Name of Policy:	**Continual Quality Assurance for Megavoltage Radiation Treatment Units**	THE UNIVERSITY OF TOLEDO MEDICAL CENTER
Policy Number:	3364-134-32	
Department:	Radiation Oncology	
Approving Officer:	Chief Executive Officer, UTMC Clinical Service Chief, Radiation Oncology	
Responsible Agent:	Manager, Radiation Oncology	**Effective Date:** **3/1/2021**
Scope:	Radiation Oncology	Initial Effective Date: 9/1980

_____ New policy proposal	__X__ Minor/technical revision of existing policy
_____ Major revision of existing policy	_____ Reaffirmation of existing policy

(A) Policy Statement

Under the supervision of a Board Certified Medical Physicist, each megavoltage treatment machine shall be checked daily, and monthly for physical and mechanical integrity and performance. For a continuous quality assurance process for each treatment modality records of data acquisition are maintained and trend analysis on quality assurance data is performed and reviewed by a QMP.

(B) Purpose of Policy

To ensure satisfactory performance of megavoltage radiation therapy units.

(C) Procedure

1) Under the supervision of a Board Certified Medical Physicist, daily, and monthly QA is performed using generally accepted Quality Assurance procedures, based on the AAPM TG 142 report:

   a) Daily checks are performed prior to patient's treatment and include the following:
      i) Dosimetry
         (1) X-ray output constancy
         (2) Electron output constancy
      ii) Imaging
         (1) Collision interlocks
         (2) Positioning/Repositioning
         (3) Imaging/Treatment coordinate coincidence
         (4) Image quality test
      iii) Mechanical
         (1) Laser localization
         (2) Distance indicator (ODI) @ iso
         (3) Collimator size indicator
         (4) MLC - Picket fence test
      iv) Safety
         (1) Door interlock beam off
         (2) Door closing safety
         (3) Audiovisual monitors
         (4) Radiation area monitor
         (5) Beam on indicator

      v) Any other parameter deemed necessary.

   b) Monthly checks are performed and include the following:
      i) Dosimetry
         (1) X-ray output constancy
         (2) Electron output constancy
         (3) Backup monitor chamber constancy

(4) Typical dose rate output constancy

(5) Photon beam profile constancy
(6) Electron beam profile constancy
(7) Electron beam energy constancy
(8) Dynamic Wedge -- wedge factor for all energies

ii) Mechanical
(1) Light/radiation field coincidence
(2) Light/radiation field coincidence (asymmetric)
(3) Distance check device for lasers compared with front pointer
(4) Gantry/collimator angle indicators
(5) Jaw position indicators (asymmetric)
(6) Cross hair centering (walkout)
(7) Treatment couch position indicators
(8) Localizing lasers

iii) Safety
(1) Laser Guard interlock test

iv) Respiratory Gating
(1) Beam output constancy
(2) Phase, amplitude beam control
(3) In-room respiratory monitoring system
(4) Gating interlock

v) EDW
(1) Wedge factor for all energies (45 or 60 deg)

vi) MLC
(1) Setting vs. Radiation Field for two patterns.
(2) Travel speed
(3) Leaf positional accuracy at all cardinal gantries

vii) Imaging
(1) Planar MV
(a) Imaging and treatment coordinate coincidence (four cardinal angles)
(b) Scaling
(c) Spatial Resolution
(d) Contrast
(e) Uniformity
(f) Noise
(2) Planar kV
(a) Imaging and treatment coordinate coincidence (four cardinal angles)
(b) Scaling for 8 mm diameter disc
(c) Spatial Resolution
(d) Contrast
(e) Uniformity and Noise
(3) Cone-Beam CT (kV and MV)
(a) Geometric distortion
(b) Spatial Resolution
(c) Contrast
(d) HU constancy
(e) Uniformity and Noise

viii) Additional in-house tests (not required by TG142)
(1) Photon energy constancy

ix) Any other parameter deemed necessary.

2) Document and file the results in common drive.
3) Under supervision of board certified medical physicists, annual QA will be performed based on recommendations of TG 142 of the AAPM within l4 months of initial acceptance or the previous annual QA. Reports of annual accelerator QA's are kept in common drive.

Approved by: /s/ 03/09/2021 Mersiha Hadziahmetovic MD Date Clinical Service Chief, Radiation Oncology /s/ 03/12/2021 Richard P. Swaine Date Chief Executive Officer -UTMC *Review/Revision Completed By:* *Michelle Giovanoli*	**Review/Revision Date:** 10/1981 2/1996 1982 3/1997 1983 4/1999 1984 3/2002 1985 1/2007 1986 4/22/2010 1987 10/1/2013 1988 8/1/2016 1989 10/1/2017 2/1990 2/1/2018 1/1994 2/1/2021 2/1995 **Next Review Date:** 2/1/2024
Policies Superseded by This Policy: 38-32	