

Efficiency and Best Use of Resources From a Safety Perspective

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RETHINKING MEDICAL PHYSICS



Disclosures

I have received research funding through Padres Pedal the Cause in the form of a Moores Cancer Center Translational Cancer Research Award.



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Outline

- Physics workload and how safety is impacted
- Efficiency and best use of time/resources
 - What can you do personally?
 - What can we do as a field?

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The New York Times

U.S. | THE RADIATION BOOM

As Technology Surges, Radiation Safeguards Lag

By WALT BOGDANSKI JAN. 26, 2018

In New Jersey, 36 cancer patients at a veterans hospital in East Orange were overirradiated — and 20 more received substandard treatment — by a medical team that lacked experience in using a machine that generated high-powered beams of radiation, publicly reported, continued for months in place to catch the errors.

In Texas, George Garst now wears two external bags — one for urine and one for fecal matter — because of severe radiation injuries he suffered after a medical physicist who said he was overworked failed to detect a mistake. The overdose was never reported to the authorities because rules did not require it.

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Radiation incidents

Executive Summary

Following the relocation of an orthovoltage radiation treatment unit from the General Campus to the Civic Campus of The Ottawa Hospital Cancer Centre in the Fall of 2008, an error of commissioning occurred. This error manifested itself as incorrect radiation output tables for all field sizes greater than 10 x 10 cm² for all field sizes other than 10 x 10 cm². From November 2008 to November 2007, a total of 1019 patient treatments were delivered to 420 patients using the incorrect orthovoltage output tables. Of the 420 patients, 126 patients were treated with curative intent for skin cancers. The maximum under-dose received by the curative patient group was 17%. The remaining patients were treated for palliative purposes for whom an independent medical opinion confirmed that no significant clinical consequences were to be expected. There were no reported over-doses of patients.

During the incident review, the Panel of Experts confirmed that the error was due to the omission of a backscatter correction factor for all fields other than 10 x 10 cm². This omission was not detected prior to clinical release of the output tables in November 2008. The error was discovered in the Fall of 2007 by a medical physicist who was assigned the task of rotating annual quality control checks on the orthovoltage unit. Following discovery of the error, the output tables were revised and all clinical treatments since that time have used the correct data.

The basis of this review is a Root Cause Analysis which focused on the following questions:

- 1) Why were the incorrect output tables prepared during commissioning?
- 2) Why was an independent annual check not done prior to release of the output tables?
- 3) Why was the error not detected for 3 years?

During the incident review, it was determined that medical physics staffing at The Ottawa Hospital Cancer Centre had been experiencing extreme resource limitations prior to and around the time the error occurred. This was further exacerbated by the increasing demands of new equipment commissioning, equipment upgrades and urgent requests by the CNSC (Canadian Nuclear Safety Commission). Although a direct causal relationship between medical physics staffing shortages and the specific calibration error cannot be established with certainty, it was definitely, in the opinion of the Panel, a significant contributory factor.

Revised scheduling of the backscatter of the error for the safety and delivery appears not to have been and monitoring of specific of radiation treatment including the energy and field size medical physics staff. Continuation of the radiology service should be maintained in the event of extreme shortages of medical physics personnel in order to maintain the safety and quality of the clinical program.

The Ottawa Orthovoltage Incident

Report of the Panel of Experts convened by Cancer Care Ontario

Peter Dunscombe, Ph.D.

Harold Lau, M.D.

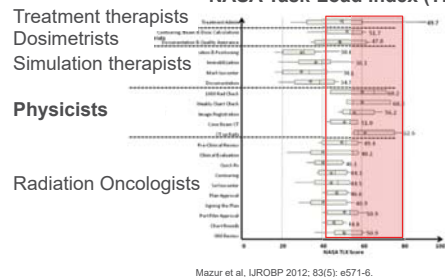
Susan Silverthorne, M.H.S.A.

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Workload levels

NASA Task-Load Index (TLX)



NASA TLX > 55 considered "high workload"

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Physicist responsibilities



Audience poll

Efficiency: What can you do?

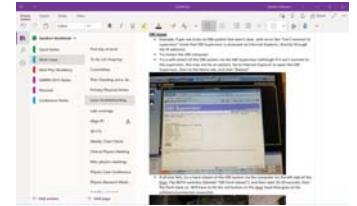
Obviously there are a lot of things that are outside of your control, but what can you do personally?

Disclosure:
My personal perspective

Stay organized

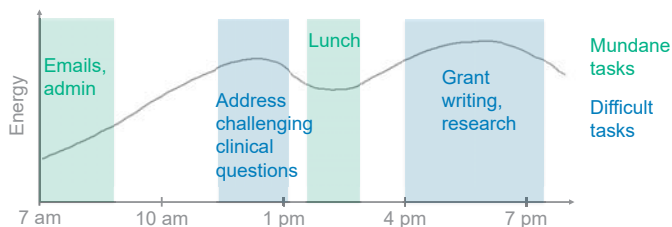
Find a system that works for you, and ideally one that can be taken with you

- Examples:
- Calendar synced between all devices
 - OneNote notes synced to all devices



Time management

- Work with your daily energy cycle
- Daily highs and lows are normal and should be listened to



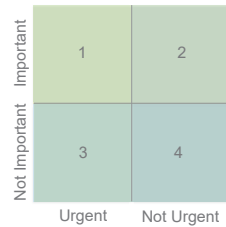
Prioritize

- Learn and recognize your own limitations
- You can't do everything



Prioritize

- Prioritize your to-do list – what NEEDS to be done, and what can wait?



Make time for wellness

Find something that makes you happy, and schedule it in



Make time for wellness

Need a reference?

From Burnout to Engagement: The Outlook for Medical Professionals' Wellbeing and Patient Safety
 Monday - 7/15/2019
 4:30 PM - 6:00 PM
 Room 302

PLOS ONE Peer-Reviewed Open Access Journal

Healthcare Staff Wellbeing, Burnout, and Patient Safety: A Systematic Review
 Louise H. Neal, Lisa J. Smith-Jones, Jani D. Arentz, and David O. Connor
 PLOS ONE | DOI:10.1371/journal.pone.0193013
 Published online 2019 Jul 9

- Significant correlation between poor well-being and worse patient safety in 16/27 studies measuring well-being
- Significant association between burnout and patient safety in 21/30 studies measuring burnout

Support network

Surround yourself with good people

- Mentors
- Coworkers
- Past colleagues
- Friends and family

Take time to build and nurture your support network

- Conferences
- Coffee, beers, surfing
- Touch base

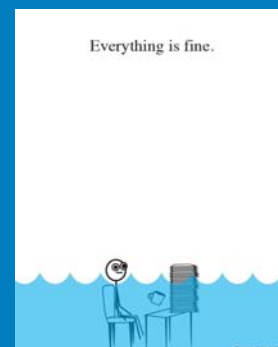
Dear family and friends,

The power of the 'Touch Base' is that it allows you to reach out to your support network when you need it. It's a simple but powerful way to stay connected and supported. Whether it's a quick text, a phone call, or a face-to-face meeting, taking time to touch base can make a big difference in your well-being.

Learn when to say no

... But be strategic about saying no

- Say yes to big boss's requests, things needed for promotion/ advancement
- Say yes to colleagues when you do find time, to maintain your support network and be a valuable team member
- Never compromise safety
- When in doubt, consult with your boss



When in doubt, ask for help

- Use that support network
- Talk to your boss about modifying your responsibilities
- Don't forget to reply to others' calls for help we can!



Efficiency: What can we do?

Automate

- Improve efficiency of clinical processes
- Eliminate opportunity for human error
- Free up time for innovation/etc.

Focus

- Tasks that add value and use our unique skillset
- Delegate menial tasks or hire assistants
- Redefine role of physicist?

Redesigning the Planner and Physicist Roles in the Era of Automated Planning	Monday - 7/15/2019	add to vcal ical
Professional Symposium	7:30 AM - 8:25 AM	PLANNER: add heading all talks
		Room: 302

Efficiency: What can we do?

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Collaborate

- Don't reinvent the wheel
- Use your network
- Share any tools you create

Communicate

- Incident learning systems
- Medphys Listserv/ other
- Publish

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Acknowledgements

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