POINT/COUNTERPOINT

Suggestions for topics suitable for these Point/Counterpoint debates should be addressed to Habib Zaidi, Geneva University Hospital, Geneva, Switzerland: habib.zaidi@hcuge.ch; Jing Cai, The Hong Kong Polytechnic University, Hong Kong: jing.cai@polyu.edu.hk; and/or Gerald White, Colorado Associates in Medical Physics: gerald.white@mindspring.com. Persons participating in Point/Counterpoint discussions are selected for their knowledge and communicative skill. Their positions for or against a proposition may or may not reflect their personal opinions or the positions of their employers.

Telecommuting: A viable option for medical physicists amid the COVID-19 outbreak and beyond

Holly Lincoln, MS
Department of Therapeutic Radiology, Yale New Haven Hospital, New Haven, CT 06510, USA (Tel: 860-444-4724; E-mail: holly.lincoln@yale.edu)

Rao Khan, Ph.D
Department of Radiation Oncology, Washington University School of Medicine in St. Louis, St. Louis, MO 63110, USA (Tel: 314-273-0112; E-mail: khanrf@wustl.edu)

Jing Cai, Ph.D., Moderator

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OVERVIEW

The impact of recent outbreak of novel coronavirus disease, COVID-19, to the global healthcare systems is unprecedently enormous. Like many other clinical disciplines, medical physics has encountered unique challenges during this special period in wider aspects from clinical practice, research, administration to education. As hospitals implement various preventive and control measures to contain the virus, medical physicists are asked to perform nonessential activities by telecommuting or work-from-home (WFH) in many places. While some welcome the adoption of telecommuting as a viable working option, others raise concerns about various potential downsides. This is the premise debated in this month's Point/Counterpoint.

Arguing for the proposition is Holly Lincoln, M.S. Ms. Lincoln is a Regional Chief Physicist at Yale-New Haven Hospital and Lecturer for the Department of Therapeutic Radiology, School of Medicine at Yale University. She received her M.S. in Radiological Medical Physics from the University of Kentucky in 2007. Ms. Lincoln has contributed to AAPM including service to new professionals, leadership initiatives, and continuing professional develop. She chairs the AAPM Summer School Subcommittee, is a member of the AAPM Board of Directors, and actively contributes to ACR's Radiation Oncology Practice Accreditation program. Ms. Lincoln has served locally as the AAPM Connecticut Chapter President and currently as Chapter Representative. She is certified by the American Board of Radiology in Therapeutic Medical Physics.

Arguing against the proposition is Rao Khan Ph.D. Dr. Khan is an Associate Professor of medical physics at Washington University in St Louis (WashU). Dr. Khan received Ph.D. in medical physics from McMaster University in 2003. Since then, he has worked in Canada and the United States. He is the founding director of the medical physics graduate and certificate programs at WashU. Dr. Khan has expertise in stereotactic radiosurgery, SBRT, brachytherapy, and proton therapy. He has published in diverse areas of mathematical optimization for modulated radiotherapy, in-vivo range verification for protons, education analytics, and experimental dosimetry and spectroscopy. Dr. Khan has certification from the ABR and fellowship from CCPM in medical physics.

FOR THE PROPOSITION: HOLLY LINCOLN, M.S

Opening Statement

As we move forward in the unchartered waters of the COVID-19, we find ourselves constantly adapting. Each day presents a new challenge with new recommendations. As of April 18, over 690,000 cases of COVID-19 have been reported in the U.S. alone.[1] Understanding the spread of the disease is critical to prevention. However, because of the novelty of the virus, there is much unknown. What is known is

that the transmission rate is high via person-to-person interactions and healthcare systems are expected to become overwhelmed.[2,3]

In response to the high transmission rate of the virus, federal, state, and local officials have closed schools and businesses, and restricted community gatherings of people. As COVID-19 cases and death counts climb, the healthcare community is faced with the challenging task of maintaining high quality care, while maximizing protection of patients and healthcare workers. Given the long life of this virus on surfaces and the prevalence of asymptomatic viral shedding, it is critical that radiation oncology clinics limit the number of people in the department, particularly given the high observed mortality of cancer patients who contract COVID-19.[4,5] This is not only essential for patients, but limiting staff interpersonal contact also serves to reduce workforce depletion due to illness of radiation oncology professionals. Cancer care continuation depends on the health of the radiation oncology workforce.

Medical physicists, vital to the operation of a radiation oncology clinic, can remain so without physical presence. Many clinically related tasks can be performed remotely, in full compliance with stay-at-home orders. With proper IT support and remote capabilities, treatment planning, initial plan and chart review, weekly chart review, and other chart documentations can be efficiently performed from home. Additionally, quality assurance analyses can be managed remotely. Treatment procedures which require physical presence, such as brachytherapy and stereotactic tadiosurgery, remain supported by a Qualified Medical Physicist.[6,7] To address this, many clinics are providing onsite medical physics coverage on a rotational basis.

Patient-related work is not all that a medical physicist can offer while telecommuting. Medical physicists are integral in many remote-friendly tasks: chart rounds, writing of new policies and procedures, software data migration, reviewing accreditation compliance, progression of departmental quality improvement initiatives, and incident learning analysis.[8–10] Teleworking medical physicists have also supported research projects, prepared for future clinical endeavors, conducted literature reviews, and evaluated educational materials. With some ingenuity, the remote working medical physicist can make meaningful contributions to their profession and institution's own practice.

Telework should be supported in medical physics. Without commutes and the usual office distractions, teleworking improves perceived efficiency.[11] Preliminary data from my own institution suggests that physics chart reviews are completed faster while working from home. Given the concerning data that >40% of medical physicists experience burnout, increasing work-life balance through flexible work options is a novel solution, which also could improve patient safety with less burnout of healthcare workers.[12] Through these days of the COVID-19 pandemic, we will gain necessary experience to evaluate productivity and effectiveness of telecommuting medical physicists. The future of medical physics talent acquisition and retention may depend on it.

AGAINST THE PROPOSITION: RAO KHAN, PH.D

Opening Statement

Of 100 million waged and salaried Americans on an average working day in 2018, about 21% worked for 2–3 h at home.[13] The share of telecommuting or work-from-home (WFH) continues to grow, since 2003. Although new technology and tools like Internet of Things (IoT) have provided some relief, the stigma of 'being at home' and **not** the workplace still hangs over workers. WFH even in major corporations continues to be treated as a perk. The whole notion of WFH inherently suffers from lack of face-to-face interactions, which provide enriched verbal and nonverbal cues, emotions and empathy, challenges of ambiguous situations, and absence of feedback, rewards/ reprisals.[14] The current technology for WFH is marred by software glitches, communication lags, and HIPAA compliance[15] issues to replicate an apparition let alone replacing a physical being. Due to ongoing episode of COVID-19,[16] social distancing to "flatten the curve" and high risk of infections in healthcare workers have led to partial WFH in a majority of cancer clinics worldwide. To understand why WFH will not become a norm for medical physicists is inherent in their clinical roles, infrastructure ill preparedness, perception on part of management, and regulatory requirements.

The medical physicist's scope of practice categorizes their activities into administrative, clinical services, education, Informatics, equipment performance evaluation, quality, and safety.[17] Physicists in clinical service provide support to clinicians in various scenarios, for example, acceptance and commissioning of new equipment, dosimetry services, planning, patient's chart review, documentation, radiation safety, and various levels of quality assurance (QA) etc. All of these tasks require teamwork, crosschecking, direct and indirect supervision, and at times providing consultation and face-to-face patient interactions.[18] Rationale regarding a physicist's presence for a complex procedure can be regulatory, quality. and safety concerns, or simply to enrich the quality. In a disruptive scenario, such as current pandemic, some requirements can be relaxed in favor of personnel safety until normalcy can be restored. However, tasks requiring the presence of an authorized medical physicist mandated by state, or federal regulations such as high dose-rate afterloaders, Gammaknife™, Gammapod™, MRIdian™ ^{60}Co system[19,20] are indispensable. Procedures related to treatment safety e.g. total body irradiation (TBI), stereotactic-body radiation therapy (SBRT)[21] patient setup, and QA activities may still need physicist's presence. The tasks in the category of quality improvement and reviews may be performed remotely such as dose-planning, chart reviews to some extent by sacrificing efficiency. In response to the COVID-19 outbreak, radiotherapy clinics have tended to treat only essential patients and use hypo-fractionation where possible. The dilemma is that if the physicists were to WFH, there is a serious risk to the safety of hypo-fractionated treatments with only a handful of RT staff onsite. Patient- or machine-specific QA is typically

performed after clinical hours by a physicist or physics-supervised individuals observing social-distancing guidelines and sanitization protocols. WFH to whatever degree may only be conceivable for medium-to-large size academic centers, but unthinkable for a majority of small clinics with one or two physicists on staff.

Research and development has been the cornerstone for all technological innovation of our profession. Without access to research facilities and students, just WFH would "flatten" the progress of the field. As educators, physicists are involved in graduate teaching and supervision, and training medical physics and allied residents, a comprehensive learning includes presence and direct supervision by mentors not ghosts operating from the virtual world.

Finally, a modest number of physics professionals in the USA work on nonimmigrant visas having restrictions regarding the location of the employer and telework. Therefore, supporting the proposition as a new norm is not a viable option.

REBUTTAL: HOLLY LINCOLN, M.S

My colleague, Dr. Khan, makes compelling arguments against the notion that teleworking medical physicists will become a new norm. However, the days, weeks, and months of COVID-19, required adoption of this practice, have demonstrated practicality. And it's not only medical physicists, businesses and other professions are re-evaluating use of remote capabilities during this unprecedented time. Our physician colleagues are maximizing the physical distancing that telemedicine offers, although many have been doing so for years now.[22,23]

Dr. Khan makes the argument that research, teaching, and clinical activities are limited by access, and network security. Making use of the advancements in technology, teleworking physicists can access electronic medical records, record and verify and treatment planning systems, as well as a host of ancillary software through virtual private network access without compromising security. Lack of physical presence of students is a limitation to telecommuting, however, with today's communication being primarily phone and email, much can be accomplished from a distance. Likewise, clinical collaboration in departmental initiatives and chart rounds, can be successful by way of virtual meetings as is already the case with multisite institutions.

Many studies have shown the effectiveness of e-learning and blended learning methods for health professions.[24] Distance learning allows the socially timid to request clarification or offer ideas during meetings or lecture through chat features, providing another way to be heard within their comfort zone. Radiation-oncology professional meetings that utilize written questions and answers have seen a large increase in submitted questions compared to the oral questions, suggesting the prevalence of this social inhibition.[25]

Many direct patient care activities that Dr. Khan and I have discussed benefit from onsite physics support. For those, as well as equipment performance QA and calibration, there's no contest. The medical physics profession will always require physical support to ensure the quality and safety in targeted delivery of radiation therapy. In the case of multi-physicist staffed radiation-oncology clinics this can be managed by distributed coverage. As for remaining charges, clinical and extra-clinical, medical physicists can offer substantial contributions, with potential benefits including increased organizational commitment, job performance and satisfaction, all while reducing the carbon footprint.[14]

REBUTTAL: RAO KHAN, PH.D

My esteemed colleague argued that the physicists could still be relevant, efficient, and have work-life balance without any boots on the ground. Let's review these more carefully:

Physicists have an important role in troubleshooting operational issues, impromptu decision-making, and supporting clinical staff. WFH would replace the benevolent human face with an impersonal image. This is becoming even more critical with the new image guided approaches breaking new grounds. The complexities of treatments are ever demanding and require teams of physicist and clinicians to be on the machines for prompt decisions e.g. online-adaptive treatments, cardiac ablation etc. Besides, the physicist's presence for certain traditional procedures e.g. *in vivo* dosimetry, patient setup, surveys, preparation of ^{90}Y doses etc. is irreplaceable.

There is a prevailing myth that telecommuting would reduce staff burnout and improve family life. Instead, mass media lately reported of increased family violence and spousal abuses with recent stay-at-home orders. Alhough the e-mails have brought access and comfort, they have been maligned for enslaving workers.[26] Several European governments had to legislate requiring that employees have uninterrupted rest by "disconnecting communication tools". WFH for a physicist with no defined start and end times would upset the delicate work-life balance, taking us back to serfdom. With administration eyeing staff-cuts under new alternative payment model and ongoing revenue losses following COVID-19, physicists should not fall for the lure of telecommuting. Micromanagement is another challenge for the managers who can no longer oversee the work in person; it would necessitate relearning management skills.

Even the greatest proponents of remote work Yahoo, Google, and IBM have changed course a few years ago. IBM scrapped its idea of telecommuting in 2017,[27] Google preferred to keep confidential code in-house under tight control and Yahoo thought that the best decisions and insights come from hallway and cafeteria discussions.

Current WFH technology was pushed into limelight due to the recent outbreak. Within weeks, we are fluent in terms as Zoombombing,[28] credentials piracy, cloud glitches, connection drops, and other privacy issues.[29] Using even the HIPAA compliant software for protected health information is a challenge with other individuals sharing home.

As we continue to evolve toward Medical Physics 3.0 aspirations, even more specialized techniques for human health are looking to embrace us in person – not our shadows. While

the natural disruptions are an exception for telecommuting or WFH, I beg to differ from my colleague that it will become the new norm in "peace time" practice of medical physics.

CONFLICTS OF INTEREST

None.

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