The Future of Medical Dosimetry

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http://cdn.gsmarena.com/pics/12/02/corning-glass-future-2/gsmarena_001.jpg
Thank You

- Chris Moore
- 40th anniversary
- Seen and unseen
- Two most important days
Disclosures
Previous Change

https://lisaleaks.files.wordpress.com/2014/06/baby-radiation.jpg?w=529&h=478
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http://titan.radonc.unc.edu/dose/images/master/simctsetup.jpg
Threats to our Existence
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Threats to our Existence
Indicator Areas

1) Social factors
Indicator Areas

1) Social factors
2) Economic factors
Indicator Areas

1) Social factors
2) Economic factors
3) Governmental factors
Indicator Areas

1) Social factors
2) Economic factors
3) Governmental factors
4) Technological factors
Social Factors

1) Social factors: directly influence or affect lifestyle or a profession
2) Can be psychosocial, behavioral or biological
Social Factors

Retirement

• Retirement of “first generation” dosimetrists
Social Factors
Flatter and Smaller World

• International Atomic Energy Association
  – 15-year initiative RT facilities in emerging or third world countries
    • $4,000 or less per capita income

https://www.middleeastmonitor.com/images/article_images/logos/international-atomic-energy-agency.jpg
Social Factors
Flatter and Smaller World

• International Atomic Energy Association
  – 15-year initiative RT facilities in emerging or third world countries
    • $4,000 or less per capita income
• “In which state will I work” becomes “in which country will I work”
Social Factors

- Dosimetry Education
- What we have done is great—lift up the profession—we have followed others.
- Where are we going?
- Where have others gone before us?
- In our evolution, should we challenge our policy?

http://www.theblaze.com/wp-content/uploads/2012/05/graduation-diploma-1.jpg
Past 30 years

1985: AAMD need for CMD National Exam

1988: MDCB BoD, 1st CMD exam administered

2005: MDCB OTJ to "higher education"

2017 onward: min. B.S., accredited program and CMD to access profession
Physicians/Physicists

• Radiation Oncology 120 slots per year (could they have more people?)
• Medical Physics: Not just the degree, but also the Clinical Fellow rotations (could they have more people?)
• Should we follow these guys?
• Look at it a different way:
The Other Way

- RTT’s: Less than 1% vacancy rate
- Why? Flooding of the market
- Have programs decreased their graduates responding to the market?
- This can easily happen to us
- Do we want this to happen to our profession?
Goal

• You always want to find the correct balance— you want to have a little demand, but not too much of a demand
• Other professions have done this—it gives your profession greater power
• Consolidation of resources means controlling manpower
Goal

• Ultimately, for medical dosimetrists to have power they will need to control access to their exam at even a higher level
• Think about it: everything the AAMD and MDCB has done to this point has accomplished this goal
• In the future we may need to take it further
Goal

• What do you want?
• The higher education market to dictate the number of people taking the exam?
• Or your profession to dictate the number of people taking the exam?
Social Factors

• Retirements, More Elderly
• Countries where we work
• Dosimetry Educational Programs
Economic Factors

• A set of fundamental information that affects a business, profession, or an investments value.
Economic Factors

Conglomeration

http://imgur.com/hTnTkG
Health Care
Economic Factors
Protons
Economic Factors

Source: National Association for Proton Therapy | The Washington Post April 7, 2013
Economics
Protons - sans Data

Intensity-Modulated Radiation Therapy, Proton Therapy, or Conformal Radiation Therapy and Morbidity and Disease Control in Localized Prostate Cancer

Nathan C. Sheets, MD; Gregg H. Goldin, MD; Anne-Marie Meyer, PhD; Yang Wu, PhD; YunKyung Chang, PhD; Til Stürmer, MD, PhD; Jordan A. Holmes, BS; Bryce B. Reeve, PhD; Paul A. Godley, MD, PhD; William R. Carpenter, PhD; Ronald C. Chen, MD, MPH

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“...The results of both comparisons support the use of IMRT as the current standard radiation technique in prostate cancer. Moreover, there is no evidence demonstrating that proton therapy is superior to IMRT.” —Ronald Chen, MD, PhD
Economic Factors

• Money and the pie
Economic Factors: Reimbursements

- Fee for Service versus capitated payment
- This would totally change our economic foundation and budgeting
- We need to be prepared that organizations may want fewer dosimetrists on staff in the future
Economic Factors

• Value will have to be proven
• Outcomes measurements will become part of medical dosimetry practice
• Outcomes = value plus economic costs
• We will just not be able to say it is of value, we will need research to prove it is of value
Economic Factors

- In the past we knew the costs, but did not measure value
- In the future we will need to know both the costs and the value given of those costs
Economic Factors

• Europe: Health Economics in Radiation Oncology (HERO)
• 1) addresses access, cost, and cost-effectiveness of radiotherapy
• 2) goal is to prioritize radiotherapy as a highly cost effective treatment strategy
• 3) where are we?
Economic Factors: HERO

- Interact better with government and insurance parties
- Become equal partners in health care management and social interactions
- Allows higher quality treatment to individual patients through technology
- Vision is to strengthen the position of radiation oncology and improve cancer care by adding value and improving patient outcomes
Economic Factors

- Health Care Consolidation
- Protons, Policy and Economic Considerations
- The Pie
- Reimbursement Patterns
- Outcomes = Value + Costs
- HERO
Economic Factor: Final Question

• IF you were asked: how would you prove that what you do as a medical dosimetrist adds value?
  A. glioblastoma multiforme-outcome
  B. pediatric- outcome
  C. metastatic disease- outcome
Government Factors

• An activity related to government policy and its administrative practices that can have an affect on something
Governmental Factors

• Hill-Burton Act of 1947
Governmental Factors

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- “Medicare” (CMS) 1967
Governmental Factors

- Hill-Burton Act of 1947
- “Medicare” (CMS) 1967
- Radiation Oncology Medical Residency Programs 1969
- Education Programs
- Legislative, Executive and Judicial
Government Factors

- Incredibly complex health care policy
- Understanding that the current cannot be viable cost wise in the near future
- Policy will need to change in order to alleviate financial stress
Governmental Factors
Governmental Factors

• Accreditation Program for Excellence
• APEx is organized around five pillars
  1. The process of care
  2. The radiation oncology team
  3. Safety
  4. Quality management
  5. Patient-centered care


Governmental Factors

- Accreditation Program for Excellence
- “Well, how does accreditation affect me?”
Governmental Factors

• Accreditation Program for Excellence
• “Well, how does accreditation affect me?”
Government Factors

• What is happening:
• ASTRO the professional society is becoming the enforcement society (accreditation)—in the past this has traditionally been separated
• The new order may dictate greater collaboration between certification and professional practices
Governmental Factors: Who Will be allowed to Sit at the Table?
Government Factors

• History of Federal Health Care Policy
• APEx
• Convergence of professional and certification societies and boards
• Who will sit at the table?
Technological Factors:

• How a business or organization operates related to the equipment used within its administration
Technological Factors

- The great medical technology paradox
- Future hardware limitations and emergence of future software
- Faustian pact: we exchange our profession for unlimited knowledge, skills and abilities through technology
Technological Factors

The Faustian Pact

Technology Is Making These 10 Jobs Obsolete - Time
May 1, 2014 - Infographic of 10 jobs that technology is making obsolete by HR software provider CIPHR. Will Technology Make Us All Jobless? - Forbes
Oct 11, 2013 - But it's also nothing new. Technology has been making jobs obsolete
Top 10 Jobs Technology Has Made Obsolete - Toptenz.net
Dec 5, 2014 - Many of us have had a job we'd rather forget, with a not-so-pleasant manager we'd be happy to never see again. But if we think we've had it...
Obsolete careers give way to technology advancements
Jan 20, 2013 - http://www.businessweek.com/magazine/the-obsolete-jobs-club-... by the implementation of office technology that reduces the need for these...

12 Occupations Technological Innovation Made Obsolete ...
Mar 8, 2010 - As computers and automated systems increasingly take the jobs humans once held, entire professions are now extinct. Click through the...
Technological Factors

The Faustian Pact

SMART SEGMENTATION
KNOWLEDGE-BASED CONTOURING

KEY BENEFITS:

• A library of cases contoured by experts, including:
  - expert case browser
  - tumor site and stage specific search filters
  - free text search
• Create your own personalized expert case
• Modify and edit existing expert case library
• Clinical commentary on tumor volume for each expert case
• Several 2-D and 3-D tools to edit structures and adapt according to clinical preference
• Fully integrated option with the Eclipse™ treatment planning system

https://www.varian.com/sites/default/files/resource_attachments/EclipseSmartSegProductBrief.pdf
Technological Factors

Physicians and Physicists

http://upload.wikimedia.org/wikipedia/commons/7/71/Roentgen2.jpg
Technological Factors

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http://upload.wikimedia.org/wikipedia/commons/7/71/Roentgen2.jpg

http://upload.wikimedia.org/wikipedia/commons/7/7e/Marie_Curie_e1920.jpg
Technological Factors
Physicians and Physicists
Technological Factors
Imaging and Dosimetry

• PET fusions to CT/SIM scan
Technological Factors
Imaging and Dosimetry

- PET fusions to CT/SIM scan
- MRI fusions to CT/SIM scan
Technological Factors
Imaging and Dosimetry

- PET fusions to CT/SIM scan
- MRI fusions to CT/SIM scan
- PET/CT simulator
Technological Factors
Imaging and Dosimetry

- PET fusions to CT/SIM scan
- MRI fusions to CT/SIM scan
- PET/CT simulator
- MRI scanners in radiation oncology departments
Technological Factors
Imaging and Dosimetry

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- PET/CT simulator
- MRI scanners in radiation oncology departments
- Tomotherapy
Technological Factors
Imaging and Dosimetry

• PET fusions to CT/SIM scan
• MRI fusions to CT/SIM scan
• PET/CT simulator
• MRI scanners in radiation oncology departments
• Tomotherapy
• ViewRay
Technological Factors
Imaging and Dosimetry

• Daily imaging for patients, changes are made at the linear accelerator
  – Medical dosimetry treatment planning has to be redone at that moment and checked off
    • “Just-in-time” treatment planning
Technological Factors

Treatment Libraries

Technological Factors

Treatment Libraries

Technological Factors
Gatekeeper to Radiation Therapy Patient Safety

http://www.vapartners.ca/wp-content/uploads/2013/05/Gatekeeper.jpg
Technological Factors

• Faustian Pact
• Imaging
• Patient Safety
Conclusions

1) Social factors
   a) Raising a profession
   b) Retirement
   c) Flatter and smaller world

2) Economic factors
   a) Conglomeration
   b) Protons craze

3) Governmental factors
   a. Medicare (CMS)
   b. APEX
   c. Reimbursements

4) Technological factors
   a) Faustian Pact
   b) Imaging and Dosimetry
   c) Gatekeepers to patient safety
Winston Churchill Quotes

“Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning”.

“We are the master’s of our own fate”.

http://i.dailymail.co.uk/i/pix/2013/08/20/article-2398032-1B60D24C000005DC-287_634x576.jpg
Thank You!