

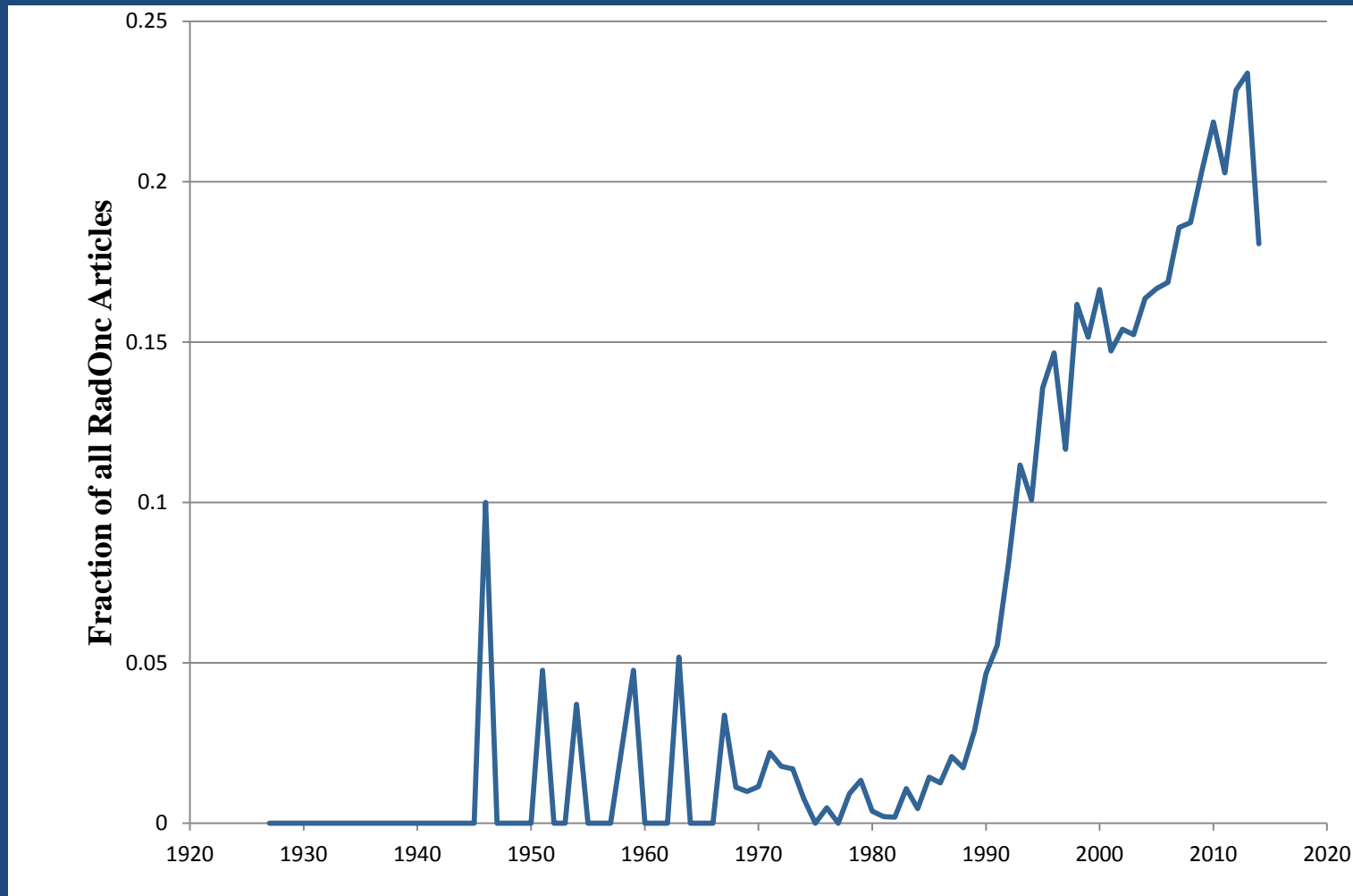
# Overview of the Working Group on Stereotactic Body Radiation Therapy (WGSBRT)

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- There has been explosive growth in the number of patients treated with stereotactic body and brain radiotherapy (SBRT (SABR) and cranial srs)
  - Dose/fraction  $>5$  Gy
  - 1-10 fractions
    - US billing, 1-5
  - Image guidance essential
  - Typically small–medium tumors
  - Local control superior to conventional fractionation
  - Remarkably few complications
    - Despite some unusual complications
      - Chest wall pain in lung SBRT
      - Carotid artery blowout in H&N SBRT

# SBRT as fraction of Radiation Oncology Articles in PubMed



Approximately 1500 articles in 2014!

Graph by Jimm Grimm who thanks Soren Bentzen for the idea

- There are hundreds of published single institution reports
- Several published systematic reviews of this literature
  - Prostate, lung, brain
- There are consensus reports on SBRT planning and delivery:
  - **AAPM Task Group 101** ([aapm.org/pub/reports/RPT\\_101.pdf](http://aapm.org/pub/reports/RPT_101.pdf))
  - **ACR-ASTRO Practice Parameter for the Performance of Stereotactic Body Radiation Therapy**
  - **Quality and safety considerations in stereotactic radiosurgery and stereotactic body radiation therapy: Executive summary**
    - PRO Vol 2 (2012) 2-9
- Is there enough peer-reviewed data on SBRT outcomes for a multi-disciplinary literature review to arrive at consensus guidelines for safe and effective dose distributions?
- Is it time for a QUANTEC for hypofractionation?
  - HITec? HypoTec? Or just WGSBRT (harder to pronounce)

# WGSBRT: Working Group of AAPM's Biological Effects Subcommittee

## Approved in 2011

### Charge

The radiobiology of hypofractionated treatments may differ considerably from that of standard fractionated treatments, in regards to repair, reoxygenation, dose-rate effects, volume effects, fraction size effects, etc.

***The working group will generate reports, including but not limited to, critically surveying the published data regarding:***

1. **Tumor response:** review of the effect of hypofractionation on local control.
2. **Normal tissue response:** review of the effect of hypofractionation on normal tissue tolerances.
3. **Radiobiology** of hypofractionated treatments.
4. **Clinical rationales** for the diverse prescription schemes in current use (e.g. 20GyX3 versus 24GyX1).
5. **Standards for reporting outcome**, including endpoints, defining/contouring of target and normal structures, dose definitions.

# WGSBRT Members (2014)

John Adler, MD	Karyn Goodman, MD	Mary Martel, PhD	Nathan Sheets, MD
Stanley Benedict, PhD	Jimm Grimm, PhD	Panayiotis Mavroidis, PhD	Ke Sheng, PhD
Soren Bentzen, PhD	Joseph Herman, MD	Charles Mayo, PhD	Timothy Solberg, PhD
Tithi Biswas, MD	Dwight Heron, MD	Paul Medin, PhD	Scott Soltys, MD
Jimmy Caudell, MD	Andy Jackson, PhD	Alejandra Mendez-Romero, MD	Chang Song, PhD
Ronald Chen, MD	Sheena Jain, MD	Moyed Miften, PhD	Randall Ten Haken, PhD
Andrew Clump, MD	Michael Joiner, PhD	Michael Milano, MD	Robert Timmerman, MD
Sean Collins, MD	Brian Kavanagh, MD	Vitali Moiseenko, PhD	Wolfgang Tome, PhD
Louis Constine, MD	John Kirkpatrick, MD	Eduardo Moros, PhD	Sue Tucker, PhD
Shiva Das, PhD	Feng-Ming Spring Kong, MD	Alan Nahum, PhD	Albert van der Kogel, PhD
Laura Dawson, MD	Tamara LaCouture, MD	Andrzej Niemierko, PhD	John Austin Vargo, MD
Joseph Deasy, PhD	Percy Lee, MD	Nitin Ohri, MD	Yevgeniy Vinogradskiy, PhD
George Ding, PhD	Young Lee, PhD	Sharon Qi, PhD	Lu Wang, PhD
Issam El Naqa, PhD	Allen Li, PhD	Nikhil Rao, MD	Shun Wong, MD
John Flickinger, MD	Billy Loo, MD	Andreas Rimner, MD	Jinyu Xue, PhD
Jack Fowler, PhD	Zhongxing Liao, MD	Trevor Royce, MD	Josh Yamada, MD
Donald Fuller, MD	Michael Lovelock, PhD	Arjun Sahgal, MD	Ellen Yorke, PhD
Martin Fuss, MD	Lijun Ma, PhD	Steve Sapareto, PhD	Jing Zhao, MD, PhD
Iris Gibbs, MD	Lawrence Marks, MD	Jason Sheehan, MD	

Although this is an AAPM Working Group, the members include  
Physicists,  
Radiation Oncologists (40-50%)  
Neurosurgeons,  
Radiobiologists,  
Biomathematicians

# WGSBRT Structure

- The WG aims to produce a QUANTEC-like publication in a peer-reviewed journal read by the whole radiation therapy community
- The WG has 17 sub-units – 5 dealing with general questions, 12 with site-specific issues of TCP and NTCP

- Unit 1 TCP (general)
- Unit 2 NTCP (general)
- Unit 3 Radiobiology
- Unit 4 Prescription rationale
- Unit 5 Reporting Standards

• Unit 6 TCP Cranial sites

• Unit 7 TCP H&N sites

• Unit 8 TCP Thoracic sites

• Unit 9 TCP Abdominal sites

• Unit 10 TCP Pelvic sites

• Unit 11 TCP Spinal sites

• Unit 12 NTCP Cranial organs

• Unit 13 NTCP H&N organs

• Unit 14 NTCP Thoracic organs

• Unit 15 NTCP Abdominal organs

• Unit 16 NTCP Pelvic organs

• Unit 17 NTCP Spinal sites

The WG is doing its best, but there are obstacles

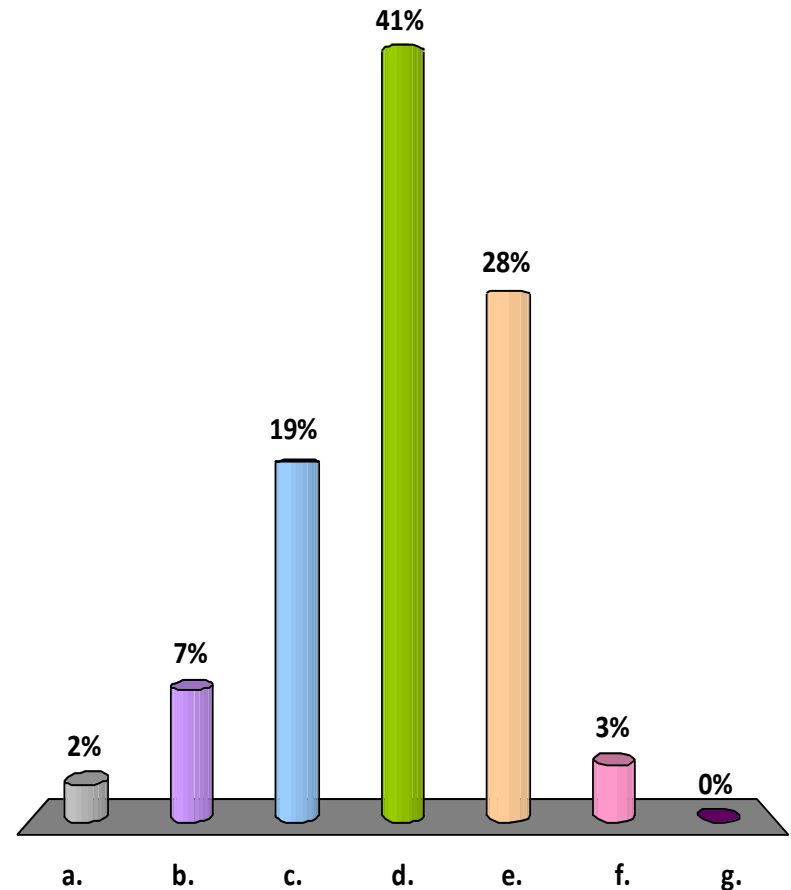




- *“Typically, papers on the dose-volume dependence of complications are not written to maximize their utility for either clinical application or subsequent meta-analysis”* (QUANTEC, IJROBP 76 V 3S)
- The same is true of the SBRT literature
  - Reported doses to tumors usually ignore dose inhomogeneity
  - Important risk structures defined differently in different reports (spinal cord, canal, thecal sac?)
  - Different definitions of ‘local control’ and of specific complications
  - Unreported denominators
    - Dose-volume data for those with complications but not those without
- Reporting standards must improve if future patients are to optimally benefit from today’s clinical experience

# The charge of the Working Group on Biological Effects of SBRT is

- a. To develop immobilization guidelines for SBRT patients
- b. To review and report on peer reviewed literature on small field dosimetry which is used in sbrt
- c. To review and synthesize for clinical use peer-reviewed literature on tumor control and normal tissue complications of SBRT treatment
- d. To develop guidelines for image guidance in SBRT
- e. To apply Monte Carlo modeling to SBRT treatment planning



- Correct answer: c

- Reference: This is the charge of the WGSBRT – see the AAPM website

[aapm.org/org/structure/default.asp?committee\\_code=WGSBRT](http://aapm.org/org/structure/default.asp?committee_code=WGSBRT)

## An important and unusual feature of the WGSBRT membership is:

- 72% a. About half the members are radiation oncologists
- 0% b. About half the members are diagnostic radiologists
- 6% c. About 1/3 of the members are commercial vendors
- 20% d. Members of the WGSBRT must be actively involved in SBRT treatment planning or QA
- 1% e. All the members use the same treatment planning system

- Correct answer: a
- Reference is the membership roster on the AAPM website

[aapm.org/org/structure/default.asp?committee\\_code=WGSBRT](http://aapm.org/org/structure/default.asp?committee_code=WGSBRT)