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Role of the Diagnostic Physicist Part 2 – Effective Consulting Imaging Physics Service

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Objectives

- Compare the role of the consulting physicist to an in-house physicist
- Discuss benefits and challenges of the consulting environment
- Identify consultative services that are becoming a standard part of imaging physics practice
- Share lessons from 18 years in private consulting practice

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Why Are Imaging Physics Consultants Needed?

- ACR, IAC, and JC all require qualified medical physicists, even at smaller accredited facilities such as urgent care, outpatient imaging centers, and physician offices
- Many facilities do not have the workload nor budget necessary to support a full-time staff physicist position
- Many experienced in-house physicists are retiring, and replacements are needed quickly to satisfy current and pending accreditation program requirements
- Many rural and remote areas are underserved by well-qualified medical physicists



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	In-House	Consultant
Benefits	<ul style="list-style-type: none"> • Can easily communicate with team members in person • Unmatched familiarity with team and equipment • Sufficient time for research, training, in-depth analysis 	<ul style="list-style-type: none"> • Familiarity with many diverse situations and machines leads to broad knowledge base • Can buy new imaging equipment easily with no retraining necessary • Multiple consultants at a firm can specialize in different areas, collectively becoming a jack-of-all-trades
Drawbacks	<ul style="list-style-type: none"> • Must provide benefits and support • Identifying program-threatening flaws can be a conflict of interest • Rare opportunities for advancement for junior physicists • Resistance to significant program changes • Must have some expertise in all areas, but can be difficult to retain mastery of all modalities 	<ul style="list-style-type: none"> • Steeper learning curve to proficiently test hundreds of equipment types and models • Potentially higher cost per hour • Travel time/cost can make low complexity services more expensive • Must be more time-efficient • More communication via phone and email is necessary

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The Thinning Line Between In-House and Consulting Physicists

- The biggest current challenge to providing high-quality medical physics services in a consulting environment is educating and informing new physicists about the consulting option
- Any qualified medical physicist can become a consultant
- Consultants can and do provide complex services
- Extensive travel is not required in densely-populated areas



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Why Do Consultants Need to Adapt to MP 3.0?

- Each new requirement is a new opportunity to improve patient care
- Simple equipment testing can increasingly be performed by less experienced physicists and/or by physicist assistants, leaving complex services as the domain of QMPs
- Consultants who just test equipment force facilities to use technologists or physicians to write policies and procedures, understand dose-tracking software, and seek out reputable online training, and they have limited time and desire to do this in many cases



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How Have Consultants Adapted to MP 3.0?

- Extensive dose optimization training sponsored by AAPM or developed in-house
- Responding to new state and accreditation program requirements with more sophisticated service offerings:
 - CT dose optimization
 - Fluoroscopy dose optimization
 - MRI safety
 - Training

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New Services Produce Real Change: Fluoro

During a hands-on fluoroscopy safety training session with pediatric cardiologists, the facility's RSO and his assistant stood on opposite sides of a patient holding GM survey probes towards a PMMA phantom target with audio activated.



The physicist then activated normal fluoro mode, boost mode, and cine mode. The doctors' eyes went wide during cine mode because of the vast increase in clicks they heard compared to the other modes.

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New Services Produce Real Change: Fluoro

They had heard from the physicist that cine mode emits a lot more dose, and that there is no dose limit, but actually hearing it was more significant. When the physicist again asked the physicians to be aware of the high dose of cine mode, he received much more sincere-sounding agreement.

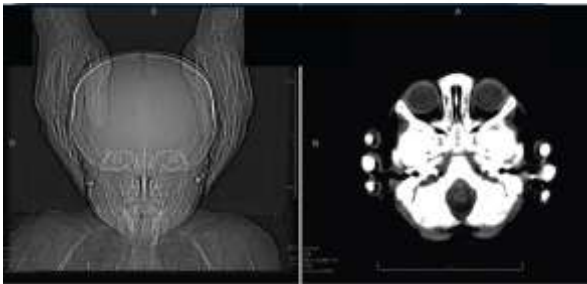


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New Services Produce Real Change: CT

- A rural hospital CT dose audit revealed multiple unmet needs:
- Educating personnel on the CT scan parameters and how they affect dose, particularly when the scan FOV (and bowtie filter) is changed, such as for head scans
 - Showing personnel to use the displayed $CTDI_{vol}$ as a quick check to see if they were running the right scan with the right parameters
 - Guiding the facility in creating dose-efficient pediatric protocols
 - Changing the facility's standard practice of holding patients even when it was unnecessary

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New Services Require Experts a More Sophisticated Model

- Graduate school, specialized training, and board certifications are evidence of the background necessary to properly address concerns and make the adjustments needed to optimize dose
- While helpful in other contexts, assistants typically lack the experience and education necessary to effectively perform these services
- Though dose optimization audits are **the most consultative** of all medical physics consulting services in nature, they are also **the most complex to provide** in a consulting context
- Adjustments to practice are required to do these services correctly

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What Is On The Horizon for Future Challenges?

Coming Expected JC Standards - Cone Beam CT "CBCT"

- Dental Offices
- Oral Surgery Environments
- Orthodontic Practices
- Other office-based practices or hospital dental clinics



Disclaimer: The following information regarding future standards is NOT approved and published by JC, but rather constitutes assumptions based on historical JC imaging standards development and projections based on related industry standards.

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Modalities That May Be Impacted in the Future

- Nuclear Medicine and PET (Dose Reduction)
- Radiography (Dose Reduction)
- Continuing evolution of products
- Completely new products



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Embracing New Standards

- JC standards are only added "if they relate to patient safety or quality of care, have a positive impact on health outcomes, meet or surpass law and regulation, and can be accurately and readily measured." (i.e., not to annoy physicists)
- The consultant (and in-house) physicist should think of new standards not as burdens that increase their workloads, but bona fide opportunities to decrease dose, improve image quality, and prove their increasing value and more central role in clinical practice.
- There is always resistance to change, even when that change is good for patients and also good for our profession. Resist the urge to say no. Standards still have a long way to go in many states and accreditation bodies and virtually all the changes we see have improved patient safety, patient care, professionalism, and knowledge.



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Conclusion & Take-Home Points

- Consultants can bring top-notch MP expertise and complex services especially to underserved facilities and remote areas
- Technique and protocol changes can vastly improve dose and image quality for facilities who haven't yet thought about them
- Should view new standards as opportunities rather than burdens
- More new standards and opportunities are coming!
