatment plan. The radiation oncologist prescribes the radiation treatment course. The prescription should include:

1. Volumes or sites to be treated
2. Treatment technique (eg, anteroposterior [AP], posteroanterior [PA], right and/or left lateral, right anterior oblique [RAO], multifield intensity modulated radiation therapy [IMRT], volumetric modulated arc therapy [VMAT])
3. Beam modifying devices
4. Radiation modality
5. Energy(s)
6. Dose per fraction
7. Total number of fractions
8. Fractionation schedule
9. Total dose
10. Prescription point
11. Volumes
12. Isodose volumes/lines

The dose per fraction and total dose should be specified for each prescription volume. The radiation oncologist, when applicable, should document appropriate specific dose-volume constraints for organs at risk [4]. Alternatively, departmental standard tissue dose constraints may be referenced. The prescription, treatment plan and dose calculation must be signed and dated by the radiation oncologist prior to the initiation of radiation therapy.

Radiation treatments are carried out by the radiation therapist, following the prescription and treatment plan of the radiation oncologist. Any changes in the planned treatment by the radiation oncologist requiring adjustment in immobilization, new calculations, or a new treatment plan must be documented in the patient's record, signed (or initialed) and dated by the radiation oncologist.

G. Fabrication of Treatment Aids

Devices to aid in positioning and immobilizing the patient, normal tissue shielding, compensating filters, etc, are designed to improve treatment accuracy and reduce treatment toxicity. They should be used where clinically appropriate.

H. Physics

The medical physicist, dosimetrist, and radiation oncologist perform the calculations necessary to determine the appropriate dose to be delivered by the treatment equipment. This requires knowledge of the physical properties of the treatment units, whether external beam or radioactive implants. These calculations must be checked by an independent qualified person or method before the first treatment.

I. External Beam Treatment

External beam radiation therapy is usually delivered in single daily doses for several weeks, or in multiple increments daily over the same period (hyperfractionation) or over shorter times (accelerated fractionation). Fractionation schedules in which the intended dose is delivered over a shorter time period than used in standard fractionation using larger-than-usual fraction sizes (hypofractionation) may be appropriate in some clinical situations.

Intensity modulated radiation therapy (IMRT) may be used as a form of external beam RT. If so, consideration should be given to the ACR–ASTRO Practice Parameter for Intensity-Modulated Radiation Therapy (IMRT), and the ASTRO white paper regarding IMRT [4,5]. In some cases, image-guided radiation therapy (IGRT) may also be clinically indicated, and centers that use this technique should refer to the ACR–ASTRO Practice Parameter for Image-Guided Radiation Therapy (IGRT), and the ASTRO white paper regarding IGRT [6,7].

Verification images are produced to confirm accurate treatment positioning and accurate treatment portals. To confirm accurate treatment positioning, images taken with the patient in the treatment position are compared with the reference treatment planning images. For example, an isocenter location may be verified with an orthogonal image pair. When clinically relevant, portal images of each static treatment field should be taken. Although it is ideal for verification images to be reviewed prior to the first treatment, at a minimum they should be reviewed by the physician before the second treatment.

A set of patient positioning or target localization images should be taken at least weekly and for any new fields. Verification images should then be reviewed by the radiation oncologist prior to the next treatment. The radiation oncologist is responsible for selecting the optimal imaging modality and frequency for verification of patient position based on the clinical situation. Dosimeters may be used to measure and record actual doses at specific anatomic sites.

J. Patient Evaluation during Treatment

The radiation oncologist monitors the patient's progress, checks entries in the treatment chart, and discusses the plan of therapy and any changes with appropriate team members. Patient evaluation and, when appropriate, physical examination by a radiation oncologist during treatment should be performed weekly, and more often when warranted. Pertinent laboratory and imaging studies are ordered and reviewed. The patient and/or referring physician should be informed of the progress of treatment whenever deemed appropriate.

K. Treatment Summary

After a course of treatment is completed, the radiation oncologist should document a summary of the treatment delivered including site treated, modality used, dose per fraction, total dose, elapsed time, treatment response (if applicable), relevant side effects (if applicable) and other observations. This should be communicated to the referring physician and any other physicians involved in the care of the patient in a timely fashion. Radiation treatment records should be retained for at least 5 years after the death of the patient or according to state law(s).

L. Follow-Up Evaluation

After treatment, periodic assessments of tumor response and sequelae of treatment are recommended as clinically indicated. They should be communicated to other appropriate physicians. Early detection of post-treatment tumor progression may permit additional, potentially beneficial treatment. Early detection and treatment of radiation-induced sequelae may avoid serious problems later. If direct follow-up isn't possible or practical because of issues such as patient medical condition, patient choice or unreasonable travel, the radiation oncologist should review follow-up documentation provided by other pertinent medical providers regarding the patient's condition.

M. Brachytherapy

Brachytherapy may be used for many sites and may be delivered with either low-dose-rate or high-dose rate techniques. The reader is referred to practice parameters relating to low-dose-rate brachytherapy, low-dose-rate brachytherapy for prostate cancer and high-dose-rate brachytherapy [8-10].

N. Stereotactic Radiosurgery

Stereotactic radiosurgery/stereotactic body radiation therapy may be used for certain benign or malignant intracranial and extracranial lesions. The reader is referred to ACR practice parameters relating to stereotactic radiosurgery and stereotactic body radiation therapy [11,12].

O. Other Treatment Modalities

Other treatment modalities are sometimes combined with external photon beams or brachytherapy to enhance the antitumor effects and decrease the effects on surrounding normal tissues. Examples include radiosensitizing drugs, hyperthermia, photodynamic therapy, and the use of unsealed-source radionuclides [13].

P. External Beam Sources

The radiation oncologist may have at his/her disposal external beam treatment equipment that provides beams other than conventional photon and electron beams (eg, proton beams). The general principles discussed above also apply to the use of other beam sources, but special expertise on the part of the radiation oncologist as well as the physics and therapy staff will be required for safe use of this treatment equipment.

III. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

To achieve optimal quality patient care outcomes, the practice of modern radiation oncology demands effective leadership and a well-developed team approach that operates within a culture of safety[14]. Members of the radiation oncology health care team include:

A. The Medical Director

1. Each radiation oncology program must have a medical director who is a radiation oncologist as described below in 2.a. and 2.b.
   a. The medical director will be responsible for oversight of the department, including policies, procedures and personnel.
   b. The medical director will be responsible for instituting and supervising the continuing quality improvement (CQI) program through direct or delegated leadership.

2. Radiation Oncologist (staff)
   a. Certification in Radiology by the American Board of Radiology (ABR) of a physician who confines his/her professional practice to radiation oncology or certification in Radiation Oncology or Therapeutic Radiology by the ABR, the American Osteopathic Board of Radiology, the Royal College of Physicians and Surgeons of Canada, or the Collège des Médecins du Québec may be considered proof of adequate physician qualifications.
      i. Radiation oncologists with time limited certificates of board certification are to be enrolled in the certifying board's maintenance of certification program and satisfactorily renew certification in a timely fashion.
      ii. Radiation oncologists with non-time limited certificates are strongly encouraged to voluntarily participate in the maintenance of certification program.

      or

   b. Satisfactory completion of a radiation oncology residency program approved by the American Council of Graduate Medicine Education (ACGME), the Royal College of Physicians and Surgeons of Canada (RCPSC), the Collège des Médecins du Québec, or the American Osteopathic Association (AOA).
      For radiation oncologists who are eligible but not yet certified by the date of initial employment, a pathway will be defined for individuals to become licensed and certified in accordance with 2a.

The continuing education of a radiation oncologist should be in accordance with the ACR Practice Parameter for Continuing Medical Education (CME) [15] and comply with all licensing entities under which the radiation oncologist practices.

3. Qualified Medical Physicist

   A Qualified Medical Physicist is an individual who is competent to practice independently one or more of the subfields in medical physics. The American College of Radiology (ACR) considers certification, continuing education, and experience in the appropriate subfield(s) to demonstrate that an individual is competent to practice one or more of the subfields in medical physics and to be a Qualified Medical Physicist. The ACR strongly recommends that the individual be certified in the appropriate subfield(s) by the American Board of Radiology (ABR), the Canadian College of Physics in Medicine, or by the American Board of Medical Physics (ABMP).

   A Qualified Medical Physicist should meet the ACR Practice Parameter for Continuing Medical Education (CME). (ACR Resolution 16g, adopted in 2006 – Revised 2012, Resolution 42)

   The appropriate subfield of medical physics for this practice parameter is Therapeutic Medical Physics. (Previous medical physics certification categories including Radiological Physics and Therapeutic Radiological Physics are also acceptable.)

4. Radiation Therapists and Simulation Staff

   Radiation therapists and simulation staff should fulfill state licensing requirements. Radiation therapists should be certified in radiation therapy by the American Registry of Radiologic Technologists (ARRT), or be eligible for such certification. Simulation staff should be certified by ARRT in either radiation therapy or diagnostic imaging or eligible for such certification.

5. Dosimetrist

   Medical dosimetrists should be certified in medical dosimetry by the Medical Dosimetrist Certification Board (MDCB), or be eligible for such certification.

6. Patient Support Staff

   Individuals involved in the nursing care of patients should have appropriate nursing credentials and appropriate experience in the care of radiation therapy patients. Oncology nursing certification is encouraged. Access to qualified nutritionists or social workers should be in place.

7. Physician Assistant

   A qualified physician assistant is an individual who has completed postgraduate education and possesses a current certification from the National Commission on Certification of Physician Assistants. Continuing education of a physician assistant should be in accordance with NCCPA guidelines and has obtained the specified licensure in accordance with the state(s) in which they are practicing as well as the required continue medical education.

8. Nurse Practitioner

   A qualified nurse practitioner is an individual who has completed postgraduate education in nursing and possesses current licensure/certification as a nurse practitioner in accordance with the state(s) in which they are practicing.

9. Administrative Support

Administrative staff are valuable for budgeting and managing resources that enable the facility to acquire and maintain the equipment needed for standard treatment practices and quality assurance procedures and to achieve and sustain adequate clinical staffing levels that assure a safe and effective treatment environment.

B. Availability

1. A radiation oncologist should be available for direct care and quality review and should be on the premises whenever radiation treatments are being delivered. The radiation oncologist, facility and support staff should be available to initiate urgent treatment within a medically appropriate response time on a 24-hour basis or refer to a facility that is available to treat on a 24-hour basis. When unavailable, the radiation oncologist is responsible for arranging appropriate coverage. Exceptions may exist for rural practices regarding the availability requirements. A radiation oncologist's availability must be consistent with state and federal requirements.

2. The medical physicist must be available when necessary for consultation with the radiation oncologist and to provide advice or direction to technical staff when a patient's treatments are being planned or patients are being treated. The center should have written policies specifying any special procedures (eg, high-dose-rate brachytherapy [8], stereotactic radiosurgery [11] or stereotactic body radiation therapy [12]) that require the presence of the medical physicist. When a medical physicist is not immediately available on-site during routine patient treatment, clinical needs should be met by using documented procedures. Authority to perform specific clinical physics duties must be established by the medical physicist for each member of the physics staff in accordance with his or her competence. The radiation oncologist should be informed of the clinical activities authorized for each member. Refer to the ACR Technical Standard for the Performance of Radiation Oncology Physics for External Beam Therapy [2] for minimal requirements for physics support.

IV. EQUIPMENT REQUIREMENTS

A. Core Radiation Oncology Capabilities

At a minimum, the radiation oncology facility must have these core capabilities: a megavoltage radiation therapy delivery system, a computer-based treatment-planning system, a treatment management system, access to simulation equipment, and the ability to fabricate or obtain customized treatment aids. The following specific equipment must be available to patients in all facilities:

1. Megavoltage radiation therapy equipment such as high-energy photon equipment capable of delivering 3-D conformal therapy and IMRT

2. CT simulator capable of duplicating the setups of the facility's megavoltage unit's and producing either standard images or digitally reconstructed radiographs (DRRs) of the fields to be treated. A dedicated CT simulator is preferred, but could be substituted with a diagnostic CT scanner modified to obtain imaging data replicating patient treatment position and suitable for radiation therapy treatment planning. Satellite facilities must have access to simulator equipment.
3. Computerized dosimetry equipment capable of providing external beam isodose curves as well as brachytherapy isodose curves, 3-D, IMRT treatment planning and Dose Volume Histograms
4. Physics calibration devices for all equipment, including a field dosimetry system (electrometer and ion chamber) and an ADCL calibrated local standard dosimetry system
5. Beam-shaping devices
6. Immobilization devices

B. Specialized Radiation Oncology Capabilities

The facility should have available equipment able to provide specialized treatments such as low-dose-rate brachytherapy and high-dose-rate brachytherapy, stereotactic body radiation therapy (SBRT), stereotactic radiosurgery, radionuclide therapy, electron beam or other capabilities for treating skin or superficial lesions, or the ability to refer for these services.

C. Maintenance and Repair

Regular preventive maintenance and repair of equipment by qualified personnel are mandatory. The medical physicist is responsible for documenting preventive maintenance and repair. It is recommended that the facility maintain up-to-date statistics regarding treatment unit uptime.

The facility should have procedures in place to provide treatment for patients in case of extended treatment interruption due to equipment repair, maintenance, or replacement or loss of personnel.

V. QUALITY ASSURANCE

A. Patient safety measures must include:

1. A treatment management system for prescription, treatment parameters setup and delivery, and daily dose recording and summation.
2. A physics program for calibrating equipment that ensures accurate dose delivery to the patient (see ACR Technical Standard for the Performance of Radiation Oncology Physics for External Beam Therapy [2])
3. A system for independent verification of treatment parameters (external beam) by another qualified person or method before the first treatment
4. A system for the radiation oncologist and medical physicist to check independently all relevant brachytherapy practice parameters to be used prior to each procedure
5. A program to prevent mechanical injury by the machine or accessory equipment
6. Visual and audio contact with the patient while under treatment
7. A policy requiring two forms of patient identification as well as verification of treatment parameters prior to each treatment

B. Personnel safety measures must include:

1. Appropriate room shielding
2. Systematic inspection of interlock systems
3. A radiation exposure-monitoring program, as required by the Nuclear Regulatory Commission or appropriate state agencies
4. Routine leak testing of all sealed sources, as required by regulatory agencies
5. Appropriate safety equipment for use of sealed sources

VI. EDUCATIONAL PROGRAM

Continuing medical education programs should include the radiation oncologists, medical physicists, dosimetrists, oncology nurses, nurse practitioners, physician assistants and radiation therapists. The programs must include the safe operation of facility equipment as appropriate to the individual's responsibility, and the treatment techniques and new developments in radiation oncology. In addition, each licensed staff member will undertake and document continuing professional education as required by his/her licensing authority.

VII. QUALITY IMPROVEMENT

The medical director of radiation oncology is responsible for instituting and supervising the continuing quality improvement (CQI) program. It is the responsibility of the director to identify problems, see that actions are taken and evaluate the effectiveness of the actions.

The medical director will select appropriate personnel to constitute a CQI Committee, which will meet at least quarterly and maintain records. Problems recognized should be addressed. Special studies or further in-depth analysis required will be regularly performed, documented and presented to the committee. CQI efforts will include review of policies, procedures and structural elements of the practice, to identify areas for potential improvement in the Committee's ongoing efforts to minimize risk of errors, improve patient safety and optimize patient outcomes. CQI records should be maintained in a manner that will, to the extent permitted by state and federal law, protect the confidentiality and discoverability of these records.

The following items are typical components of a CQI Program:

A. Chart Review

A designated chart reviewer will audit an appropriate number of charts each month after an adequate time has passed to allow completion and closure of these charts. A chart screen must be performed and may include:

1. Diagnosis
2. Stage of disease
3. Pertinent pathology report
4. Pertinent history and physical examinations
5. Signed and dated treatment plans and prescriptions at the beginning of treatment along with appropriately documented changes
6. Planned total dose, numbers of fractions, dose/fraction, and fractions/day
7. Method of delivery
8. Treatment site or treatment volume, with properly labeled diagrams and/or photographs of fields
9. Appropriately documented verification images
10. Isodose plan and/or dosimetry calculations
11. Summary or a completion-of-therapy note
12. Follow-up plan
13. Documentation that the treatment record was checked weekly during treatment
14. Documented periodic examination of the patient by the radiation oncologist, including patient progress and tolerance
15. Documented informed consent

Charts failing to pass any one of the indicators chosen for review will be documented and the report referred to the CQI Committee staff for review along with pertinent policies and procedures.

B. Review of physics quality improvement program report

C. Review of all cases in which there is a variation from the prescription of greater than 10% of the intended total dose; this review includes any chart in which mathematical corrections of 10% or more are made on the second check of dose calculations

D. If a new treatment modality or technique is started in a facility (eg, high-dose-rate brachytherapy, stereotactic radiosurgery), the procedures, results, problems, complications, etc, should be reviewed by the CQI Committee in a timely fashion consistent with patient safety.

E. Review of any chart in which an incident report is filed or in which there is a report of an accident or injury to a patient

F. Review of unplanned interruptions during treatment; unusual or severe, early or late complications of treatment; and unexpected deaths

G. Review of outcome studies from the cancer committee, tumor registry, or any other section, department, or committee of an associated hospital that includes radiation oncology patients

H. Individual Physician Peer Review

If there is a hospital-wide or similar broad-ranging peer review program that includes evaluation of appropriateness of actions by radiation oncologists, this evaluation should be reviewed by the CQI Committee and may be used as its physician peer review. If no such higher-level program exists, or if a separate intradepartmental review is desired, a facility physician peer-review program should be put in place.

Methodologies of peer review are numerous, and facilities are encouraged to participate in several formats of peer review. Case-specific peer review is encouraged on a weekly basis with the radiation oncologist presenting their new patients who have recently or will soon be starting a course of external beam radiation therapy, brachytherapy, radiosurgery and stereotactic body radiation therapy. This conference should be attended by radiation oncologist(s), physicist(s), dosimetrist(s), radiation therapist(s) and nursing staff. The case- specific review should be performed by other radiation oncologists with attention to indications for radiation therapy, target(s), dose per fraction and total dose. Attendance, patients discussed and feedback should be recorded. Follow-up of feedback is encouraged.

It is recognized that the peer review process for the radiation oncologist in solo practice presents a unique and difficult situation; however, the solo practitioner should institute a documented peer review mechanism.

I. Patient Outcome

Radiation oncologists should attempt to follow up, at appropriate intervals, all patients treated with curative intent and document the outcome of therapy, including results of treatment (tumor control, survival) and significant sequelae. Patients who are treated with palliative intent may also require close follow-up. For patients who are not followed by the radiation oncologist, the name of the physician who will be responsible for the patient's ongoing care should be documented.

J. Appropriate patient radiation records should be kept in the radiation oncology department or facility, consistent with state and local requirements.

K. Patient-Related Outcome Data

Facilities should collect data for an annual summary**,** such as:

1. Number of new patients
2. Number of consultations
3. Number of patients treated
4. Treatment intent: curative or palliative
5. Number of simulations, external treatments and/or brachytherapy procedures performed

Facilities should also strive to collect data on:

1. Anatomic site and stage (American Joint Committee on Cancer [AJC], International Federation of Gynecology and Obstetrics [FIGO], etc.) of tumors treated
2. Stage-related survival
3. Complications

These functions can be accomplished by maintaining a tumor registry.

L. Patient Satisfaction and Quality-of-Life Surveys

Throughout the year the facility may endeavor to perform surveys of patient attitudes, observations and recommendations.

M. Other General Information That Helps to Assure Quality

The following items are recommended:

1. New patient review: documented review of plans for management of new patients; this should be attended by the radiation oncologist(s), and may include representatives of physics and dosimetry staff, nursing, and radiation therapist(s).
2. Chart review: documented weekly review of the treatment records of patients under treatment. This should be attended by the radiation oncologists, and may include representatives of physics, dosimetry, radiation therapists and nursing. This could be combined with new patient review.
3. Image verification review: documented and dated review of appropriate initial and periodic (at least every 5 treatments) images by the radiation oncologist.
4. Physics Chart Review: weekly review of patient treatment records should be performed by a Qualified Medical Physicist, in keeping with the ACR Technical Standard for the Performance of Radiation Oncology Physics for External Beam Therapy [2].

VIII. DOCUMENTATION

Documentation should be in accordance with the ACR Practice Parameter for Communication: Radiation Oncology [16].

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This practice parameter was revised according to the process described under the heading *The Process for Developing ACR Practice* Parameters *and Technical Standards* on the ACR website (http://www.acr.org/guidelines) by the Committee on Practice Parameters – Radiation Oncology of the ACR Commission on Radiation Oncology in collaboration with the ASTRO.

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